

# Transition Expertise

Cognitive factors and developmental processes  
that contribute to repeated successful career transitions  
amongst elite athletes, musicians and business people

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## **Abstract**

This thesis examines the nature of transition expertise which enables individuals to make repeated successful transitions over the course of their career. It addressed four areas that contribute to transition expertise: 1) cognitive flexibility that enables the generalisation of expert knowledge and processes; 2) inferential and inductive cognitive mechanisms that enable expertise to be generalised; 3) personal intelligences that are used to support transitions; and 4) practical intelligence as it supports performance contextually during transitions.

The study used retrospective interviews to gather data from elite performers in three fields who had made successful career transitions: sports people who become national coaches or heads of national bodies; successful musicians who become heads of faculty or principals of a conservatoire; successful business people who become senior vice presidents or CEOs.

Participants were able to generalise expert knowledge and processes beyond their primary domains, contrary to widely held views about the domain specificity of expertise. Cognitive flexibility enabled this generalisation and was developed through broad based training, early exposure to multiple domains and the early use of generative cognitive processes during the development of primary domain expertise. Inductive, inferential and analogical cognitive mechanisms were the main tools through which expertise was generalised during transitions.

Personal intelligence contributed to transition expertise. Intrapersonal intelligence enabled individuals to understand how their abilities, values and motivations shaped their career progression. Interpersonal intelligence enabled individuals to respond effectively to the requirements of their peers, direct reports, stakeholders and organisational context. Contrary to expectations, self regulatory processes did not play a central role in the management of transitions.

Practical intelligence enabled transition expertise. It involved more than applying subject-area and tacit knowledge. It encompassed the abilities to: identify and resolve problems; manipulate environmental objects in the form of administrative tasks, schedules and plans; utilise resources in terms of people and materials; and shape their environment, corporate structures and culture.

Transition expertise develops and evolves over the course of a career as it uses convergent and divergent cognitive processes, inductive mechanisms, personal awareness and cognitive pragmatics to address issues of increasing scope and implication. While motivational factors, self belief and personality resiliency are important contributors to transition expertise they did not form part of this study.

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## IV. Terminology

There are a many different uses of terminology in the study of human behaviour and performance. Words can be used almost interchangeably by some theorists whereas others will use narrow, specific definitions and even attempt to expropriate terms for their exclusive use. Words that are part of everyday vernacular are often given very specific denotations. Consequently I would like to clarify how some common terminology will be used in this dissertation.

*Intelligence* definitions vary widely. They can be narrow or broad, more trait or more cognitively based, more knowledge related or more general, and more inherent or acquired. Some elements of intelligences are more tied to specific types of performance e.g., mathematical or verbal, others are broader e.g., *gc* and *gf*, while still others are more generic e.g., inference and induction. Intelligence in this study will mean the collection of traits, abilities and cognitive processes possessed by humans to vary degrees. Most of these can be developed.

*Abilities* are componential elements of intelligence and expertise. For example, expertise might be composed of cognitive, psychological, or physiological abilities which enable one to make effective financial decisions, perform in a concert hall or react faster to a moving ball. Abilities are both innate and developable. I will use abilities to identify elements of intelligence which may also be elements of expertise.

*Giftedness* and *Talent* are often linked with intelligence and sometimes used interchangeably. Some associate talent with achievement and giftedness with



potential. Others reverse this relationship. Both terms have been associated with expert performance and can often be tied to a particular domain. I will avoid using the terms talent and giftedness and focus on intelligence and expertise.

*Domain* is a particular arena of endeavour or activity with associated abilities, processes, and knowledge. A domain in which one performs might be chess, orthopaedic surgery, football, the piano, chemistry, opera singing, mathematics, stock trading, engineering psychotherapy, politics, acting, etc. A domain may use abilities or elements of intelligence but these abilities are not inherently tied to a specific domain e.g. mathematical intelligence might be used by a mathematics professor, an accountant, an engineer and an equities trader. Someone with kinaesthetic intelligence may be a football player, a dancer or actor.

*Field* describes the socially defined arena in which a specific domain operates. So for example the field of football will include the striker who scores goals, the goalkeeper who defends the goal, the coach who trains the striker and goalkeeper, the manager of the team, the referees, board of directors, the fans, the television commentators, etc. It also includes the domain knowledge, agreed social norms for the field, the physical arenas in which individuals perform, etc. I will use it most often to describe the various career stages, positions, roles and functions associated with the domains under discussion

*Expertise* is the aggregation of abilities, skills, and knowledge which produce high levels of performance in a specific domain e.g., ‘He is an expert equities trader’ or ‘She is an expert pianist.’ Expertise is usually determined through 1) recognition of high achievement by others in the same field and/or 2) meeting high standards of achievement in a domain as determined by tests, performance

and other more objective measures. *Expert processes* are used to acquire, store, retrieve and apply *expert knowledge* to achieve *expert performance* in a domain.

An *expert* is someone who demonstrates expertise in a specific domain.

*Primary domain* will refer to the performance domain in which an individual first attained expertise e.g. cycling, playing the violin, and engineering. *Secondary domain* will be used (somewhat more generally) to describe any of the career positions taken up in the same field after an individual completes their performing phase in the primary domain e.g., when a cyclist has moved to coaching function, when a violinist becomes head of strings faculty at a music college, when an engineer takes on the design strategy for the power train of a vehicle. This differentiation between primary and secondary domains is mostly one of convenience for comparison within this study.

*Transition* in the general study of the lives of human beings can be used to describe any change from one life situation to another such as marriage, illness, moving home, etc. In this study it will be used to describe *career transitions* which involve movement to different positions within the same field e.g., from pianist to professor of piano.

*Characteristic* is used in two ways. One is more theoretical as when used most often in theories of personality such as “perseverance seems to be a characteristic of individual who make transitions...” The other is more general such as “the approach to the study will have several characteristics...” *Attribute* has similar double usage. It can be used in attribution theory for example, “An individual

will attribute an external locus of control when...” and in more general usage such as “One of the attributes of second stage transitions is that...”

## V. Preface

This project is the outgrowth of an impasse I reached in my career as a psychologist and performance consultant for athletes, business people and musicians. In the early part of my career I helped individual performers develop their full potential and achieve optimal performance in their expert domain – some would say with relative success. I applied performance related academic research in the field and wrote about my experiences. As I began to work with more senior individuals, I was increasingly asked to help them make transitions to new career roles or to recover from difficulties they encountered in a transition to new role. Often they found it challenging: successful and affluent financial traders struggled to lead a department of similar traders; elite athletes encountered obstacles when building a career as a coach or manager; musicians who were brilliant performers on the world stage didn't know how to head up a faculty of music. The more I worked with these leaders in their fields, the more I was confronted with a fundamental dilemma: despite my years of relative success I couldn't say why or precisely how I was successful in coaching transitions or why I failed.

I tried to rectify my lack of understanding by surveying the literature related to the field of career transitions. I was disappointed: the literature was often outdated, directed at identifying the skills required for new roles, and often more concerned with how to achieve stability in a new position rather than manage the transition itself. Career transition models (mostly from the business community) that did attempt to explain transitions were often full of 'folk-wisdom' and

developed relatively anodyne processes with stage names like arriving, surviving, and thriving. More problematic was that many addressed transitions in terms of dealing with issues like fear, anxiety, and control which had not characterised many of my experiences in coaching transitions in which I encountered enquiry, ambition and excitement. Few models provided satisfactory explanations for the cognitive abilities and skills used to successfully manage career transitions repeatedly. So after 30 years of working in the profession I decided to stop coaching, go back to school and discover more about the fundamental principles and processes of what I have come to call *transition expertise*.

Because the structure of this dissertation may vary from a standard approach in that the theoretical discussion is spread over several chapters rather than frontloaded, a brief summary will be useful.

***Part 1*** will consist of three chapters presenting the context and objectives of the dissertation and the methodology of the study used to collect the data.

*Chapter 1. Introduction* will introduce the concept of expertise and then give an overview of major theoretical approaches to the study of career development and career transitions. The review will look for common themes across models which might indicate the nature of transition expertise. The chapter will then identify the major areas which will be studied in the dissertation and focus in particular on the cognitive processes associated with expertise and intelligence.

*Chapter 2. Methodology* will discuss the theory behind the decision to use qualitative methodology, why retrospective interviews in particular were used for collecting data in the study and the process used for the analysis of the data.

*Chapter 3. The pilot and the main study* will explain the reason for the use of a pilot study and a main study and describe the two studies conducted in this project. It will explain how the main study was modified in light of some methodological shortcomings and some preliminary theoretical outcomes that were identified in the pilot.

**Part 2** will consist of four chapters, each of which will address one of the major theoretical areas under consideration in this dissertation and their operation in career transitions. Perhaps atypically, the theoretical review will be spread over these four chapters so that the analysis and discussion of the data take place in proximity to the relevant theory. Each chapter will be structured in the same way: firstly a review of the appropriate literature and theory, then analysis of the data and finally a discussion of the data in light of the theory.

*Chapter 4. Expertise and expert generalisability* will give an overview the major theories of expertise and identify some of their most important cognitive structures and processes. It will address specific issues which affect cognitive flexibility such as encoding specificity, deliberate practice, reductive bias, automatisisation, and functional fixedness. It will then discuss how they may constrain the generalisation of expert knowledge and processes that have been acquired or developed in the primary expert domain to secondary domains and subsequent career stages. It will then investigate how cognitive flexibility can be developed in ways which mitigate these limitations.

*Chapter 5. Intelligence and inferential processes* will present an overview of the major approaches to the study of intelligence. It will focus primarily on those cognitive factors or mechanisms which support cognitive flexibility and the generalisation of the cognitive processes and knowledge from one domain to another. It will then investigate how these factors – inference, induction and analogy in particular – operate to generalise expert knowledge and processes during transitions.

*Chapter 6. The personal intelligences in transitions* will review the important place given to intrapersonal and interpersonal intelligence in most models of intelligence. It will explain how intrapersonal intelligence provides self awareness, self control, and the ability to adapt consciously to changing circumstances during transitions. It will then explain how interpersonal intelligence enables individuals to situate themselves in their context, learn from their environment and respond appropriately during transitions

*Chapter 7. Practical intelligence in transitions* will review this somewhat awkward but useful conceptualisation of an area of intelligence theory which provides a ‘basket’ into which a variety of real life applications of intelligence can be collected and studied. The main focus will be on three common forms of practical intelligence as they operate during transitions: problem resolution, administrative organisation and the use of environmental resources.

**Part 3** will consist of three chapters which will identify and review the overall patterns and findings of the study as they elucidate the operation and

development of transition expertise. It will include the conclusion to this dissertation.

*Chapter 8. Transition expertise over the career cycle* will revisit the career cycle and the stage transitions discussed in the first chapter. It will also review further theories about the development of intelligence and expertise in adults and their correspondences with adult developmental theories such as wisdom models of expertise and evolving self-concept models. The development and evolution of transition expertise over the course of a career will be discussed in light of these models and the supporting evidence in the data.

*Chapter 9. The transition process and transition expertise* will review the transition process itself and in particular the movement from a stable career position through an unstable transition process to a different but stable new position. It will then discuss some important types of transitions including reactive transitions, initiated transitions, failed transitions, and choices to not transition. It will examine the operation of convergent and divergent cognitive processes during transitions and how these provide further insight into the nature of transition expertise

*Chapter 10. Conclusion* will summarise the findings of the dissertation, present general conclusions drawn from these findings, and suggest areas for future study.



# Chapter 1. Careers, Career Transitions and Transition Expertise

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## Introduction

*Expertise* is generally defined as superior performance in a domain as agreed by expert representatives for the domain or by an established measure of expertise: a concert pianist, a Wimbledon champion, a Nobel Laureate scientist, an accomplished Shakespearian actor, a famous sculptor, a successful politician are all experts in their domains. Indeed there are expert ‘tinkers, tailors, soldiers and sailors.’ The pursuit of expertise extends uninterruptedly throughout Western history. Socrates and Plato sought to elicit the highest standards of ethics in young leaders while the Sophists taught excellence in oratory and the law. The medieval guild system developed its expertise hierarchy of *Novice*, *Initiate*, *Apprentice*, *Journeyman*, *Expert* and *Master*. The universities in the Middle Ages developed a curriculum of *trivium* (Latin, rhetoric and logic) and *quadrivium* (arithmetic, astronomy, geometry and music) to educate and promote expert scholarship. The systemisation of knowledge by the Encyclopaedists and the music guilds of Baroque Germany are illustrations of the pursuit of expertise in the enlightenment. The reintroduction of the Olympic Games by D’Coubertin sought excellence in body and mind.

Three studies in the 2<sup>nd</sup> half of the 20<sup>th</sup> century set the benchmark for studying expertise. Anne Roe (*The making of a scientist*, 1952) interviewed leading scientist in United States to identify what characterised individuals who were “the *best* men in each field” (Roe, 1952). Harriet Zuckerman (*Scientific Elite*:

*Nobel laureates in the United States*, 1977) interviewed American Nobel Laureates focussing on how future Laureates found study opportunities, worked with expert mentors and were socialised into the world of the scientific elite. Benjamin Bloom's (*Developing talent in young people*, 1985) study of talent identified how gifted young people developed to their full potential in adulthood. It was conducted across several domains: 1) athletic or psychomotor talent, using Olympic swimmers and world class tennis players; 2) aesthetic, musical, and artistic talent, using concert pianists and sculptors; 3) cognitive talent, working with research mathematicians and research neurologists; and 4) interpersonal relations talent.

Specific models of expertise have emerged more recently in the form of the *General theory of expertise* (Chase & Simon, 1973; Richman et al., 1995a; Gobet & Simon, 1996a); the *Expert performance approach* (Ericsson, Krampe & Tesch Römer, 1993; Ericsson, 1995); and *Mental model paradigms* such as frames and schemata (Minsky, 1975; Rumelhart & Ortony, 1977; Zeitz, 1997).

The fields of *talent*, *creativity* and *giftedness* have been researched extensively by Koestler (1964), Tannenbaum (1983), Csikszentmihalyi (1990), Runco (1992), Amabile (1996), Simonton (1988), Gagné (2000), Sternberg (2003), Renzulli (2005), and others. Their research has regularly overlapped with the study of intelligence or expertise and in the process there has been considerable entanglement of conceptions and components of giftedness, talent, creativity, intelligence and expertise.

*Transition expertise*, the object of this study, is oxymoronic. Expertise is generally considered to be a relatively homeostatic or stable state. It is achieved

over time through a combination of ability, training, dedication, and sometimes good fortune. Transition on the other hand is an unstable, non-homeostatic state: a change in careers, a dropping of old patterns to adopt new ones, dealing with ambiguity and uncertainty, moving from a homeostatic state into a non-homeostatic state. But in this apparent conflict resides the particular value and, consequently, objective of this dissertation. Transition expertise, can be defined as: *the skills and abilities to manage oneself, one's performance and one's environment in ways that produce repeated and successful non-homeostatic transitions between one homeostatic career stage or position to another.* What is it that characterises or is acquired by individuals who are consistently able to make successful transitions in a way which sets them apart from their peers? Can the key components of transition expertise be identified and measured? Is there such a thing as a transition expert?

This study will focus particularly on experts who make repeated successful career transitions through their career up to senior positions in their field of expertise: a clarinettist who becomes principal of a faculty of music, a yachtsman who becomes chef d'Equipe of an Olympic team, a chemist who becomes chief scientist of a major energy company. All the participants in this study will have been experts in their primary domain. These three criteria – expertise in a domain, careers in the same field as their primary expertise and repeated successful career transitions to very senior levels in their field – are the main characteristics of the participants in this study.

Before questions about the nature of transition expertise itself can be answered, it is necessary first to understand careers, how they develop over time and the

process of career transitions in particular. Consequently, this introductory chapter will have four parts which will present an overview of the major theoretical issues and models that concern careers and career transitions and identify the major theoretical model that will be used understand the nature of transition expertise. *The first part* will briefly review the most relevant of the multitudinous theories of career development and transitions. *The second part* will identify common patterns shared by these theories for the major career stages and the transition processes which individuals go through between stages. *The third part* will then give an overview of the main theoretical areas of research that will be addressed in this dissertation: Intelligence, Expertise, Cognitive Flexibility, Inferential Mechanisms, Personal Intelligence and Practical Intelligence. Together these will be considered to constitute the main cognitive elements of transition expertise to be studied in this project. I will briefly summarise the broader research issues associated with these areas and then identify the central questions I will be asking as to how these abilities, skills and cognitive processes might operate during transitions. I will then compare these to similar elements found in the main career theories. *The fourth part* will identify a further area of interest for this dissertation: the construct of Self Concept and how it may evolve over the course of a career with specific reference to changes in and development of the foregoing elements of transition expertise.

## 1.1. Career theories

### 1.1.1. Career cycle or career stage models

Early career development models tied career development to the personal life cycle and the development of identity over the course of one's life. Most theorists developed models with distinct career stages. Miller and Form (1951) identified five career stages: Preparatory work period, Initial work period, Trial work period, Stable work period, and Retirement. Hall and Nougaim (1968) identified five similar stages: Pre-work, Establishment, Advancement, Maintenance, and Retirement. Dalton and Thompson (Dalton, Thompson & Price, 1977) developed a four stage professional career model consisting of Working under direction of others, Going into depth in one area, Developing greater breadth of experience and Providing direction to others. Super (1963) conceived of career development based on an evolving self concept employing self perception and self assessment in relationship to factors like race, gender, social class, education, abilities, characteristics, and physical attributes. It also had five stages: Exploratory, Growth, Establishment, Maintenance and Decline. Psychologically based development models are best represented by Erikson's (1985) *epigenic matrix* which mapped the relationship between psychosexual development, life stages and a series of 'psychological crises' mostly concerned with relationships and identity.

Levinson's *life cycle model* (Levinson et al., 1978; Levinson, 1986) is a highly regarded adult developmental model. His *life structure* is similar to Super's self concept and is the "underlying pattern" of a person's life which is a continuous and evolving process that reflects the way the aspects of the self are lived out,

how the socio-cultural world impinges on the individual, how the individual participates in the world and the choices they make. An individual goes through a sequence of relatively orderly *developmental eras* and *transition periods* in their life which alternate between 6 structure-building stable periods and 5 structure-changing transition periods (Figure 1.1).

Figure 1.1. Levinson Life cycle model: From Levinson (1978)

		65	Late Adulthood
60		LATE ADULT TRANSITION	
55		Culmination of Middle Adulthood	
50		Age 50 Transition	
45		Entering Middle adulthood	
40		MID-LIFE TRANSITION	
33		Settling down	
28		Age 30 Transition	
22		Entering the Adult World	
		EARLY ADULT TRANSITION	
		Childhood and Adolescence	

Transitions are a part of Levinson’s model. For example, in the three major transition periods – Early Adult, Mid-Life, Late Adult – the life structure is subject to major changes and the course of life to major redirection. But these transitions are viewed as stages in a career and can often last for 5 years. They also concern major revisions of identity and purpose rather than the processes for successfully managing a particular career transition.

Edgar Schein (1978) proposed a *work career cycle* (in addition to a biosocial and family cycle) which has been widely recognised as mapping the major stages of the work life of an individual. It is linked to age over the course of a life-time but not explicitly tied to personal or familial development (Figure 1.1).

Table 1.1 Stages and tasks of the career cycle. Based on Schein (1978)

STAGE	AGE	ROLE
1. Growth, fantasy, exploration	Age 0-21	Student, aspirant, applicant
<i>Passage into an Organisation or Occupation</i>		
2. Entry into world of work	Age 16-25	Recruit, entrant
3. Basic Training	Age 16-25	Trainee, novice
4. Full membership in early career	Age 17-30	New but full member
5. Full membership, midcareer	Age 25 +	Full member, tenured member, life member, supervisor, manager
6. Midcareer Crisis	Age 35-45	
7. A. Late career in non-leadership role	Age 40- retirement	Key member, individual contributor, member of management. Good contributor or deadwood
<i>Passage through Inclusion and Hierarchy Boundary</i>		
7 B. Late Career in Leadership Role	Age 40- retirement	General manager, officer, senior partner, internal entrepreneur, senior staff
8. Decline and disengagement	Age 40 – retirement	
<i>Passage Out of the Organisation or Occupation</i>		
9. Retirement		

Schein’s career cycle is noteworthy for its diverging paths at stage 7 where an individual either peaks in their career cycle, most often staying in their field of specialisation, or continues to progress within the organisation often moving laterally away from their main area of specialisation before continuing a hierarchical progress. To explain such lateral moves Schein (1978) developed a three dimensional organisational model (Figure 1.2) which shows how an individual making a transition may move along one of three different dimensions that are regulated by boundaries that maintain the identity and consistency of the organisational culture. The three dimensions are:

1. *Hierarchical (promotion)* in which an individual moves up a hierarchy increasing rank and status usually accompanied by increase in power, authority and control over resources.
2. *Inclusion (membership)* in which one moves from the outside to the inside of an organisation or visa-versa without necessarily moving up the vertical ladder e.g., moving to the outside such as running a small but autonomous function in a different country, or to the inside taking up a function with relatively little control over resources but more input into the strategic direction of the organisation.

3. *Functional or technical (rotation)* in which an individual moves around an organisation e.g., from manufacturing to design to marketing which again could be without any vertical progression.

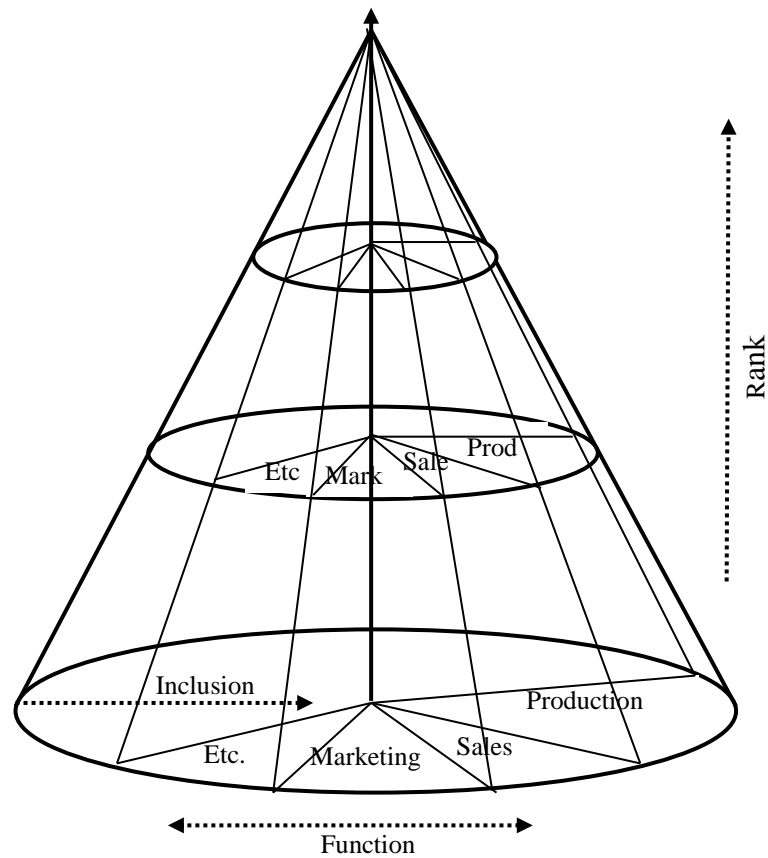


Figure 1.2 A three dimensional model of an organisation. Based on Schein (1978)

Schein proposed that an individual would be most subject to organisational socialisation prior to and during *boundary* transitions, whereas stable career periods an individual would be more likely to engage in innovative behaviour. The model explains why career transitions may not necessarily be hierarchical.

Torbert (Torbert, 2004) used *an action inquiry* approach to develop his leadership development framework (LDF) which identifies progressive developmental stages through which individuals pass (Table 1.2).



*Table 1.2 Leadership stages. Based on Torbert ( 2004)*

Opportunist (5%)	Winning any way possible	Self-oriented, manipulative “Might makes right”
Diplomat (12%)	Avoiding overt conflict	Wants to belong, obeys group norms and rarely rocks boat
Expert (38%)	Efficient problem solving	Seeks rational proficiency
Achiever (30%)	Effective performance	Achieves goals through teams, juggles managerial duties and market demands
Individualist (10%)	Interweaves competing personal and company action logics	Creates unique structures to resolve gaps between strategy and performance
Strategist (4%)	Generates organisational and personal transformations	Exercises mutual inquiry, vigilance and vulnerability for short and long term
Alchemist (1%)	Generates social transformations	Integrates material, spiritual and society transformation

The figures under the name of the stage reflect the percentage of individuals measured by the LDF who fall into its different categories and they follow a more or less normal distribution with the most frequent stages being expert (38%) and achiever (30%). The LDF action-logic model is intriguing because it decouples personal development from hierarchical career positions, i.e. the stages are not strictly sequential and it is possible for an individual to rise hierarchically to the top of an organisation without having traversed all of the developmental stages. For example, while a Strategist and Alchemist utilise more ‘highly developed’ action-logics, an Opportunist or Achiever action-logic might still attain the highest CEO levels in an organisational hierarchy.

For all their different terminology and categories, there are common, progressive stages that run more or less in parallel through the different models (Table 1.3).

Table 1.3 Comparison of adult development models

<u>Erikson</u>	<u>Dalton &amp; Thompson</u>	<u>Super</u>	<u>Torbert</u>	<u>Schein</u>	<u>Levinson</u>
Life Cycle	Career Stages	Self-Concept	Leadership Development Framework	Career Cycle	Seasons of a Man's Life
Infancy; Early childhood; Play age; School age; Adolescence		Exploratory Stage  Age: 0 to14		Growth, fantasy exploration  Age: 0-21	Pre-adulthood  Age: 8-22
Young adulthood - Intimacy vs. Isolation	Working under direction of others	Growth Stage  Age: 14 to25	Opportunist	Entry into world of work Age: 16-25	Early adult transition Age: 17-22
	Going into depth in one area		Diplomat	Basic training Age 16-25	Entry life structure for early adulthood Age: 22-28
Adulthood - Generativity vs. Stagnation	Developing greater breadth of experience	Establishment Stage  Age: 25 to 45	Achiever	Full Membership in early career Age: 17-30	Age 30 transition Age: 28-33
			Expert	Full membership mid-career Age: 25 +	Culminating life structure for early adulthood Age: 33-40
	Providing direction to others	Maintenance Stage  Age: 45 to retirement	Individualist	Late career in non leadership role Age: 40 - retirement  Or...	Mid life transition Age: 40-45
			Strategist	Late career in leadership role Age: 40 – retirement	Entry life structure for middle adulthood Age: 45-50 Age 50 Transition Age: 50-55 Culminating life structure for middle adulthood Age: 55-60
Late adulthood - Integrity Vs. Despair		Decline Stage  Age: Retirement to death	Alchemist	Decline and disengagement Age: 55 until retirement	Late adult transition Age: 60-65
				Retirement	Late adulthood Age: 65 –

### 1.1.2 Transition process models

*Transition process* theories describe specific transitions and associated issues between career stages – though transitions can sometimes take place within a career stage. They are of particular interest to this study for defining the target periods in careers of individuals during which transition expertise will be most operative. Strauss's seminal study *Mirrors and masks: The search for identity* (1959) contributed to the early examination of life transitions. Van Gennep's (1960) *Rites of Passage* was a seminal study of life transitions from a sociological and anthropological perspective which had three stages: separation, where the individual moves away from or lets go of their previous environment or role; initiation, in which they break more completely from their old role, are introduced to their new role and prove themselves in their new role; and reintegration, in which the new role is fully assumed and they move fully back into their social structure. Glaser and Strauss's *Status Passage* (1971) continued the work on identifying the social determined nature of life transitions. More pragmatically, Tiedeman and O'Hara (1963) framed career development in terms of choice and adjustment. Crites (1976) presented a transition cycle that focused on the Early Adulthood or Establishment Stage of his *work adjustment* theory which might correspond roughly to Schein's (1978) Full Membership mid-career or Levinson's (Levinson et al., 1978) Culminating Life Structure for early adulthood. It has five stages: 1) *Career motives* involve the needs and drives for attaining career success; 2) *Task and problems* describes how the individual seeks to meet the requirements of their new role; 3) *Career adjustment* describes the psychological mechanisms for dealing with frustrations, conflict and the accompanying adjustment of goals; 4) *Anxiety or tension reduction* describes

how the individual deals with blocks or frustration through coping mechanism;

5) *Satisfaction and success* describes how the individual has adjusted in a career.

This model was designed primarily to address adjustments to a steady or stable state career rather than the continually evolving careers which are typical of most of the participants in this study. It is also a process which can extend over many years and may involve a number of transitions within it. Nicholson (1984) proposed a process model which had a more narrow scope dealing with a specific transition. It also has five stages: 1) *Preparation* involves anticipation and expectation of a change; 2) *Affect and sense making* occurs during the first few weeks of the new position; 3) *Adjustment* shows how the individual adjusts both themselves and their job role to reduce person/role misfit; 4) *Stabilisation* arises when the person is connected and settled in their role; 5) *Preparation* starts the next transition.

Bridges (1991) proposed a three stage model: *endings* in which individuals let go of the past, attachments, old behaviours and fears of the new; *neutral zone* which is neither the old nor the new and in which the individual is subject to fears, anxiety, self doubt and consequently requires structured processes, goals, small wins, etc. to move through the zone; and *new beginnings* which includes purpose, future picture, vision, planning and having a part to play. The cycle focuses significantly on managing ambiguity and anxiety through structured processes designed to minimise uncertainty and establishes clear, sequential steps for generating a new role, function and career identity. Elsner and Farrands (2006) devised a four stage model: *leaving* last role; *arriving* in a new role and dealing with issues of competence, relationships and trust; *surviving* which involves finding one's own "internal compass", relying on resiliency and self

belief and winning the confidence of others to lead; and *thriving* in which the individual can focus on the “right things” such as the opportunity to experiment, self-awareness, openness to personal change and the confidence to hold uncertainty. They also proposed a reflexive “*Cycle of Enquiry*” (Figure 1.3) during transitions that consists of: “reflecting on experience, reframing understanding, and reshaping practices.”

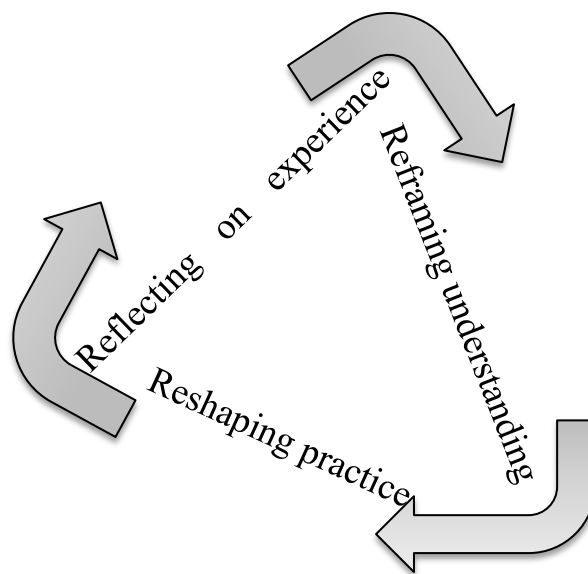


Figure 1.3 The cycle of enquiry. Based on Elsner & Farrands (2006)

Of particular interest is Herminia Ibarra’s (2004) concept of *working identity* which focuses specifically on changing careers to a different field and the identity changes accompanying such a transition away from primary domain expertise, for example, when moving from being a Wall Street banker to becoming a writer or from a professor of Spanish literature to becoming a stockbroker. Ibarra derives her theoretical background in part from Schein’s (1990) work on career anchors, Bridge’s (1991) work on transitions and Hazel Markus’s work on possible selves (Marcus, 1977; Markus & Nurius, 1986).

Markus postulates the existence of multiple potential selves which are not to be confused with psychological constructs like multiple personalities. Such possible selves may include who we think we might become, fear we might become, think we should become, aspire to become, dream of becoming, etc. Using a grounded theory approach to her research, Ibarra discovered that during major career changes individuals who are successful in radical career changes often take time to explore their possible selves before making the career move. Ibarra's "reinventing your career" transition cycle has three stages: 1) Exploring possible selves, 2) Lingering between identities and 3) Grounding a deep change. She further identified an iterative three-stage process called *Identity in practice* that is used when making major career changes. This is the 'engine' of her change process and also involves three more-or-less sequential processes: crafting experiments, shifting connections and making sense. Each of which has a number of representative activities (see Table 1.4).

Table 1.4 Identity in practice: processes and practice. Based on Ibarra (2004)

	Process	Practices
Crafting experiments	Trying out new identities on a small scale or practicing professional roles before making a major commitment	<i>The experimental method</i> – Compare and contrast – Narrow the search <i>Opening Gambits</i> – Side projects – Temporary assignments – Back to school <i>Gutsy thinking</i> – i.e. intuitive, affective, non-rational decisions <i>Committed flirtation</i> – i.e. rigorous investigation without final commitment or foreclosure
Shifting connections	Developing contacts, role models and peer groups who can open doors to new worlds, can guide us and which can be used to benchmark our progress	<i>Ties that bind (and Blind)</i> – i.e. overcoming close, familiar contacts that may constrain <i>New faces, New places</i> – New peer groups – Guiding figures – Communities of practice <i>A secure base</i> – I.e. a safe support context
Making sense	Discovering and making catalysts or triggers for change and using them as opportunities to rework one's story	<i>Alert intermissions</i> – I.e. pivotal events the give meaning <i>Defining moments</i> – Unfreezing events – 'Jelling' events <i>Preparation prepares reinvention</i> – Stepping back – Windows of opportunity <i>Telling ourselves</i> – I.e. practicing one's new self narrative

Ibarra's model is very much concerned with non-homeostatic transitions: the people investigated in her study were often changing their careers to completely different domains and fields. The processes and practises she identified are largely concerned with working within the transition state itself. Furthermore, Ibarra (1999) upends the traditional 'plan and act' sequence associated with traditional problem solving and replaces it with a reverse process of 'test and learn' in which individuals experiment with a variety of different new selves or identities, "trying out" possible new selves without committing to them. Through testing and learning individuals narrow in on new identities using

iterative trials and refinement processes in which the new identity is slowly discovered or uncovered rather than designed, planned and implemented.

A comparison of some of the transition process models is presented in Table 1.5.

*Table 1.5 Comparison of some recursive transition cycles*

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<b>van Gennep</b>	Separation	Initiation			Reintegration	
<b>Crites</b>	Career motives	Tasks and problems	Career adjustment	Anxiety reduction	Satisfaction and success	
<b>Nicholson</b>	Preparation	Affect and Sense making	Adjustment		Stabilisation and preparation	
<b>Elsner &amp; Farrands</b>	Leaving	Arriving	Surviving –reflecting, reframing, reshaping–		Thriving	
<b>Bridge</b>	Endings	Neutral zone			New beginnings	
<b>Ibarra</b>	Exploring possible selves	Lingering between identities –crafting, shifting, making sense–			Grounding deep change	

### 1.1.3 Vocational and typological models of careers

Typology and vocational models have been widely used in career development. They tend to use psychometric measures to identify personality characteristics and abilities of individuals which correspond to job and performance requirements. Holland (1973, 1978) used factor analysis to identified 6 personality types as the basis for his Vocational Preference Inventory (VPI) to predict what kinds of careers would be most appropriate for different individuals by matching their scores with occupational environments associated with different types of jobs. The Strong-Campbell Interest Inventory (SCII) (Hansen & Campbell, 1985) used Holland’s work to identified commonalities of interests in different occupational groups to determine how well an individual would integrate into a work setting. Their proposal that congruence between personal



needs and requirements of a job would lead to more satisfaction and longer tenure was supported by a variety of studies (e.g., Dawis & Loquist, 1984; Osipow, 1983).

Schein's (1971) used his concept of *career anchors* – mentioned earlier as a contributor to Ibarra's working identity model – to aggregate motivation, values, innate abilities and self-perceived abilities into personality patterns that oriented and directed career choices and development (see Table 1.6).

<i>Technical-functional competence</i>	Individuals organise their career around the acquisition of specific technical skills or functional competences and make transitions based upon the opportunities to maximise their expertise in these areas.
<i>Managerial competence</i>	Individuals move through the corporate hierarchy to senior management positions where they can exercise control over a large area. This competence has three sub-competencies: a) analytical competence; b) interpersonal competence; or c) emotional competence in responding to challenges.
<i>Security and stability</i>	Individuals seek stability in job positions, organisational continuity, family stability, etc.
<i>Creativity</i>	Individuals - called entrepreneurs by Schein - need to create ideas, a product, a company of their own, etc.
<i>Autonomy and independence</i>	Individuals make choices which often take them out of organisations or large institutions and into professions like writing, consulting, and free-lance work.

Schein (1978) subsequently suggested that there might be other career anchors, naming four in particular: *Basic identity* requires clearly defined roles, symbols, functions; *Service to others* which might involve social work and health care; *Power, influence and control* as represented by politicians, doctors, and ministers; and *Variety* which might be represented in consultants, journeymen, and freelancers.

## **1.1.4 Adjustment models**

### **1.1.4.1 Work adjustment models**

*Work adjustment models* view vocational satisfaction as an indicator of personal congruence and stable careers. For example, the work adjustment theory of the Minnesota Studies in Vocational Rehabilitation (Osipow, 1983; Dawis & Lofquist, 1984; Rounds, Dawis & Lofquist, 1987) is structured in terms of *satisfactoriness* – how well the worker can perform their job as measured by the correspondence between an individual’s abilities and the requirement of the job – and *satisfaction* – how well the interests or vocational needs of a worker correspond to the reinforcer systems of the organisation. A well adjusted worker, as indicated by tenure in a job, is one who achieves satisfaction and performs satisfactorily. Incongruence leads to dissatisfaction and often to leaving an organisation (Wanous, 1980), though dissonance reduction during the early period of the transition (Vroom, 1966) can lead to fewer departures than would be predicted. Crites (1976) maintained that high career adjustment is reflected in less conflict between expectations for a role and the actual identity achieved in that role. Holland’s (1973) hypothesis that congruent individuals will be more satisfied and less likely to change work situations was supported by Spokane’s (1985) review of multiple studies. Holland’s more provocative hypotheses – that incongruent persons will be shaped or influenced by their organisational culture and environment to move towards congruence – has also been confirmed (Gottfredson, 1979; Gottfredson & Becker, 1981).

#### **1.1.4.2 Other adjustment models**

There are a huge range of other adjustment models that have occasionally been applied to understand career transitions with varying degrees of success.

Psychologically based adjustment models were developed to explain adult career patterns. Gould (1978) focussed on how individuals face and master *false childhood assumptions* about life. Neugarten (1976) focussed on aging and *adaptive patterns* in older adults. Valliant (1977) focussed on *resolving defensive conflicts* in adulthood and moving toward career consolidation. Pollock (1987) addressed the *mourning process* and how learning from it impacts on the second half of life.

Social gerontological models have been applied to career transitions, particularly in the case of sport, in which the ending of a performing career – often at an early period of one’s life – can be thought of as paralleling the aging process. *Activity theory* (Havinghurst & Albrecht, 1953) suggests that individuals attempt to maintain homeostatic levels of activity through their life and will attempt to adjust the activity in their life so that when one activity ceases they substitute another. McPherson (1980) applied this to transitions in sport when, having retired through injury or age, individuals seek to replace sporting performance with other new or compensatory activity. *Continuity theory* (Atchley, 1989) focuses on how individuals seek to maintain well-established or stable patterns of behaviour when making transitions to retirement so that there is minimal disruption, i.e. the best adjusted individuals continue activity and manage change effectively. Continuity may reflect how much the former role of person is viewed as more or less central to that individual’s identity e.g., the higher the

importance of the primary identification with a sporting identity, the less continuity in the transition (Rosenberg, 1981). *Exchange theory* (Homans, 1961) explains how, as people age, they rearrange their activities so that their reducing energy is distributed to maintain maximum returns. Some theorists (Rosenberg, 1981) maintain that exchange theory is particularly useful for understanding retirement from performance while others (Koukouris, 1991) challenge the use of exchange theory because in sport, music or dance individuals most often go on to develop fully active careers after career ‘retirement.’

*Thanatological theory* offers some transition models that are informative. *Social death* has been used to characterise when one terminates a professional performing career as an athlete or musician and experiences loss of contact with others (Kalish, 1966; Lerch, 1984). *Social awareness* (Glaser & Strauss, 1965) follows the awareness of family members during the dying process. The well known thanatological model of Kübler-Ross (*On death and dying*, 1969) has been used as a template for many transition models.

### **1.1.5 Contextual and Psychometric models**

There are a range of other approaches to understanding and studying human transitions which will not be addressed directly or utilised in the research or explanation of the findings as they relate to career transitions and transition expertise. However, I will briefly mention the two most common and encompassing of these approaches: ecological/contextual and psychometric models of human behaviour.

### 1.1.5.1 Ecological/Socially embedded/Contextual models

The social ‘situatedness’ of human beings has been widely theorised and studied. Everett Hughes (1958, 1971) and colleagues such as Becker & Strauss (1956) and Kurtz (1984) were contemporaries of *symbolic interactionists* Mead (1964) and Blumer (1969). Hughes’ Chicago Area Project (CAP) develop “fugue-like renditions of career by weaving together four related themes: (a) careers fuse the objective and the subjective; (b) careers entail status passages; (c) careers are rightfully properties of collectives; and perhaps most importantly (d) careers link individuals to the social structure” (Barley, 1989, p. 49). *Ecological psychologists* such as Barker (1968), Bronfenbrenner (1979) and Gibson and Pick, (2003) stressed the interpenetration of individual and social institutions that embedded human identity, behaviour and careers in their social context in which the individual is a “growing dynamic entity” that progressively moves through its environment, structuring and being restructured through reciprocity and mutual accommodation. Anthony Giddens (1979, 1984) developed his concept of *structuration* to avoid the dualism of the “imperialism of the object” implicit in the structuralism of Levi-Strauss and functionalism of Durkheim and Parsons vs. the “imperialism of the subject” as characteristic of hermeneutics and phenomenology. The logic of an institution’s *structures* and propositions are encoded in *modalities* which are recurring patterns that contain the knowledge for individuals about operating in an institution and so shape the *interactions* amongst the participant in the institution. The process is reversible: via structuration individuals recursively shape modalities through their actions which in turn influence the institutional structures.

An ecological/socially situated approach to studying transitions could make a valuable contribution to understanding how humans move through careers and manage transitions because one needs to understand how changing contexts shape the behaviour of the individual. However, I will not use ecological and contextualist models for studying expertise in this dissertation. Rather, I will address environmental and contextual factors primarily in terms of how individuals use personal abilities and skills to respond to changing contexts and to utilise environmental resources to help manage their transitions.

#### **1.1.5.2 Psychometric personality measures**

There are also a wide range of personality measures that have been used for making career decisions and for supporting individuals when they move into new roles and positions. These include Cattell's (1957) *16 Personality Factors (16PF)*; Schutz's (1958) *Fundamental Interpersonal Relations Orientation (FIRO-B)*; Eysenck's (1990) *Intraversion-Extraversion, Neuroticism and Psychoticism*; the *Myer Briggs Type Indicator (MBTI)* (Myers & Myers, 1980); Belbin's (1993) *team roles*; McCrae and Costa's (2008) *Five Factor model*; to name some of the more popular. Many of these largely psychometric instruments will include measures of abilities and attributes that might contribute to managing transitions. While they will not be used in this study, they would prove useful in future studies.

## **1.2 Career stages and transition processes**

### **1.2.1 Career stages and transition processes: assessing their usefulness for this study**

From the foregoing review it should be evident that there are a plethora of models about careers, career stages, and career transitions from which to draw frameworks for studying career transitions. I will briefly summarise some of the attributes of some of the models that would prove most useful for this purpose.

#### **1.2.1.1 Career stages vs transitions: Homeostasis vs non-homeostasis**

The first and most obvious conclusion about most career models is that they contain a number of stages. The second is that they focus largely on attaining a series of stable, homeostatic career states.

*Career stage models* such as those of Levinson (Levinson et al., 1978), Schein (1978) and Torbert (2004) focus primarily on differentiating the progressive stages of careers and identifying the characteristics of the roles in a given stage. Transitions are examined in light how they lead to individuals attaining the skills required to achieve stable performance in a new position or role, though some e.g., Levinson (Levinson et al., 1978) and Schein (1978) to a lesser extent, make transition stages a central part of their model. *Vocational and typology models* like Holland's (1973) and the Strong-Campbell Interest Inventory (SCII) (Hansen & Campbell, 1985) focus on performance in career roles themselves and have little to say about the nature of transitions. Models like Schein's Career anchors (1990) are of more use for identifying which types of careers individual might gravitate toward and how successful they might be in a type of career. Almost all *work adjustment models* (Kuder, 1946, 1966; Crites, 1976) focus on

the processes and consequences of conforming to the environment, adjusting work expectations, minimising dissonance and attaining stability. They do not address the crucial issues involved with the non-homeostatic instability of the transition process except in seeking to return to cognitive stability. Most *gerontological and thanatological models* focus on psychological coping mechanisms for dealing with loss, controlling negative affect and managing diminished resources. They do not address career transitions that involve growth, enhanced performance, and expanded capabilities – though they may be of use for understanding how individuals respond to transition failures.

#### **1.2.1.2 Transition process models**

Van Gennep's (1960) rites of passage model is primarily descriptive of a socialising process in which individuals are initiated into a new stage of their life through a variety of rituals and learning processes that help them fit into their new roles. Crites (1976) as always is concerned with adjustment to a career stage and Nicholson's (1984) adjustment and stabilisation stages in his transition model are again concerned with reducing person/role misfits and regaining homeostasis. More recent transition process models are less concerned with adjustment and congruence and address the non-homeostatic nature of transitions. The actual transition process models themselves present relatively similar variations on transition stages e.g.: Bridges (1991) "leaving, neutral zone and beginning;" Nicholson's (1984) "preparation, sense making, adjustment and stabilisation;" Elsner and Farrands' (2006) "leaving, arriving, surviving, thriving." A major focus of these models is on managing ambiguities, uncertainties and unknowns and the processes described for managing transitions



is often one of controlling what can be controlled and minimising the impact of what can't be controlled.

Ibarra (2004) addressed a fundamentally different process than most other transition models. Her primary focus was not so much on making a transition from one stage to another in a career but on the more radical process of changing careers and identity redefinition. The identity transitions she used as the basis for her research and resultant model are major career and identity dislocations from one field to another, from one possible self to an often completely different possible self. Perhaps it is for this reason that of the transition process models, hers seems to genuinely embrace the instability and non-predictability of change. This may also explain why the processes she described in her “identity in practice” cycle are less concerned with managing or containing the unknown and more with exploring and elaborating upon it.

## **1.2.2 Career Stage and Transition Process models used in this study**

### **1.2.2.1 Career stage model used for this study**

Levinson and Schein's models were the most useful for identifying major transitions as they chart the progress through a series of discrete career stages. Also, two of the three types of transitions – functional and inclusion – in Schein's organisational model (Figure 1.2 above) may help identify a number of transitions that are not necessarily hierarchical but are nonetheless significant. It is quite likely that a career stage model consisting of 5 or 6 stages will apply to most of the career cycles of participants in this study and further inter-stage

transitions or lateral transitions may be explained in part by Schein's non-hierarchical boundary transitions. Such a five-stage model might be as follows:

- 1. Student**
- 2. Performer**
- 3. Coach/manager/professor**
- 4. Head (coach, faculty, department)**
- 5. Leader (CEO, Principal, National Director)**

#### **1.2.2.2 Transition process model used for this study**

*Transition process* models almost all have three or four stages: a leaving stage which may include preparatory work; a transitioning stage which can involve various processes and is the main focus of most transition models and of this study as well; and an integrating stage which involves performing successfully in the new role or function. It is likely that most participants in this study will pass through a similar type of transition process each time they make a transition. Because the main emphasise in this dissertation will be on the skills and abilities used to manage transitions rather than the cycle that participants go through when making transitions, I will for now – against the advice of some – put new wine into old wineskins and use a similar transition process model with three stages for simplicity's sake:

- 1. Leaving**
- 2. Transitioning**
- 3. Reintegrating**

If in the course of the study it becomes clear that transitions do not conform to such a three stage processes, I will address this in the analysis of the data and the model will be revised. However, the priority in the dissertation will remain on how the participants manage their transitions rather than the stages of the transition process.

## **1.3 Transition expertise skills**

### **1.3.1 Transition Expertise: The cognitive skills and abilities to be studied in this dissertation**

Having briefly reviewed models of career development and transitions I will now present a succinct overview of the major academic arenas and associated research question which will form the substance of this project and will be the focus of Chapters 4-7 in this dissertation.

#### **1.3.1.1 Intelligence**

I will accept the well supported, if controversial, argument that experts will have inherent abilities that enable them to perform at high levels in their domain. That is, a musician will have the musical abilities, an athlete will have the abilities associated with their sport and a business person, such as an energy trader, will have the abilities to analyse financial data to make the correct decisions in their field. I will draw from a number of widely recognised models of intelligence that support this approach including Binet and Simon (1916), Cattell (1943), Thurstone (1947), Guilford (1967), Sternberg (1985, 1988), Gardner (1983, 1993b), and Carroll (1993). While I will not be seeking to validate these models in particular, I will use them as the basis for responding to three initial questions:

*1) Can the primary domain intelligence be generalised to meet role requirements in subsequent career stages?*

*2) Does the way in which primary domain intelligence is developed influence the capacity for the individual to generalise it?*

*3) Are there other intelligences than the primary domain ones which are transition supportive and may actually be required to make a transition?*

### 1.3.1.2 Expertise

I will focus primarily on three major approaches to expertise: 1) *The general theory of expertise* (Chase & Simon, 1973; Gobet, 1993; Richman, Staszewski & Simon, 1995; Gobet & Simon, 1996a); 2) *The expert performance approach* (Ericsson, Krampe & Tesch Römer, 1993; Ericsson, 1995, 2003); and 3) *Knowledge based (mental model) paradigms* which include models such as such as frames, schemata and MACRs (Minsky, 1975; Rumelhart & Ortony, 1977; Zeitz, 1997). A central issue – perhaps the central issues for this dissertation – across all these models will be if and how expert knowledge and processes can be generalised beyond the expert domain in which they were developed or acquired. Many theories take a position on this question which comes close to a categorical no: the nature of expertise, expert knowledge, expert processes and their associated cognitive structures are said to make them relatively non-transferable (Chase & Simon, 1973; Ericsson & Kintsch, 1995; Gobet & Simon, 1996b; etc.); deliberate practice may limit generalisability (Ericsson & Kintsch, 1995); encoding specificity can limit the ability to access expert knowledge from multiple routes (Tulving & Thomson, 1973); and retrieval mechanisms are context dependent (Chi, 2006) which would make solutions based on previous experience relatively inaccessible in new contexts (Feltovitch & Barrows, 1984). A major objective of this dissertation will be to establish if expertise is indeed so domain tied and to then establish what characteristics might make it more generalisable during transitions. Research questions will focus on:

- 1) *Can the domain specificity constraints associated with expert knowledge and processes be overcome?*

- 2) *How can expertise be acquired in ways which enable it to be generalised?*
- 3) *Are there expert cognitive processes that are non-domain tied and hence useful for transition expertise?*

### **1.3.1.3 Cognitive flexibility**

Cognitive structures and mental models that individuals develop in the acquisition of expertise may support or constrain their ability to make transitions. Cognitive flexibility will be determined by linkages to previous experience, how tied cognitive structures are to existing processes for resolving problems, whether individuals can maintain open and unbiased approaches to emerging situations during transitions and how individuals are able to adapt to new situation. The cognitive flexibility required to respond successfully and repeatedly to the challenges faced in transitions will be enhanced if individuals can reduce constraints on cognitive retrieval processes (Woods et al., 1994; Chi, 2006), overcome reductive bias (Feltovitch, Spiro & Coulson, 1993), interrupt automatisisation (Sternberg, 1981; Sternberg & Frensch, 1992), and reduce functional fixedness (Dunker, 1945; Feltovitch et al., 1984). Cognitive flexibility will be influenced by the ways in which mental models are transformed (Egan & Greeno, 1974; Klahr & Wallace, 1976), schemata reorganised (Rumelhart, 1980; Glick & Holyoak, 1983) and cognitive bridges built between previous expertise and new situations (Sternberg, 1977; Miller, 1979; Goldman & Pellegrino, 1984; etc.). Research questions will include:

- 1) *How tightly tied are the cognitive structures developed by an expert in a domain to exclusive use in that domain?*

- 2) *What makes cognitive structure more or less flexible and adaptable particularly in the case of experts?*
- 3) *What processes enable individuals to generalise expert knowledge, processes and cognitive structures from one domain to another?*

#### **1.3.1.4 Inferential intelligence**

Most intelligence models include an array of important mechanisms that would enable experts to generalise their knowledge and processes during career transitions. These will be the kinds of (generally) cognitive mechanisms that operate to produce flexibility in cognitive structures and enable individuals to overcome limitations to applying expert knowledge and processes across domains. These processes have been described variously as insightful thinking (Sternberg, 1981), induction (Cattell, 1943; Carroll, 1993; Sternberg, 1988; etc.), education (Spearman, 1923), elaborating and mapping, (Cattell, 1943; Sternberg, 1977), novelty and metaphorical capacity (Gardner, 1983, Sternberg, 1988), inductive inference (Carnap, 1962), divergent production abilities (Guilford, 1967), analogy (Spearman, 1927; Thurstone, 1938; Carnap, 1962; Miller, 1979; Sternberg, 1985; etc.), flexibility of use and closure (Carroll, 1993), and so forth. Research questions for this study will include:

- 1) *How do inference, induction and analogy enable individuals to generalise expert knowledge and processes from one career stage to another?*
- 2) *How do induction, inference and analogy operate in reformulating and restructuring cognitive structures associated with expertise in a domain?*

### **1.3.1.5 Personal intelligences: Intrapersonal and Interpersonal**

Personal intelligence skills have been widely recognised as contributing to self awareness, self management, use as feedback, responding to environmental contexts and generally enabling individuals to adapt and grow in changing contexts. Personal intelligences should play a central role in managing transitions and may be less tied to the specific domains under study than some other cognitive processes. The study of personal intelligence is central to most intelligence theories. Spearman's (1927) apprehension of one's own experience, Binet and Simon's (1916) interpretations, Thorndike's (1920) ability to understand and manage people, Vernon's (1950) insight into the states of other people, Guilford's (1967) self and other behavioural operations, and so forth have all positioned identified personal intelligence as a key aspect of intelligence. Gardner's (1983) differentiation of personal intelligences into interpersonal and intrapersonal intelligence has gained widespread acceptance and will be used in this dissertation to delineate the operation of personal intelligence into these two simple categories. Information processing models like metacognition (Flavell, 1979; Nelson & Narens, 1990) and popular models like emotional intelligences (Goleman, 1995; Bar-On, 1997) may contribute to understanding the operation of personal intelligence during transitions. Social intelligence theories (Kihlstrom & Cantor, 2000) provide a contextual approach. Social learning models like self regulation (Schunk, 1982; Schunk & Zimmerman, 2006) may explain how personal intelligences might employ a variety of techniques to manage and regulate performance. Research questions will include:

- 1) How does intrapersonal intelligence enable individuals to use self awareness and self management to enhance transitions?*

2) *How does interpersonal intelligence enable individuals to understand the contexts into which they move and utilise feedback in ways that enhance transitions?*

#### **1.3.1.6 Practical Intelligence: Problem solving and resource management**

In the review of the elements of career stage and transition models, problem solving and resource management emerged as two distinct areas which contributed to transitions. Originally, I considered addressing these as separate issues particularly because problem solving has been so widely studied (Neumann & Morgenstern, 1944; Miller, Galanter & Pribram, 1960; Newell & Simon, 1972; Chi, Feltovich & Glaser, 1981; Axelrod, 1984; Frensch & Sternberg, 1991; etc.). Resource management, on the other hand, is a peculiar category but appears in intelligence models within conceptualisations like crystallised intelligence (Cattell, 1963), spatial intelligence (Gardner, 1983) and acculturated knowledge (Horn & Masunaga, 2006). However, I have settled on combining the examination of problem solving and resource management under the useful, if rather awkward, conceptualisation of *practical intelligence*. This composite model generally includes: identifying, formulating and resolving problems (Cole & Scribner, 1974; Scribner, 1986); application of abstract logic in practical way (Ceci & Liker, 1986b); organising, administering and directing the execution of plans (Sternberg, 1985, 1996b); using tacit knowledge, (Wagner & Sternberg, 1985; Sternberg & Wagner, 1986); applying common sense (Gardner, 1983); operating within a context (Sternberg, 1996b); and using resources, people, and materials in appropriate fashion (Goodnow, 1985; Sternberg, 2000b). The research questions for this study will include:



- 1) *How do individuals use problem formulation and resolution processes in ways that move beyond ties to a specific domain and enable them to manage transitions?*
- 2) *How does the ability to administer and organise the pragmatics and logistics of daily operations enable individuals to manage transitions more successfully?*
- 3) *How does the management of social and organisational resources contribute to transition expertise?*

## **1.3.2 Intelligence, Expertise and Performance Confluence**

### **1.3.2.1 Intelligence models and their multitude of uses**

Intelligence is one of the most extensively studied areas of human psychology and behaviour. It will not be surprising, therefore, that, when reviewing some of the most important models in Chapter 5, they will often be describing the same phenomena in different ways. I will attempt to make clear these overlaps in the review of the literature. More problematic is the way in which practical intelligence in particular includes many elements somewhat eclectically from different intelligence models. These include the operation of crystallised intelligence (Cattell, 1963), logical thinking (Gardner, 1983), analytical processes (Sternberg, 1988) convergent thinking (Guilford, 1967), quantitative and general sequential reasoning (Carroll, 1993) from intelligence models. It also includes element of cognitive flexibility such as approaching problems non-sequentially (Feltovitch, et al 1984) and acculturated knowledge (Horn & Masunaga, 2006). Practical intelligence also incorporates parts if Sternberg's contextual intelligence sub theory (1988) as well as some social intelligence

theories (Kihlstrom and Cantor, 2000). The fact that practical intelligence includes many elements of other intelligence models in a hybridised fashion raises the suspicion that it is not a distinct kind of intelligence but rather a mongrel aggregation of elements from many theoretically more rigorous and internally consistent models. But its primary focus is in addressing how individuals apply intelligence in the unpredictable, mutable, non-controlled environments of real life. This applied, contextual perspective makes it of use in understanding how transition expertise, which also cannot be measured within the confines of a laboratory, will operate to apply experience, expertise and knowledge in changing circumstances and environments.

### **1.3.2.2 Intelligence and Expertise Conflation**

It is not my intention to engage in the nature/nurture debate in this research project. As will be clear, and I believe and I think enormous amounts of research and data confirm, a balanced perspective that expert performance will usually be the product of some combination of innate ability and effective training. That extraordinary ability may overcome lack of training or practice and that intense and systematic practice may compensate for ordinary abilities is what one might expect at the ends of a normal distribute for the intersection between ability and training in the production of performance. Similarly early and systematic development of performance abilities may produce precocity in an individual while latent abilities and potential may not emerge until late in an individual's development. Again, there is no reason why this should be surprising given the normal distribution of human developmental patterns.

But through all of this discussion, the distinction between intelligence and expertise should be clear. I will be using intelligence to describe innate abilities or potential much of which (though not all) can be assessed and measured even if full potential may or may not be realised in performance. I will use expertise to describe the acquired capacity to perform to high standards within a given domain using domain specific knowledge and processes as determined by objective standards or experts in the field.

### **1.3.3 Correspondences with elements of career and transition models**

#### **1.3.3.1 Transition expertise skills in existing models**

Levinson's model identified a number of transition stages each of which has developmental tasks that are primarily concerned with evolving identity rather than the pragmatics of transitions. For example the developmental tasks of the mid-life transition include resolving four polarities: 1) Young/Old, 2) Destruction/Creation, 3) Masculine/Feminine, 4) Attachment/Separateness (Levinson et al., 1978, p. 197). The two intermediate transitions - Age 30 and Age 50 - bring developmental tasks that are more concerned with refining the current life structure in light of the shortfalls or opportunities that have emerged from the previous developmental era. Levinson's transitions are viewed as major stages in the life cycle for a particular period in an individual's life that last 5 years on average and involve life identity issues for that transition stage.

In Schein’s model development tasks are different for each stage (See Table 1.7).

*Table 1.7 Comparison of career stage tasks. Based on Schein (1978)*

Stage 5 Full membership	Stage 7b Late career in leadership role
1. Choosing a specialty and deciding how committed to become to it	1. Using talents for long- range welfare of organization
2. Remaining technically competent and continuing to learn in ones chosen area	2. Integrating efforts of others and influencing broadly
3. Establishing a clear identity in the organisation, becoming visible	3. Selecting and developing subordinates
4. Accepting higher levels of responsibility	4. Developing broad perspectives
5. Becoming a productive person in the occupation	5. Learning how to sell ideas
6. Developing ones’ long range career plan	

By the contrasting tasks of Full Membership in early career vs. Late Career in leadership role some it can be seen that some skills associated with new roles may also be used to manage transitions into that role. Also, an individual’s abilities evolve over time and skills accrue with this evolution. Some of Schein’s (1990) career anchors might also make individuals more or less adept at transitions e.g., individuals who have autonomy/independence or creativity anchors might be more comfortable during transitions whereas managerial competence and stability/security anchors might incline individuals to stabilise in new positions more rapidly. While these transition stages do not really address the specific nature of transition expertise itself, they may lend insight into the nature of an evolving self concept (Super, 1963) or the development of wisdom (Baltes, 2004) over the course of a career.

Both Elsner and Farrand’s “cycle of inquiry” (2006) and Ibarra’s “identity in practice” (2006) processes delineate practices which offer more insight into how transitions might be managed. Elsner and Farrands’ process falls into a more standard feedback/learning cycle. However, its starting point is reflecting on experience (rather than planning) and is followed by reframing understanding (which is a sense making process of one’s experience) before actually engaging

in the activity of reshaping practices. Ibarra's transition process examines the ways in which individuals break out of former identities and experiment and explore. Her conceptualisation of transition moves away from controlling and anxiety reduction and from planning and implementing towards genuine exploration and experimentation as individuals seek out challenge and opportunity rather than try to minimise uncertainty or self doubt.

### **1.3.3.2 Correspondences with existing models**

When I began to explore the theoretical approach to this study and dissertation I started with the identification of major elements of intelligence and expertise that I thought might influence the ability to make career transitions. During subsequent investigation, intelligence and expertise were further delineated into areas such as personal intelligences, inferential mechanism and cognitive flexibility. Most career stage and transition process models identify skills and abilities associated with transitions but as was also investigating career theory and was surprised at the lack of comprehensive or clear cognitive models or structures that might help explain transition expertise. This ultimately threw me back on my own conceptual resources and led to my identification of these main areas of research touched upon in the previous section. In comparison of my research into cognitive models of intelligence and expertise on the one hand and career theory on the other I identified a variety of common patterns of abilities, skills and cognitive processes which have some correspond with the main categories my own cognitive conceptualisation of transition expertise developed for this dissertation. Table 1.8 identifies some of these correspondences.

<i>Table 1.8 Comparison of some expertise and intelligence factors in the major career, transition and adjustment models that may contribute to transition skills</i>					
Skills	Career Stage models	Transition Models			Vocational Adjustment Models
	Schein	Bridges	Elsner & Farrands	Ibarra	Cites, Holland & Others
	Cognitive Flexibility				
Cognitive flexibility			Openness to personal change Reframing understanding	Trying out new identities Discovering catalysts for change Unfreezing Stepping back	
	Inferential mechanisms				
Generative or inferential thinking	Creative career anchor Substituting wisdom based on experience for technical skills	Visioning	Experimenting	Experimenting Intuitive decisions	
	Personal Intelligences				
Inter-personal skills	Developing interpersonal and group skills Developing key subordinates Influencing broadly Supervisory skills		Relationship and trust building Winning confidence of others	Developing contacts Finding role models Joining peer groups	
Intra-personal skills	Dealing with mid-life crisis Assessing implications for one's career Accepting responsibility Assess one's motives, talents and values		Self Awareness Reflecting on experience	Intuitive decisions Making sense	Self awareness Dissonance management Sense making
	Practical Intelligence				
Problem analysis and solving		Structured processes Planning Goals	Planning	Compare and contrast Rigorous investigation	Preparation Task solving Tasks and problems
Resource management	Managerial competence career anchor			Safe support context Guiding figures Communities of practice	
	Self concept				
	Levinson's (1978) and Super's (1963) models also focus on changing self concept and identity				

From this somewhat superficial comparison, it should be apparent that, even though most career models do not address career development and career transitions in as cognitively structured a way as I intend to do in this dissertation,

a number of the cognitive abilities and processes are touched upon in part in these models.

## **1.4 Evolving transition expertise and Self Concept**

One of the questions I hope to address in this dissertation is whether or not transition expertise develops and evolves over the course of a career. If it does, it would be consistent with many of adult developmental models. Erikson's (1985) epigenic cycle clearly involves an evolution of self identify over the course of the life time. Super's self concept model (1963) is based on the regular revisions of self identity over the course of one's career cycle. Career stage models such as Levinson's (Levinson et al., 1978) also reflect an evolving self concept: the developmental tasks for his three major transition periods focus on changes to the life structure and involve leaving the past behind and defining the future course of life. Torbert's (Torbert & Rooke, 2005) leadership development framework can be viewed as an evolving self concept model that tracks progressive approaches to leadership issues and the development of corresponding abilities. Ibarra's (2004) working identity addresses the process of changing self concept through Markus' (Marcus, 1977; Marcus & Nurius, 1986; Marcus & Wurf, 1987) model of possible selves. Wisdom models of expert performance (Baltes & Staudinger, 2000; Sternberg, 2003) may provide insight into how this developmental process operates. What Howard Gardner (1983) calls "the project of the self" utilises the personal intelligences and may have parallels with the development of the personal intelligences during transitions over the course of a career. (A more detailed discussion of self concept development in conjunction

with transition expertise will take place in Chapter 8.) Research questions will include:

- 1) *Do different stage transitions use different types of transition expertise?*
- 2) *Do the skills associated with transition expertise develop over time?*
- 3) *Does this development correspond to other adult developmental models?*

## 1.5 Personality structures: Contributors to the transitions but not used in this dissertation

In the review transition models a further arena emerged that plays an important function in career transitions. This encompasses several major personality configurations or structures, in particular, motivation, personality resiliency and self belief systems. Some illustrations are listed in Table 1.9.

*Table 1.9 Comparison of some personality structure related process in career models*

	Career Stage models		Transition Models			Vocational and Adjustment Models
Skills	Schein	Levinson	Bridges	Elsner & Farrands	Ibarra	Cites, Holland and others
Motivation	Career Anchors generally	Career choices				Career Motives Vocational inventory Satisfaction Need to attain success
Coping and Resiliency	Stability career anchor		Dealing with fear	Dealing with ambiguity Resiliency		Dealing with frustration Anxiety reduction Loss management Maintaining stable patterns
Cognitive beliefs	Career Anchor beliefs and values		Dealing with self doubt	Self belief	Possible selves	

Factors in all three of these areas were considered to be important contributors to career transitions and transition expertise. They were initially investigated and researched: theoretical models were reviewed, questions were formulated,



participants were asked about them in the data collection process, the data was analysed and initial discussion was written up. However the issues and outcomes from the research, even when limited to the cognitive factors involved with expertise and intelligence, soon outran the scope of this dissertation. In the end it was decided to not include an analysis or discussion of these further areas, though they may be mentioned intermittently where they are inextricably linked with the areas under study.

## **1.6 Gender Issues**

It is necessary to discuss gender issues even though this dissertation will not address them as they impact on transition expertise. The main reason for this decision is that the research will make the identification of general issues involved with transition expertise as its primary focus and draw comparisons across expert domains and between the beginning, middle and later stages in a career rather than attempting to identify how these might reflect or be influenced by gender issues. The criteria for participation in the study are based primarily on success in career transitions rather than gender or other demographic criteria because of its exploratory nature. In the end fewer women took part in the study than men (only 6 of the 24 participants in the main study were women). However, gender like many other issues not examined in this study probably influences career development patterns and career transitions and, consequently, findings of this study may reflect some gender issues and biases without necessarily pinpointing them. Therefore, I will take a opportunity to acknowledge the influence of gender issue in career transitions while not actually

seeking to identify in detail what they are or how they might influence career transitions or transition expertise.

In the business world women have generally been more represented in service roles, in sectors like nursing, education, and administration as well as professions like publishing and media. The domains of banking and engineering, to which most of the participants in the business field in this study belonged, typically have smaller percentages of women in senior positions (Only 1 of the 8 business participants in the main study was a woman). However, in the music profession there seems to have been more room for women to play significant roles in senior positions (3 of the 8 music participants in the study were women). While women have been involved in sport for many decades they have only more recently been able to pursue (paying) professions in their sporting field after their performing career ends in the form of coaching, academic research and leadership (2 of the 8 sports participants in the main study were women). It could be proposed (with some solipsism) that the proportion of women in the different fields who took part in this study might reflect their relative representation in senior positions in their fields at the point of time that this study took place.

Occupational gender segregation (Hurst, 2007) in which gender differentiates the kind of work and the roles of women in professions is a well-known phenomenon, though this has been changing over the last few decades as evolving social values, human rights developments and accesses to higher education have enabled women to aspire to and attain roles in occupations formerly closed to them. Educationally, the cadre of women to which most individuals in this study belonged would have pursued higher education in the

1970's and 80's when increasingly higher proportions of women entered professional education programmes during this period: only 5% of first-year students in professional programs were female in 1965, but by 1985 for example, there were 40% in law and medicine and 30% in dentistry and business schools (Goldin & Katz, 2001).

The existence of a 'glass ceiling' in which highly qualified women are blocked from achieving hierarchical positions equal to their male peers due to cultural issues and gender discrimination remains very much in evidence in the business arena to this date and has been well documented (Cotter, et al., 2001). Gender discrimination is still evidenced by men in positions of power in the job economy in which their preference for working with other men as peers because they share similar characteristics will incline men in positions of power to hire or promote other men rather than women (Massey, 2007). More relevantly for this study, gender inequality is often embedded within social hierarchies and culture as well as in perceptions of competence and expertise. This affects how women and men are perceived in leadership roles and may in turn affect how they are judged to have performed during transitions. Generally women are less likely to be promoted than males and when promoted they actually have stronger performance ratings than males. Women demonstrating expertise equal to that of male colleagues can still be viewed as less able than men and different levels of abilities ascribed to females when compared to males may be due to selective gender-based bias (Ridgeway, 2001). Nor is this attributed lack of skills the only reason why women are not deemed worthy of leadership roles. Women's achievements can be attributed to luck or effort rather than ability or skill (Thomas-Hunt & Phillips, 2004) and consequently devalued. At best, women

possessing expertise are simply not viewed as positively as males with commensurate abilities (Lyness & Thompson, 1997). At its most perverse, traits considered to be positive in males may be viewed negatively in women (Thomas-Hunt & Phillips, 2004). It seems, furthermore, that performance ratings are more strongly connected to promotions for women than men suggesting biases for promotion of men due to factors other than their abilities or performance (Lyness & Heilman, 2006).

## **1.7 Concluding discussion**

Hopefully, the breadth of factors that might influence career transitions will have been made clear in the foregoing review. It should also be clear, consequently, why this study will focus on a more narrow range of issues involved with the managing of transitions from one career stage to the next. A basic career stage model and transition process model will be used as the framework within which to study career transitions. The largely cognitive abilities and processes that make up transition expertise and enable successful transitions and which will be the main focus of this dissertation as presented in Chapters 4 through 7 are: 1) generalising expert knowledge and processes and developing cognitive flexibility to adapt and apply expert knowledge and processes across domains, 2) using inferential intelligence to build bridges between cognitive structures, 3) using intrapersonal and interpersonal intelligence to help manage transitions, and 4) applying expert knowledge and processes in practical ways to resolve problems and manage resources in transitions. At the end of this dissertation a further discussion of how the development of transition expertise over the course of a career may parallel or contribute to the development of self concept and possibly

wisdom will be taken up in Chapter 8 and will complete the areas under study in this dissertation.

# Chapter 2. Methodology

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## 2.1. Qualitative research

The study of transition expertise in this dissertation will be use qualitative research methodology. Denzin and Lincoln, *doyens* of qualitative research, describe it as “the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, historical, interactional and visual texts – that describe routine and problematic moments and meanings in individuals’ lives” Claude Levi-Strauss (1962) used the term *bricoleur* to characterise the job of a qualitative researcher as someone who works with their hands to build something from whatever materials are available to construct a finished product. *Symbolic interactionism* “recognises that the genuine mark of an empirical science is to respect the nature of its empirical world – to fit its problems, it guiding conceptions, its procedures of inquiry, its techniques of study, its concepts and its theories to that world....by the direct examination of the actual empirical world rather than by working with a simulation of that world, or with a preset model of that world” (Blumer, 1969, p 48). Glazer and Strauss (1967) bearded the “positivistic” research lion in its den with their iconoclastic emergent *grounded theory* which is a “process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges” (Glaser & Strauss, 1967, p. 45). *Naturalistic research* maintains, similarly to grounded theory, that “what is salient to us is, first, no manipulation by the inquirer is

implied, and, second, the inquirer imposes no a priori units on the outcome" (Lincoln & Guba, 1985, p.8).

Symbolic interactionism, grounded theory, and naturalistic research were the avant-garde leading the philosophical charge for qualitative research's place in the pantheon of research methodologies. And the battle has largely been won: qualitative research data are recognised as "well-grounded, rich descriptions and explanations.....qualitative data are more likely to lead to serendipitous findings and new theoretical integrations....the findings from qualitative studies have a quality of 'undeniability' (Miles & Huberman, 1984, p. 13).

## **2.2. The methodology used in this thesis**

Most researchers in qualitative data bring with them a particular theoretical or paradigmatic bias. Blumer (1969) presented a method for engaging in enquiry as a "scientific act"; Miles and Huberman (1984) emphasised the importance of how one analyses and presents qualitative data; Sosniak (2006) focused on the implementation of a qualitative study; Denzin and Lincoln (2003) worked with the intersection of culture and theoretical perspectives. They mostly follow a similar sequential process with numerous correspondences (See Table 2.1).

*Table 2.1 Comparisons of different qualitative research methodology stages*

Connolly (This study)	Blumer	Sozniak	Miles and Huberman	Denzin and Lincoln
	a) use of a prior picture or scheme of the empirical world			a) researcher as multicultural subject
1) define the conceptual framework				b) theoretical paradigms and perspectives
	b) the asking of questions and conversion of the questions into problems	a) choosing a process		
2) determine methodology	c) determination of the data to be sought and the means to get the data	b) defining a sample		c) research strategies
3) identify the subjects		c) identifying control/comparison groups	a) data collection	d) Methods of collection and analysis
4) collect the data			b) data reduction	
5) analyse the data	d) determination of relationships between the data	d) identifying issues of validity	c) data display	e) the art of interpretation and presentation
6) interpret and draw conclusions about the data	e) interpretation of the findings		d) conclusion drawing	

Based upon a reviewed of these methodologies, I arrived at a 6-stage approach for this study which largely parallels these models while remaining relatively devoid of paradigmatic overtones. I will discuss each in turn.

### 2.2.1 Defining the conceptual framework

In Chapter 1 I reviewed the major approaches to careers and career transitions and identified common career patterns, transition processes and areas of skills and abilities used to manage transitions. These were listed and described in the



final section of that chapter and they form the career and transition frameworks within which I will operate in the study itself.

## **2.2.2 Determining the methodology**

### **2.2.2.1 Use of Retrospective Interviews**

“If we want to know how people become extraordinary adults, we can start with some of the latter....and then try to find out how they came to do it.” (Gruber, 1982, p. 15). When I first considered studying expertise and elite performance, before focussing on transition expertise in particular, I reviewed some of the most famous studies investigating expertise, intelligence, talent and career cycles. In these and similar studies the use of retrospective interviews was the preferred approach for the study of such individuals. Three of the most significant projects in the study of gifted and expert performers have used this technique thereby establishing the strong pedigree of retrospective interviews as a qualitative research methodology in general and for a study such as the one which forms the basis for this dissertation. Anne Roe (*The making of a scientist*, 1952) in her seminal study of eminent scientist conducted several retrospective interviews with her subjects. Harriet Zuckerman (*Scientific Elite: Nobel laureates in the United States*, 1977) used retrospective interviews with her subjects and also conducted interviews with parents, colleagues and friends to develop a more encompassing, ecological perspective on how expertise was a construction between the individuals and the domain in which they operated. Benjamin Bloom (*Developing talent in young people*, 1985) and his colleagues first read biographies of talented individuals, then identified and conducted pilot studies with a small number of participants who met their performance criteria.

Using these exploratory studies as a basis for their subsequent research, they identified individuals who had reached world-class performance levels and interviewed them “to get a *retrospective* picture of the process of talent development” (Bloom, 1985, p. 7). The Bloom study also interviewed parents, teachers and coaches.

Studies of careers have also used retrospective interviews. Schein’s (1971, 1978) career cycle and career anchors models were initially derived from qualitative interviews conducted with MBA students and graduates as a primary source of data. Ibarra’s study of career transitions used retrospective interviews in which her opening question was “Tell me about your career to date” (Ibarra, 2004, p. 178). She supplemented her interviews with subsequent phone conversations and email exchanges and, where participants were in career transitions, with what she called “Change in Progress” interviews.

Lauren Sosniak, Benjamin Bloom’s main collaborator and research coordinator in the Development of Talent Research Project, maintains that “retrospective interview studies represent an imperfect but necessary method of investigation for this field. These studies allow us to investigate questions about expertise that can not be explored with other methods, and they reveal aspects of expertise that we would be unlikely to uncover in any other way [...] Studies concerned with the development of exceptional talent over time have little choice but to make use of retrospective interviews” (Sosniak, 2006, p. 292). Retrospective interviews have a strong pedigree as a valid qualitative research methodology for studying expertise and careers.

### ***2.2.2.1.1 Approaches not used***

There are a range of approaches to collecting data from individuals, both qualitative and quantitative, that are utilised in research studies. All have been used in the different studies I will cite in this project. It is worth mentioning some, but by no means all, of the various methodologies that I did not use.

- Idiographic studies involve reading about historical figures and were used in Blooms (1985) work on talent and Maslow's (1968) study of self-actualisation.
- Interviews with parents, teachers, colleagues or others were used in Zuckerman's (1977) study of Nobel Laureates.
- Action research, phenomenological research, hermeneutics, ecological psychology, and other approaches were briefly investigated and discarded as methodologies for this study.
- Methodologies like *narratology* and *discourse analysis* were not considered in the preparation of the interview format nor used in the analysis of the data. The methodologies of poststructuralism, semiotics, etc. are not addressed in the study or utilised in the analysis of the data.

In addition, I did not use:

- Psychodynamic tests such as the Thematic Apperception Test that was used by McClelland et al (1953) for studying achievement motivation and in Roe's (1952) use of Rorschach in her study eminent scientists.
- Psychometric tests that were used by Kuder (1946), Super (1963) and Holland (1973) for determining interests and vocations adjustment in studying career transitions.

Finally

- I have not used controlled laboratory based experiments as cited throughout this study and as typified by the work of Ericsson (1995) in expertise, Sternberg (1985) in intelligence, Bandura (1997) in self efficacy, Zimmerman (2006) in self regulation, Atkinson (1964) in motivation, Block & Block (1980) on ego resiliency, etc.

While most of the research studies cited in this dissertation have conducted important and admirable work using these and similar methods, and I have drawn upon their findings heavily, I have not used them for this study because I have explicitly chosen to use retrospective interviews as the most appropriate vehicle for collecting data. This is because this study involved considerable exploratory investigation and, to be candid, the formulation of a specific and focussed theoretical hypothesis around which to build more multi-level and targeted data collection was not immediately forthcoming at the commencement of this project. I preferred to keep the investigation open and retrospective interviews allowed this whereas narrower hypothesis might have constrained the collection of data and limited the usefulness of the data that was produced. There were also constraints on the time of the participants as well: most were very senior people in their respective fields and gaining their time to engage in multiple tests or interview sessions would have proven difficult. Finally, I did not have the personal resources to utilise and analyse multiple data sets. As it was, the data collection, transcription and analysis was onerous.

### **2.2.2.2 Formulating the interview questions**

The main tool for data collection used in this study was a *semi-structured interview* in which the interview guide consisted of an informal "grouping of topics and questions that the interviewer can ask in different ways for different participants" (Lindlof & Taylor, 2002, p. 195). The questions were theory driven (Patton, 1990) in that they used expertise and cognitive intelligence theories as the basis their enquiry but at the same time avoided narrowing down to a specific theoretical construct e.g., interpersonal intelligence was not conceived as an exclusively factor analytic (Carroll, 1993), contextual-componential (Sternberg, 1985) or social learning (Cantor & Kihlstrom, 1987) construct.

The preliminary question set would:

1. Ask the participants about their early abilities, how they acquired their expertise in their primary domain, and the context in which they acquired their expertise.

The rest (and largest part) of the interview would consist of iterations of two sets of questions:

2. How they managed their career transition e.g., from studentship to performer or from performer to teaching. The questions focussed on the continued development of their expertise, how they generalised their expertise from one career stage to the next, types of intelligence used in transitions, challenges encountered, what additional skills they developed, etc. The questions would also address issues of

motivation, self belief and self image in transitions though this data was not written up as part of this dissertation.

And then:

3. Questions about developing their expertise in next career stage or domain, asking similar questions as the preliminary stage.

When the participants exhausted their memory of the transition or no new information was emerging, they would then be asked to discuss their next career transition and questions within sets 2 and 3 would be asked again. This process would be repeated until the interview arrived at the contemporary situation of the participant. Individuals would be allowed to describe their experience emergently, in their own language and to focus on what was important to them rather than follow a strict interview protocol. The interview question guidelines are attached in Appendix 2.

### **2.2.3 Defining the Sample and Participants in the study**

#### **2.2.3.1 Populations for study**

It was decided to investigate transition expertise in three very different fields – sport, music and business. All participants in the study were referred through contacts of the researcher in the different fields. Some of the participants of the study were known to the researcher on a professional basis through his previous work as a consultant. None were known personally. There were a total 30 participants who took part in the study:

- Pilot Study: 6 participants took part in the pilot study – 2 from each field of sport, music and business.
- Main study: 24 participants took part in the main study – 8 from each field of sport, music and business.

Participants were selected on the basis of three primary defining characteristics: (a) expertise in a primary domain, (b) career progression mainly within the same field as the primary domain and (c) progression to leadership in their field.

### ***2.2.3.1.1 Expertise in primary domain***

Each participant would be recognised as having attained a high degree of expertise or excellence as an individual performer in their field. Musicians would have performed to high standards as a soloist or consort performer as recognised by peers and the general public. Sports people would have competed at an international or Olympic level or as a professional such as a Premiership football player. Business people would have been high achievers in engineering, finance and energy trading before moving to management and leadership positions in their field.<sup>1</sup>

### ***2.2.3.1.2 Progression mainly within the primary domain field***

In order to narrow the range of types of transition under study, it was decided to restrict the study to individuals whose career transitions took place primarily in the same field as their primary domain i.e. all sports people progressed to senior coaching levels or leadership in governing bodies associated with sports;

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<sup>1</sup> The business sample was intentionally narrowed to domains where the success as an individual was likely to reflect Gardner's (1983) logical/mathematical intelligence. Choosing participants from other fields such as advertising, architecture, law, etc. would complicate the task of extracting transition-specific skills from domain skills and abilities. This issue will be addressed at more length in Chapter 5.

musicians became heads of faculties or principles of music colleges; business people progressed to senior leadership in organisations involving expertise in their original domain e.g., automotive engineering or finance. Generally, individuals who made career transitions to different domains and fields, as was the case with Ibarra's study (2004), were not include in this study, though there were some individuals who did make such transitions at periods in their lives before returning to the field of their primary domain.

#### ***2.2.3.1.3 Progression to leadership in their field.***

The third criterion for the candidates was that they had attained senior roles within their field. Musicians would have attained a position as head of a faculty, principal or vice chancellor of an institution associated with music. Sports people would have become a national coach, a manager of a professional sporting club or CEO of a national organisation. Business people would have progressed from being a 'star trader' or engineer to senior management of a division, president or vice-president within a business, head of design in an engineering company, etc.

#### **2.2.3.2 Control**

##### ***2.2.3.2.1 Cross domain control***

The main approach to control was to examine populations from three very different domains: sport, business and music each of which would have very different abilities, skills and training associated with expertise in their primary domain. Transitions in different fields might present different challenges and have different requirements and participants from different domains might use similar or different abilities in managing those transitions.

##### ***2.2.3.2.2 Different levels of career transitions***



In each domain some individuals would have progressed to more senior leadership roles in their field than others. The different levels of career progression would provide further contrast amongst the participants. In addition there would be some cases where individuals failed to make important transitions. Comparing individuals who attained higher levels in their field and comparing failed transitions with successful ones would also operate as a control.

#### ***2.2.3.2.3 Control issues***

There was no formally constituted control group of ‘failed transitioners’ for this study. Individuals who repeatedly failed to make successful transitions were generally not willing to take part in such a study. For reasons of scope as mentioned earlier individuals who had made transitions to other fields e.g., into business after a sporting career, were not included in this study. The population consisted of 23 male (77%) and 7 female (23%) participants. But generally demographics were not the focus of this study so there were no specific parameters established to control for sex, family background, education, social/economic factors, etc.

### **2.2.4 Data collection**

#### **2.2.4.1 Interviewing structure**

The interviews all lasted between 1 hour 45 minutes and 2 hours except for two interviews that lasted approximately 2 hours and 15 minutes because they were interrupted half way through and recommenced at a subsequent date. All interviews were recorded. All participants took part in the study willingly. All interviews took place privately in a variety of settings depending up availability and location of the participants. Before interviews commenced, participants were

informed about the nature of the study, assured of anonymity and ethical consideration and gave their permission for their information in this dissertation. They were provided with a copy of an ethical permission form, read it and signed it (Appendix 1).

#### **2.2.4.2 The interviewing process**

The interview question protocol was used to assure that the main areas of interest for the study were addressed and that the focus remained on career transitions rather than career stages. The interviewer interventions, interruptions or further questions in addition to those in the interview protocol could take several forms: (a) to repeat or summarise an understanding of what the interviewee had been saying for purposes of clarification to which the interviewee was invited to agree, correct or elaborate upon; (b) to ask specific questions about skills, abilities, processes, etc. that were developed or used during transitions and how these were felt to have operated in making transitions; and (c) to ask questions which encouraged interviewees to add anything they had left out of their input before moving on to the next stage. No notes would be collected on observations about the individuals or their behaviour during the interview as this would have distracted the interviewer from engaging fully with the participants and might have reduced the sensitivity and timing of interventions.

#### **2.2.5 Analysing the data**

Importantly, not all approaches to qualitative research decline – as do the grounded theorists or the naturalistic researchers – to utilise a priori principles or theories: “What distinguishes the discussion of theory in much of the literature on qualitative methods is the emphasis on inductive strategies of theory

development in contrast to theory generated by logical deduction from a priori assumptions” (Patton, 1990, p 66.). Patton calls this latter approach *Orientational Qualitative Inquiry* which he considers to be a more neutral term than *ideologically based* inquiry. It constitutes a broad umbrella of qualitative research under which one can undertake an inquiry from almost any theoretical perspective: expertise, intelligence, feminist, Marxist, Capitalist, Freudian, Maslowian or any other perspective in which theory informs the way that the study is constructed and the data identified, organised and analysed. Some of these perspectives e.g. Marxist and feminist will often be indicative of a *critical theory* approach which will not be used in this study. But regardless of their philosophical stance almost all “qualitative methods consist of three kinds of data collection: (1) in-depth, open-ended interviews; (2) direct observation; and (3) written documents” (Patton, 1990, p. 10) and it is the first methodology – open-ended retrospective interviews – that formed the basis for collecting data in this study. “*What is required is that the researcher be very clear about the theoretical framework being used and the implications of that perspective on study focus, data collection, fieldwork and analysis* (Patton, 1990, p. 87, *italics in original*).

#### **2.2.5.1 Content Analysis: Coding the data**

All interviews were recorded on a digital voice recorder and transcribed by professional transcriptionists. These transcriptions were then reviewed by the author while listening simultaneously to the recordings so that mis-typing, gaps, unintelligible statements could be identified and rectified. There was almost no lost data. Hesitation pauses, clearing of voice, “ums, errs, ahs” were noted in the transcriptions but were not utilised for any purpose in the analysis of the data.

Content analysis was the major approach used for analysing the data. Content analysis is a “general term covering a variety of methods for analysing a discourse, message or document for varying themes, ideas, emotions, opinions, etc. Most of such analysis consists of sophisticated counting schemes in which the frequency of particular words, phrases, affective expressions and the like are determined” (Rhianon, Reber & Reber, 2009, p. 9). Ochse, a highly regarded researcher in expertise and creativity, says that “quantitative research may give an impression of exactitude, especially where complicated mathematical strategies are employed to control or correct possible errors of measurement. But insistence on quantification may be dangerous. It may force researchers to measure inappropriate quantifiable artificial substitutes instead of the real variables of interest. In other word, it may engender invalid *operational definitions*” (Ochse, 1999, p. 45, *italics added*). One of the challenges of this study has been to be clear about what my operational definitions are. It is for this reason that the study, though qualitative, has been a theoretically informed study so that what was measured was at least measured against existing operational definitions. Where the study is perhaps innovative or stretching the boundaries of existing knowledge in the whole field of excellence on the one hand and career transition on the other is in its attempt to see how operational definitions emerging out of different fields of study like intelligence and expertise are of use in identifying or capturing information or perhaps being validated further through usefulness as models into which the self reports of the individuals who were studied could be easily fit.

The analysis of the content of the interviews used the software programme NVivo 8, a well-regarded computer assisted qualitative data analysis software

(CAQDAS) (Gibbs, 2002). In NVivo a system of “Trees and Nodes” can be set up before coding the data to represent the main theoretical categories being used in the study. Nodes are base level categories into which statements which reflect a particular skill – like use of analogy or intrapersonal awareness – can be collected. Trees are sets of hierarchically organised related nodes. For example, ‘use of analogy’ might be a node under a branch called ‘inferential intelligence’ of a tree called ‘intelligence’ which would be a main theoretical category. New nodes could be created during the coding if new patterns emerge during the analysis.

Data could be represented in a number of ways:

- The total number of statements coded under a node could be counted to indicate the varying use of skills and abilities used during transitions.
- The number of times each individual participant described a behaviour associated with a node could be counted and extracted.
- Statements could also be organised and counted by domains of participants allowing comparison across domains e.g., how often sports people generalised expert knowledge compared to musicians.
- Matrices could be generated e.g., statements that were indicative of both interpersonal intelligence and external resource utilisation could be identified.

Appendix 3 maps the coding hierarchy of trees, branches and nodes.

Appendix 3 maps the coding hierarchy of trees, branches and nodes.

## 2.2.6 Data display

The data will be displayed in a number of ways.

- *Verbatim quotations* extracted from the interviews were used regularly and typically several statements from the data will be used as illustrations of a particular aspect of transition expertise.
- *Tables* will be used to present the references from the entire population and sub-populations indicative of different aspects of transition expertise.
- *Matrices* will be used to represent comparisons across domains, interactions between different aspects of transition expertise, transition expertise at different career transitions, etc.

Each quotation by a participant was assigned a reference and anonymity of the participants was protected. A typical reference at the end of a statement by participant might be (MUS R3 Robert).

The reference at the end of the quotation consists of several elements. 1) The field/domain (MUS-Music, SPT-Sport-, BSN-Business). 2) The assigned name. Sports people were given names beginning with the letter A-H, business people J-P and musicians R-Z. 3) In addition a text reference e.g., (R3) was assigned to each quotation in case there was a need to find that particular quotation in the data. All references to specific individuals, institutions, businesses, organisations, etc. were substituted with a generic category e.g., {business}, {colleague} or {university}. For example:

*As with everything that I've ever done is, I've stepped back and said 'What was the goal? How do you do that? And what could happen along the way?' (SPT R3 Claire)*

*Or*

*I suddenly thought: “I can do that” and I had visited {college} before so I could picture in mind what needed to be done. (MUS R5 Richard)*

### **2.2.7 Interpretation and conclusion drawing**

The process of interpretation and conclusion drawing will form the main body of the dissertation and be presented in Chapters 4-8.

## **2.3 Validity**

Dingwall (1992) maintains that the substance of the research, the role of the observer, the nature of the interpretation, the audience of the final product and ultimately the interpretive style all contribute to how one validates qualitative research. Hammersley (1992, p. 62) identifies four general criteria for the quality of ethnographic/qualitative research: plausibility, credibility, relevance and importance of topic. I believe that my approach to the study of transition expertise will meet a number of these foregoing criteria even if it does not meet all of the ‘positivistic’ criteria for validity.

### **2.3.1 Validity**

The methodology of this study will not meet all the *validity* criteria of the nineteenth century, positivistic models of the physical sciences whereby “actual or real events in the world are explained in a deductive fashion by universal laws that assert definite and unproblematic relationships. [However,] how a researcher accounts for his or her approach to certain aspects of research, including the routine source of problems, is key for evaluating the work substantively and methodologically” (Altheide & Johnson, 1998, pp. 287, 295).

### **2.3.1.1 Participant feedback**

The scope and time frame of this project has not allowed for the analysis and write-up of the data to be subject to member-checks in the form of participant feedback or respondent validation in which the interpretation and report could be given to members of the sample in order to check its authenticity. There are plans to conduct a follow-up debriefing on the findings in the form of mixed focus groups of 6-8 participants in which they are given feedback on the outcomes, engage in a focussed discussion of the findings and comment on the validity of interpretation. These outputs would be subject to further analysis.

### **2.3.1.2 Cross examiner data validity.**

Many studies employ a number of individuals to conduct interviews and code data. For these studies, cross-personal validity is essential for consistency of coding. Because of the exploratory nature of the study and its being conducted solely by myself, it was not readily feasible to ‘educate’ another individual in the theoretical and coding criteria in order for them to review the same data for cross-coding validity. Because there were not a specific set of questions closed questions with succinct answers, it would have proved difficult to conduct this kind of validation.

### **2.3.1.3 Confirmability and transferability**

In terms of *confirmability* it is hoped that this study will form the basis of further studies using a variety of qualitative and quantitative methodologies in the near future. Equally the *transferability* of these findings to settings other than the one in which they have been made would seem to bear the seeds of numerous applications for further research.



### **2.3.2 The self-reflexive nature of content analysis**

My experience of career transitions will have influenced my own role in interpreting the data. There are three ways in which I think this influence might operate.

- 1) *Previous coaching experience bias.* One of the objectives mentioned in the preface of this dissertation was to understand better the phenomenon of transition expertise in order to be able to coach people in transitions more effectively. While I had had experience in coaching individuals in transition, I had become less certain as to why some individuals were more successful than others in making transitions. Consequently, I do not think that this experience influenced or biased me or my approach. On the contrary it made me open to what might emerge.
- 2) *Personal transition experience bias.* A candid reflection on my own experience in career transitions would lead me to believe that I myself am not as expert in transition expertise as many of the participants in this study: my failure to make transitions to the most senior levels in my field may have been “in the back of my mind” when undertaking this study. But a self-reflective review leads me to conclude that I was not engaging in this study as a compensatory process for any lack of success in my own career transitions. What could be said is that, having stepped back from working in large organisational operations, my motivation was to understand what contributed to successful career transitions in order to coach individuals and to provide consultancy to organisations rather than to understand how I might make further career transitions.

3) *Theoretical bias*. I no doubt have theoretical biases which informed the nature of this study. I suspect that I am no different than 98% of most researches who have chosen certain theoretical contexts within which to conduct their research. Experience in the study of social psychology, performance psychology and cognitive psychology will have influenced my approach.

However, in spite of these apparent implicit influences, I think that the findings of the study will remain relatively free from bias. Firstly, at the time of undertaking this study I had a MA in psychology and had been a practicing psychologist for a number of years. I had been trained in basic interviewing and questioning skills including: Rogerian (Rogers, 1951), Gestalt Therapy (Polster & Polster, 1974), Critical Incident Theory (Gremler, 2004) and Repertory Grid (Fransella, 2005) techniques. This training and experience contributed, I hope, to *some* degree of impartiality in my interviewing technique and data analysis. Furthermore, while I brought some hypotheses to the interviews concerning the major theories I was investigating as to how they might explain transition expertise, these hypotheses were contradicted as often as confirmed in the data from the study. For example (previewing some of the findings of the study which will be discussed at length in the ensuing chapters) I had assumed that intrapersonal psychology would play a central role in transition expertise throughout a career: this was not borne out by the data. I had started with a strong bias towards using a modular and trait conceptualisation of intelligence as most clearly captured in Howard Gardner's (1983) Multiple Intelligence framework: however, most of the research focus and data analysis moved away from this approach and towards cognitive and developmental models of

intelligence and expertise. Having written a master's degree thesis and books on the use of self-regulatory processes in performance enhancement, I had assumed that these would also play a key role in transition expertise: as the analysis of the outcomes of the study will indicate, this assumption was not borne out. I also had a strong resonance with self-actualising models of human development as presented in the theories of Maslow's (1968) and Rogers' (1951): though the findings of the study tended to validate the importance of intrinsic motivation and self-actualisation as key determinants of career choices, in the end this field of motivation was excluded from the study. For these and other reasons, I think it is fair to say that for the most part I did not let my own theoretical predispositions and beliefs bias my data collecting process. Nor were theoretical biases embedded in the findings: I believe the data was subject to a fair scrutiny.

## **2.4 Two studies: Pilot and Main study**

Because of the scope of the study, it was decided to run a pilot study in order to gauge the suitability of the theoretical models for understanding transition expertise, to refine the questioning protocol and to practice the interviewing process. The outcomes of the pilot, how they shaped the final form of the main study and modifications to the methodology in the main study will be reviewed in the following Chapter 3.

# Chapter 3 The Pilot and Main Study Methods

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When this project was originally developed, the intention was to carry it out as a single study. However, as the complexity of the issues emerged first in the review career cycles and transitions and then when reviewing the theory on intelligence and expertise, it became clear that a pilot would help refine both the methodology and theoretical focus of the main study. Firstly, I had not subjected many of the issues encountered in the review of the literature or through my previous experience to any kind of systematic investigation. A pilot and the analysis of its data would enable me to understand better the concepts and their operationalisation in careers. Secondly, a pilot would enable me to practice my interviewing technique. It would also enable me assess how effective I was at eliciting useful data from the participants. Thirdly, the pilot would provide an opportunity to revise the questions and interview protocol and to assess the accuracy of the coding of the data. Finally, the pilot would enable me to determine if I attained the right focus of the theoretical models or if I had overemphasised some and neglected others. While disconfirmation of theory can be useful, I wanted to make certain that both confirmation and disconfirmation of theory would be based upon as systematic and accurate an elicitation of information from the participants as was possible.

## **3.1 The pilot study**

### **3.1.1 Setting up the pilot**

#### **3.1.1.1 Pilot Study Sample**

There were 6 participants in the pilot study – 2 musicians, 2 sports people and 2 business people – drawn from the same population as described in the previous chapter on methodology. They all met criteria of the study.

#### **3.1.1.2 Outcomes from Pilot**

I will not engage in a detailed analysis of the data of the pilot study – though it is of interest, it parallels the data of the main study and all relevant issues will be addressed in Chapters 4-7 when reviewing the data of the main study. In this chapter I will, however:

- Identify several inadequacies of the pilot interviewing and coding processes that could be modified for the main study. These changes will be discussed more fully in the second half of this chapter addressing the main study method.
- Note further theoretical issues that emerged in the pilot which helped redirect some of the subsequent theoretical research and also target the main study interviews to elicit the data which will be discussed in the ensuing chapters.

### **3.1.2 Career and transition models**

The Career Stage, Stage Transition and Transition Process models used as the basis for categorising the statements of the participants were refined following the pilot. Fuller discussion of these models will be taken up in Chapter 8 and 9.

Here, I will only note briefly any revisions to the models that were used in collecting and analysing the data

### **3.1.2.1 Career Stage Model**

Following my preliminary analysis of career theories I had concluded that there would be five career stages in a typical career cycle and that these five stages could be used across different domains to differentiate levels of responsibility, changes in scope and new expert knowledge and skills required for a the new stage. However, the pilot clearly indicated the need for six stages as the original fourth stage which proved inadequate for encompassing the range of transitions that took place during this period of a career. Consequently, I introduced a new stage 5) *Divisional lead, department head or strategic lead* between 4) *Head of faculty, head coach, or head of a business unit* and 6) *Organisational Leader*.

1. *Studentship*. Age 5-24. Before any of the individuals in this study embarked upon a career they engaged in study and the acquisition of expert skills that they would use in their subsequent professional career.

2: *Performer*. Age 16 to 30. At this stage all of the participants were beginning their professional careers, further developing domain expertise and also managing their professional life.

3. *Coach/Manager/Professor*. Age 26-35. This transition took place at varying ages but was marked by a move into managing and directing the performance of others.

4. *Head of faculty, head coach, or head of a business unit*. Age 30 to 45. At this career stage individuals began to head larger departments within their field.

5. *Divisional lead, department head or strategic lead*. Age 35-50. This stage involves senior executive roles within an organisation.

6. *Organisational Leader*. Age 50 – 65. This final career stage involves becoming a senior vice president or CEO of an organisation.

### 3.1.2.2 Stage Transition

Between each Career Stages was a Stage Transition. The Stage Transitions are the part of the Career Cycle that are the major focus of this study. They are listed below including the new transition between Career Stages 5 and 6.

***First Stage Transition: From Student to Performer***

***Second Stage Transition: From Performer to Coach, Professor or Manager***

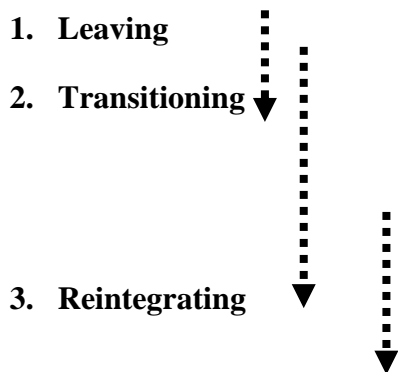
***Third Stage Transition: From Coach, Manager, Professor to Department Head***

***Fourth Stage Transition: From Department Head to Division Lead***

***Fifth Stage Transition: From Division Head to Organisation Leader***

### 3.1.2.3 The transition process model

A Transition Process model discussed in Chapter 1 consisted of three steps as indicated in in Figure 3.1.



*Figure 3.1 Transition Process Steps*

These steps proved adequate for tracking the transition process. However, it was clear from the pilot interviews that most of the participants' transition processes were concerned with transitioning and reintegrating. Most of the skills and abilities that make up Transition Expertise were used in the latter two stages.

Breaking down the transition process into further sub-stages seemed an artificial process at this point in the study and not particularly productive.

### **3.1.3 The interview process**

The most important challenge faced in the interviews was keeping the participants focused on career transitions rather than career stages and on the particular areas of behaviour as characterised by the theoretical models under consideration.

- Participants were very interested in telling their “career story,” usually sequentially and in their own way. One of the challenges was for the interviewer to keep the individual focussed on the transitions in their career rather than the stable career stages.
- Even when the interviewer tried to focus questions specifically on transitions, participants tended to confound transitions with more general discussion on developing their expertise and getting on with their careers.
- Progressing through the list of questions in a sequential, structured way interrupted the flow of the participants and produced less useful data.
- Generally, the list of questions was too long and too full of technical language which did not always convey the intent of the question to the participants.
- The questions about certain theoretical fields – self regulation for example – did not elicit very much response and seemed somehow inadequately formulated for generating useful data.
- Generally (as the interviewer) I felt I was falling between two stools: the interviews were not structured enough to generate standardised data



which might be analysed more quantitatively and not open enough to generate information rich qualitative data.

Revisions to the interview process in response to these challenges will be discussed shortly in the second half of this chapter.

### **3.1.4 Coding**

#### **3.1.4.1 Latent content analysis**

When first coding the pilot study data using content analysis it became clear that relying primarily on *manifest content analysis* would be inadequate. Manifest content analysis identifies the explicit or apparent elements of a text such as words or phrases which can be considered to represent the existence of a particular phenomenon in the experience of the interviewee (Gottschalk, 1995). Using this process with the interview data did not yield very useful information and it was necessary to rely primarily on *latent content analysis* which looks beyond specific words or phrases to identify the underlying message of the text. Utilising both methods results in a more interpretive approach which has been called *thematic analysis* (Gottschalk, 1995; Smith et al, 1992) which formed the approach used to analyse the content of the interviews for coding purposes.

#### **3.1.4.2 Duplication**

A large number of statements could be coded under a variety of codes. For example, a statement about spending time to plan in advance for a meeting with new team members after a career move could be coded as interpersonal intelligence, resource management and analytical intelligence. Where possible,

duplication was reduced by forcing some of the data into one category or another. Still in many cases data was coded under several categories.

#### **3.1.4.3 Differentiation**

Reducing replication was often achieved through carefully reviewing the context in which statements were made. An important typical example was the need to differentiate the generalisation of *expert processes* from that of *expert knowledge*. The process of differentiating the statements proved very educative.

#### **3.1.5 Theoretical issues arising from the pilot**

In the analysis of the data from the pilot, several issues involving the operationalisation of theory in ‘real life’ had been inadequately addressed in the interviewing process. But equally importantly, the effort to resolve the methodological questions resulted in the elucidation of the theoretical concepts through the constant referencing back to the literature in order to understand better what the participants in the study were actually describing so as to code the statements more accurately.

The following theoretical issues arising from the Pilot Study produced some changes in the questions and coding structure.

##### **3.1.5.1 Personal Intelligence**

The overlapping of models of personal, social and emotional intelligences made for some confusion which required clarification, particularly when different theorists were essentially talking about the same thing or when they used the same terminology to mean very different things. In the analysis of the data, a number of different subcategories of both intrapersonal and interpersonal

intelligence were identified but these were not captured in the coding itself. For example the category of self awareness might include statements concerning self identity issues, self assessment, or self regulation. However, these were noted and their implications addressed in the discussion of the data.

### **3.1.5.2 Practical Intelligence**

Practical intelligence proved awkward. Until the data had been fully transcribed and coding had taken place, it had proved difficult to differentiate the main components of practical intelligence. In addition, analytical intelligence was strongly linked to problem solving. In the end, practical intelligence's complicatedness was simplified for purposes of coding and analysis by dividing it into three areas: problems solving, administration and resource utilisation.

### **3.1.5.3 Expert knowledge and processes**

Expert knowledge and processes are intertwined: the one depends upon the other and visa versa. Yet it was felt important to differentiate when individuals were generalising a particular type of knowledge e.g., about ball control from performing to coaching vs. generalising a process e.g., from how one plans one's performing career to how one organises a faculty of music.

### **3.1.5.4 Generalisation of expertise**

I had to reorganise the coding to account for different factors that influenced the generalisability of expertise.

1. Though I had not intended to investigate how the way in which expertise was acquire might influence expert generalisability, participants all wanted to talk about their early development as an expert and significant amounts of data emerged concerning how they acquired their primary

domain expertise. In the end the data was coded so that some conclusions could be drawn about the how acquisition of expertise might influence its generalisability.

2. After the pilot, I decided to differentiate the coding of expert knowledge from expert processes. The two were distinct, though intertwined, and they seemed to be different in how they did or did not transfer across domains.
3. Increased theoretical research after the pilot helped clarify the nature of cognitive flexibility as a key contributor to expert generalisability. This was subsequently coded as were some of its manifestations in the form of non-reductive bias or non-automaticity to help understand better how cognitive flexibility operated to enable expert generalisability.

### **3.1.5.5 Under-representation of theory**

Some areas that were hypothesised to contribute to transition expertise were under-represented in the data. For example, both metacognition and self regulation produced less instances than had been anticipated. This may have been due to the structure of the questions or the interviewing process itself. Or maybe they operated largely as tacit knowledge and participants simply couldn't verbalise engaging in self regulatory or metacognitive monitoring processes. But it might also be the case that these intelligences and expert processes that had been hypothesised to contribute to transition expertise did not substantially do so. Though I initially considered dropping self regulation and metacognition from the study, I decided subsequently that it was important to keep these models in the study to consider whether they were or were not major factors in transition expertise.

### **3.1.6 Summary of benefits from conducting a pilot**

The pilot study proved invaluable for refining the interview protocol, improving interviewing skills, clarifying the application of theoretical models to both interviewing and analysing the data, and refining the coding process. While these changes discussed in this chapter helped refine the methodology for the dissertation as a whole, the method itself was not significantly changed. Rather it was refined and made more ‘fit for purpose’ for the study of transition expertise.

## **3.2 The main study**

### **3.2.1 Main study sample**

The Main Study population was drawn from the same population as described in Chapter 2 and as took part in the Pilot Study. There were 8 musicians, 8 sports people and 8 business people.

### **3.2.2 Interviews**

The general structure of the interview protocol was maintained but it was modified to reflect the learning from the Pilot Study. The opportunity for the interviewer to probe was expanded and samples probes were included in the questioning protocol since extended probing is one of the main benefits of semi-structured interviews (Boyatzis, 1998; Berg, 2004). There was also some shift in the content emphasis (Gottschalk, 1995) as discussed in the theoretical implications above.

#### **3.2.2.1 Revised Interview Protocol**

Having tried to ‘force’ the interview process down the structured interview protocol in the pilot, the interview approach was modified to follow the narrative

of the individual as they composed it and to use questions and interventions to investigate their narrative further or steer them toward the areas of interest for the study rather than to impose a rigid structure, sequence of questions or timetable which the interviewees were compelled to follow. As Roe explains: “I let him go ahead and give this to me as fully as he wished, and asked questions only when necessary to clarify a point or to remind him of something he had omitted” (Roe, 1952, p. 33). Consequently, the method of the Main Study evolved from the more *structured* approach of the pilot to a *semi-structured* process and in some cases utilised a *quasi-unstructured* approach to generate useful data (Lindlof & Taylor, 2002). This meant that:

- The interview protocol was perceived as a general guide and the question outline was not always followed in their written sequence.
- The time dedicated to each question or area of the overall interview varied from participant to participant due to the way in which the data emerged unevenly from the interviewing process and according to what they stressed as important.
- Participants were allowed to start at the beginning of their career and to then progress through the stages of their total career as it unfolded over time. Questions were interjected as expeditiously as possible to maintain the focus on transitions.
- If a participant spent more time discussing one transition, this was considered to be indicative of that transition’s importance for understanding the nature of their transition expertise.

- Probes would be used more frequently. They might take the form of “Tell me more” or “Could you be more specific?” or “In what way?” The probes could also include more targeted questions derived from some of the theoretical models e.g., “Was this way of dealing with the challenge planned or more spontaneous?” Where such a probe provoked a relatively minimal or non-informative response e.g., “I don’t know, I just did” then a second or third probe would be asked e.g., “Did you set goals to achieve an objective within a certain time?” If probes continued to produce sparse information, the line of questioning was discontinued.
- The interviewer periodically interject ‘uh-huh’ or ‘hmm’ in order to encourage the respondent to go deeper into their experiences.
- Throughout the interview, the interviewer still maintained a clear objective of progressing systematically through the interview process and collecting data across all dimensions of the interview protocol.

### **3.2.3 Coding**

#### **3.2.3.1 Cleaning the data**

The first completed coding resulted in excessive and sometimes inaccurate coding. When all coding was finished I had attained a substantially better understanding of the theory as well as a better knowledge of the data, what it was ‘saying’ and the coding structure itself. As consequence, when the coding was then reviewed, approximately 20% of the preliminary codings were eliminated as weak or wrong. Subsequently, in the process of analysing the data in light of the theory and beginning to draw conclusions about the data, there were again a number of data which were not clear enough illustrations of the theoretical point

so as to be retained or even more importantly which needed to be recoded under a different category. This eliminated approximately another 10% of the codings and also resulted in at least 10% recoding to another category. In total, the process of cleaning and refining the coding resulted in the elimination of approximately 35% of the original codings and the recoding of approximately 20% of the items.

### **3.2.3.2 Changes in coding structure**

As the analysis of the data progressed, there were some modifications in coding categories, *in vivo*. Most of these changes were simply reorganising the trees, branches and nodes so that they were more logically and tightly grouped. Some nodes were incorporated into others and some that were subsumed under others. Some branches were collapsed. However, most of these modifications took place between the Pilot and the Main Study where some coding nodes were eliminated completely and other new coding nodes introduced.

## **3.3 Conclusion discussion**

While the theoretical and methodological approaches for the pilot and the main study were largely similar, the pilot proved extremely useful for refining most aspects of the methodology of the main study and clarifying a number of theoretical issues. Based upon the foregoing refinements in research methodology, the collection, coding and analysis of the data of the Main Study was conducted and the data that produced was considered to be satisfactory and valuable. The next part of this dissertation will now present the main theories of the areas under study and the findings of the data in light of these theories as they help explain the nature of transition expertise.



# Chapter 4. Expertise and Expertise Generalisability

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## **Introduction**

Expertise largely consists of the learned knowledge and processes that enable an individual to perform in a given domain. The effectiveness in retrieving domain-related knowledge and using expert processes for performing in a domain will further determine the degree of expertise in a particular domain. This chapter is divided into three parts. The first part will review some of the major theoretical approaches to the study of expertise and important accompanying theoretical issues like memory, practice and life-span development. The theoretical discussion will then address issues which concern the generalisability of expertise such as cognitive flexibility, domain specificity, and generalisation of knowledge and processes. It will also review some of the major impediments to expert transitions like functional fixedness, reductive bias, and automatisisation and how these might be overcome. The second part of this chapter will review the data in light of three questions: How much does the way expertise is acquired at an early stage influence its generalisability? How effectively were the participants in the study able to generalise their expert knowledge and processes? How cognitively flexible were the participants in circumventing cognitive impediments during transitions? The third part of this chapter will briefly summarise the conclusions.

## 4.1 Expertise theory

### 4.1.1 Theories of expertise

#### 4.1.1.1 A prologue: Information processing models

To understand the workings of expertise a brief prologue is necessary. Information processing models emerged in conjunction with the search for a workable model for mental representations in cognitive psychology. Together they formed the basis for most expertise theories. Colin Cherry (1953) and David Broadbent (1954) developed information processing models in which human cognitive processes were viewed as analogous to the operation of computer programmes based upon Broadbent's engineering models and process flow diagrams: taking inputs, processing the information, and transforming it into outputs. Bruner, Goodnow and Austin (1956) proposed that behaviour could be explained through the execution of "strategies" which consist of *long strings of logic* or chains of actions in human cognition that are developed over multiple trials and refined through feedback on results rather than in response to a particular stimulus/response situation. Miller, Galanter and Pribram suggested that human cognition could be thought of as a symbol manipulation process in which *plans* operate like computer programmes as a "*hierarchical process in the organism that can control the order in which a sequence of operations is to be performed*" (1960, p. 16). Executive programmes could control lower order subroutines thereby structuring complex problem solving activities. Their collaboration is perhaps most well known for their TOTE (Test-Operate-Test-Exit) model. Intellectual adaptability and development occurs as plans become

more *horizontally elongated, vertically elaborated, numerous and efficient* (Sternberg, 1982).

Newell and Simon's (1972) *General Problem Solving (GPS)* used *production systems* to explain problem solving and decision making processes. Production systems consist of a sequence of ordered productions of condition-action sequences. An *executive* is hypothesised to make its way down a list of productions and when certain conditions are met, then certain actions are performed through use of heuristic searches in which knowledge is represented as operating through a series of execution tasks involving production rules formulated in a sequence of: "IF... *a pattern* exists....THEN....*an action* follows." The process is repeated until it has worked through the list of productions and a problem is resolved. Subsequent models were developed for *self-modifying production systems* in which rules enabled "productions to modify other productions" (Waterman, 1975; Langley, 1984). Under the right circumstance unsuccessful problems solving strategies can be abandoned or modified to enable searches in new directions (Newell et al., 1962). Different mechanisms produce these modifications such as *strengthening and discriminating mechanisms* which tend to reinforce more specific productions and *generalisation mechanisms* which weaken the specific conditions that activate a production (Klahr & Wallace, 1976) and allow productions to be executed under a wider range of circumstances (Anderson, Kline, & Beasley, 1976). Production systems were developed over time into sophisticated models of learning and development (Klahr, Langley & Neches, 1984). Production systems that use self-modifying rules have been applied to solving algebra problems, puzzle solving, concept learning, schema abstraction, language

acquisition, and other learning situations (for an overview of this research see Langley, Neches, Neves and Anzai, 1981).

#### **4.1.1.2 General theory of expertise**

Most contemporary research in expertise can trace its roots back to Simon and Chase's seminal *General theory of expertise* (Simon & Chase, 1973; Chase & Simon, 1973). Simon and Chase's computer based model proposed that knowledge and experience are accessed via sensory and semantic *cues* that are used to sort through a *discrimination net* to an end point or *leaf* which represents a piece or 'chunk' of knowledge or experience. These leaves are linked associatively to other information or *leaf nodes* so that a given leaf can be compared with other leaves and new nodes can be created when new stimuli cannot be 'accommodated' by one of the older leaf nodes. Knowledge and experience is organised, stored and subsequently accessed using discrimination nets (Richman et al., 1995) and templates (Gobet & Simon, 1996b). Discrimination nets grow both quantitatively and associatively and are used to store, identify, compare, contrast and organise information in ways that make it accessible for use. This storing, sorting, and information retrieval model is complemented by Newell and Simon's (1972) earlier *General Problem Solving (GPS)* in which expert *production systems* operate as problems solving and decision making processes. *Soar* (Newell, 1990), another computer based model, stored information about the paths followed in previous problem solving processes and could recognise recurring patterns and resurrect previous paths without the need to duplicate the problem solving process (Richman, Staszewski & Simon, 1995).

Together these three sets of processes – information acquisition and retrieval (discrimination nets, nodes, leaves), pattern recognition (SOAR) and problem solving (GPS) – could be said to operate in concert as the comprehensive platform for the general theory of expertise (Newell & Simon, 1972; Simon & Chase, 1973; Feigenbaum & Simon, 1984; Gobet, 1993).

#### **4.1.1.2 The expert performance approach**

Ericsson collaborated with Chase (Chase & Ericsson, 1981, 1982) in the study of memory and retrieval of information to develop early models of a *skilled memory theory*. In numerous subsequent collaborations with colleagues Ericsson developed the *expert performance approach* to the study of expertise “to describe the structure of superior performance of experts by reproducing it repeatedly in the laboratory and then by applying available methods of process-tracing and experiments to assess the mediating mechanisms” (Ericsson, 2003, p. 380). The expert performance approach has reached a number of theoretical positions on expertise which are generally agreed upon: (a) expertise and its acquisition are domain specific; (b) performance related memory and problem solving abilities are domain specific and tied to experience and knowledge in that domain; (c) the ways experts organise and represent their knowledge is qualitatively different than non experts and much of the way it is organised and used is contextually based; (d) the use of this knowledge can be intuitive and not always accessible through verbal reports; (e) elite achievements are very much the product of superior learning environments. But some positions to which Ericsson’s theory is tied are questioned such as: (f) general traits or innate mental and physiological capacities are not essential for or predictors of exceptional performance; (g) the development of expertise is primarily the product of *deliberate practice*; and (h)

the study of expertise can only be conducted in studies which replicate domain-specific expert performance in the controlled environment of a research laboratory (Ericsson, 2006, pp. 10-14).

#### **4.1.1.3 Mental construct and reasoning based models of expertise**

Knowledge based paradigms provide a variety of alternative theoretical perspectives to describe the cognitive structures which enable expert knowledge to be organised and retrieved. *Schemes* (Case, 1974) consist of a variety of increasingly complex internal representations of information, perceptual configurations, functions, rules, and procedures that individuals use to solve problems. *Schemas or schemata* (Rumelhart & Ortony, 1977) can also be thought of as prototypical representations or mental structures of a situation in one's memory that act through *pattern matching* in which a current situation is matched with an existing schema so that an individual can recognise it as belonging to a given class of situations. This enables them to recognise and respond appropriately to a situation rapidly and with decisions and actions based upon previously successful responses. Rumelhart and Norman (1978) propose two main modes for the acquisition of knowledge in schemata: *accretion* which assimilates new knowledge into existing structures and *restructuring* which reorganises existing knowledge structures to accommodate new information that does not fit into existing knowledge structures. Interestingly, these echo Piaget's proposal that adaptation is "an equilibrium between assimilation and accommodation" (Piaget, 1972, p. 7). Schemata include processes that enable an individual to expand their application to different situations with different content. New schemata are acquired by modifying or combining old schemata.

*Frames* (Minsky, 1975, 1977) like schemata operate as data structures that represent stereotyped situations and enable individuals to respond appropriately to similar but different situations such as entering one's own living room to relax versus going into some else's living room for a party. *Moderately Abstracted Conceptual Representations* or *MACRs*, enable an expert "to become facile at processing information at the appropriate level of abstraction for that domain" (Zeitz, 1997, p.44). The schematic nature of these abstract representations not only integrates information but can also represent what is important and ignore the trivial or non-related and thereby aid in steering a particular course or action. This process has been demonstrated (Patel & Groen, 1991) in research on forward thinking strategies for problem solving in medical experts and generally in providing justification for a course of action (Zeitz, 1997).

*Mental models* was used by Endsley (2006) to classify a number of other knowledge based paradigms including concepts like *scripts* (Shank & Abelson 1977), *prototypes* (Rosch & Mervis, 1975) and *trees* (Reitman & Rueter 1980). These various mental models provide expert performers (a) structures for knowing what information is relevant in a given situation, (b) the ability to take in information rapidly and classify it appropriately, (c) a mechanism for projecting future states and forward thinking from the current situation, and (d) the ability to make effective decisions through this knowledge. Such "formalisms" are frequently used to represent expert knowledge systems that model human performance in computer programmes (Gobet, 1998).

#### **4.1.1.4 Expertise: The question of practice vs. ability**

Simon and Chase (1973) first proposed that it took 10 years or more of nearly full time practice for an individual to become an expert in chess. Bloom (1985) identified the long period of development required to achieve excellence in his talented young people. Ericsson and Crutcher (1990) confirmed this general standard of 10 years of intensive practice and preparation required for expertise across a range of domains. There is little doubt that in many ways ‘practice makes perfect’ and expertise research has been strongly influenced by the expert performance school and its theory of *deliberate practice* (Ericsson, Krampe & Tesch-Römer, 1993) which distinguishes work and play from deliberate practice in which the latter is said to be the basis for developing the cognitive processing mechanisms as well as physiological adaptations that enable individuals to perform at elite levels and perform at the extreme range of limitations of physiological, psychological and cognitive processes (Ericsson & Smith, 1991). There are a number of attributes that together are said to characterise deliberate practice (though most of these are generic approaches to skill acquisition and are not exclusive to the specific concept of deliberate practice). These include “focused, programmatic, carried out over extended periods of time, guided by conscious performance monitoring, evaluated by analyses of level of expertise reached, identification of errors, and procedures directed at eliminating errors. Specific goals are set at successive stages of expertise development” (Horn & Masunga, 2006, p. 601). Through the central role assigned to deliberate practice in the acquisition of expertise, Ericsson and his colleagues have challenged the notion of the importance or even necessity of giftedness, talent or intelligence as a central criterion for the development of expertise (Ericsson & Smith, 1991;



Ericsson, Krampe & Tesch-Romer, 1993; Ericsson, 1996; Ericsson & Lehmann, 1996). At the very least an extensive range of studies have sought to demonstrate the primacy of skill acquisition processes and learning over talent or intelligence for achieving expertise as indicated by the research in music (Sloboda, 1991); musical pitch (Oakes, 1955); medicine (Norman, Brooks, and Allen, 1989); bridge (Charness, 1979); sport and dance (Allard & Starkes, 1991); and generally (Chi, Glaser & Farr, 1988).

But deliberate practice theory does not go unchallenged. Sternberg (1996a) systematically details the methodological shortcomings of research associated with the expert performance/deliberate practice model. These include: 1) numerous examples of high performance/low practice results as well as the high heritability of practiced skills such as verbal and quantitative abilities; 2) rendering itself non-disconfirmable by ruling out as expertise any domain that doesn't depend heavily on the need for deliberate practice; 3) confounding correlation with causation - deliberate practice is not necessarily causally linked to expertise; 4) often not including control groups, for example, those that have spent equal amounts of deliberate practice time without achieving expertise; 5) ignoring dropout effects and the fact that individuals will stop pursuing an expertise when they are not doing well, even if they have invested significant amounts of deliberate practice; and 6) choosing data that maximises the fit of data to theory and ignoring or not studying domains that do not fit its model.

Abernathy, Farrow and Berry (2003) question whether practice requires “full attention and complete concentration.” They maintain that implicit learning can play a significant role in expert performance and that implicit knowledge may be

acquired by means other than deliberate practice. Beek (2000) suggests that implicit learning rather than explicit learning may in fact be the norm in the acquisition of movement skills. Young and Salmela (1998), in their study of athletes noted that provincial (lower level) middle distance athletes enjoyed practice less than national level athletes, challenging Ericsson's proposition that deliberate practice is by nature not enjoyable. While some real life expertise can be measured under standardised conditions e.g., chess, memory, typing and mental calculations, there are also a greater number that cannot. Expertise needs to be observed in practical applications in order to understand its operation more fully (Sternberg, 1996b). Medical diagnosis which is often the subject of expert research is not easily reducible to laboratory study or when done so proves extremely difficult to standardise and measure (Patel & Groen, 1991). The psychomotor skills and tasks associated with playing a sport such as tennis are extremely difficult to test and measure in a laboratory since they interact with each other synergistically as well as with mental and affective elements of the game. Extracting them from an integrated sporting performance is not predictive of performance in real life (Abernathy, Farrow & Berry, 2003).

#### **4.1.2 Expert knowledge: Memory, storage, access and retrieval**

There has been a long history of studying the acquisition and retrieval of domain relevant knowledge as an important measure of expertise. Most of this has focussed on the use of memory starting with Binet's (Binet & Simon, 1916) early study of memory experts and skilled mental calculators. Classic studies such as de Groot's (1946) study of memory in chess, Chase and Simon's (1973) studies of expertise in chess, and Chase & Ericsson's (1981; 1982) recall of random

numbers have all attempted to elucidate the relationship between memory and expertise. Models like Miller's (1956) conceptualisation of *chunking* explained the capacity to group related information into larger more useful aggregations and Atkinson and Shiffrin's (1968) Long Term Memory (LTM) and Short Term Memory (STM) memory differentiated the dichotomous storage capacity of memory. Together they provide structures for the operation of memory which have gained widespread acceptance. For expertise theory, the mechanisms of memory storage, access and retrieval have operated as a forum for discussion of the role of knowledge in expertise. So for the purpose of examining how experts in transition use their expert knowledge, the discussion of memory is appropriate.

#### **4.1.2.1 Episodic and semantic memory**

Tulving (1972) differentiated between *episodic* and *semantic* memory. Episodic memory receives and stores information about specific events e.g., remembering what I had for lunch yesterday utilises episodic memory. Semantic memory includes processes, rules, algorithms and inferential properties that enable it to be used to draw conclusions without necessarily having experienced a specific event e.g., though July follows April in the calendar year, one can use semantic rules to conclude that April precedes July alphabetically without ever having a specific experience of learning this information. Though the use of episodic and semantic memory covers different kinds of operations, nonetheless they are interdependent, share content and utilise outputs from each other. This model of memory incorporates many elements of Chase and Simon's production systems. For episodic memory the nature of the encoded *traces* rather than other semantic processes will determine whether it is retrieved (Tulving & Osler, 1968). *Encoding specificity* determines that "only that can be retrieved that has been

stored, and how it can be retrieved depends on how it was stored” (Tulving & Thomson, 1973). However, the more links an experience has to semantic memory, the more readily memory of that experience can be retrieved through a variety of routes: when “human memory search is guided by semantic retrieval cues, any semantic aspect of a target could potentially provide access to a relevant analogy” (Holyoak, 1984, p. 218).

#### **4.1.2.2 Long Term Working Memory (LT-WM)**

The model of *Long Term Working Memory (LT-WM)* (Ericsson & Kintsch, 1995) is based upon earlier work on skilled memory theory (Chase & Ericsson, 1982). It seeks to bridge the gap between Atkinson and Shiffrin’s (1968) Long Term Memory (LTM) and Short Term Memory (STM). LT-WM operates as an “efficient extension” of STM which enables an individual to access information that has been stored in LTM through the use of associated retrieval cues even when cognitive processes are interrupted or a situation requires parallel cognitions. Its “mediating mechanisms” are based on Kintsch’s earlier studies in discourse comprehension (Kintsch & van Dijk, 1978) and in particular his model of *Construction-Integration (CI)* (Kintsch, 1988) which accounts for how readers construct and integrate their comprehension of text through linguistic cognitive processes that sustain comprehension of text from sentence to sentence and paragraph to paragraph during interruptions or when seeking to unravel the general complexity of a text.

#### **4.1.2.3 Articulatory loops**

Baddeley, (1986, 2003) proposed a model of *working memory* that consisted of an executive control system which is accompanied by two *slave processing*

*systems* for visuospatial and phonological information. Working memory utilises *articulatory loops* which can code, store and retrieve information as well as delay or hold operations during the manipulation of information and the delays accompanying this manipulation.

#### **4.1.2.4 Template Theory (TT)**

*Template Theory (TT)* (Gobet & Simon, 1996b) is much more than a memory model. Rather it is a complex schematic structuring process for storing, accessing and using expert knowledge. But it is useful for discussing how the general theory of expertise addresses memory retrieval. Templates consist of core chunks that have been developed and organised in a schematic form and give access through association to an extended range of knowledge via discrimination nets and retrieval processes in which some nodes evolve into more complex data structures or templates. Templates operate as cognitive retrieval processes that enable searches to identify stored memory of previously observed patterns which conform to or diverge from a new pattern. These pattern recognising, strategy-forming and decision making processes enable experts to organise knowledge in accessible and useable constellations of information (Gobet & Simon, 1996b; Gobet, 1997). In the case of chess, for example, semantic memory can operate as a template that may include references back to the opening moves which led to a particular position. According to Template Theory (Gobet & Simon, 1996b), expertise is due in part to both the large number of chunks in memory which are indexed by discrimination nets and to the large knowledge base which is encoded as production systems and schemata. Chunks can be developed into templates which are specific to situations in a domain and the process slots in the template allow it to be adapted to a given

situation and be filled in by non-stable features. Templates present a model for how self-modifying production systems might operate. Using templates, potential future moves can emerge from the current position, plans for moves to apply to or counter a position can be developed, etc. (Gobet, 1998). Furthermore “nodes in the discrimination net may be accessed through several paths, thus adding redundancy to the system” (Gobet, 1998, p. 127).

#### **4.1.2.5 Expert knowledge: Memory, access and generalisability in performance**

Extensive research has demonstrated that experts are superior to novices in storing and accessing knowledge in a domain. This includes studies in music notation (Sloboda, 1976); go (Reitman, 1976); medicine (Norman, Brooks, & Allen, 1989); electronics (Egan & Schwartz, 1979); bridge (Charness, 1979); field hockey (Starkes & Deacon, 1985); figure skating (Deakin & Allard, 1991); chess (Chase & Simon, 1973); mental calculations (Staszewski, 1988); and many other domains. Overall, there is a strong correspondence between the development of expertise and memory (for a summary, see Wilding and Valentine, 2006) which could suggest a monotonic relationship between memory, performance, and expertise in a domain. There is also considerable debate about how generalisable domain specific knowledge is, how much memory storage and retrieval processes contribute to non-generalisability and how tightly linked knowledge and memory storage and access processes are. The ability to generalise domain specific knowledge for use both during transitions and in subsequent domains is important for transitions expertise.

#### ***4.1.2.5.1 Domain knowledge and memory retrieval non-generalisability***

The knowledge-tied basis of expertise has been well established both through ‘folk wisdom’ and through repeated research across a wide range of domains. The seminal works of de Groot (1978), Newell and Simon (1972) and Simon and Chase, (1973) demonstrated that skilled problem solving performance in a domain was dependent upon domain specific knowledge. Some expert models for memory systems maintain more restrictions than others. Ericsson and Kintch propose that their LT-WM is acquired “in particular domains to meet specific demands imposed by a given activity on storage and retrieval [...] and must therefore be discussed in the context of specific skilled activities” (1995, p. 221). Knowledge retrieval models like long term working memory (LT-WM) (Ericsson & Kintsch, 1995) and template theory (TT) (Gobet & Simon, 1996b) utilise cognitive mechanisms to acquire expertise and subsequently access it which are intertwined with the knowledge specific to a given domain. In the end, habits and skills “become relatively inflexible, involuntary, automatic” and when over-learned become “almost as resistant to change as if [they] were innate” (Miller, et al., 1960, pp. 83, 89).

Chi (2006) characterises *context dependence* as the state in which cognitive retrieval strategies can be very domain-specific particularly when accessing memory: when the context changes, expert predictions and solutions based upon previous experience may be inappropriate. Experts rely on contextual clues for accessing their stored knowledge, for example about a patient and their history, when conducting medical diagnosis, particularly where there are tacit elements to that knowledge (Feltovitch & Barrows, 1984). Voss and colleagues found that chemistry professors who took the role of political operatives in the Soviet Union

performed similarly to novice political scientist when attempting to implement strategies for increased crop production and seemed unable to transfer their academic knowledge to ‘real world’ applications (Voss, Tyler, & Yengo 1983).

#### 4.1.2.5.2 Flexibility of knowledge retrieval

However, memory management processes like chunking, schemata, and long term memory can store *and* allow access to expert memory from multiple routes and in multiple domains (Feltovitch et al., 1984; Hoffman, 1987; Woods et al., 1994; Gobet, 1998; Chi, 2006; etc.). Ericsson and Kintsch’s hierarchical representation of the retrieval structure of LT-WM includes a variety of levels or operations such as retrieval cues, associations, encoding processes, and schemata (Figure 4.1) which will contain knowledge and processes that can be accessed from multiple routes.

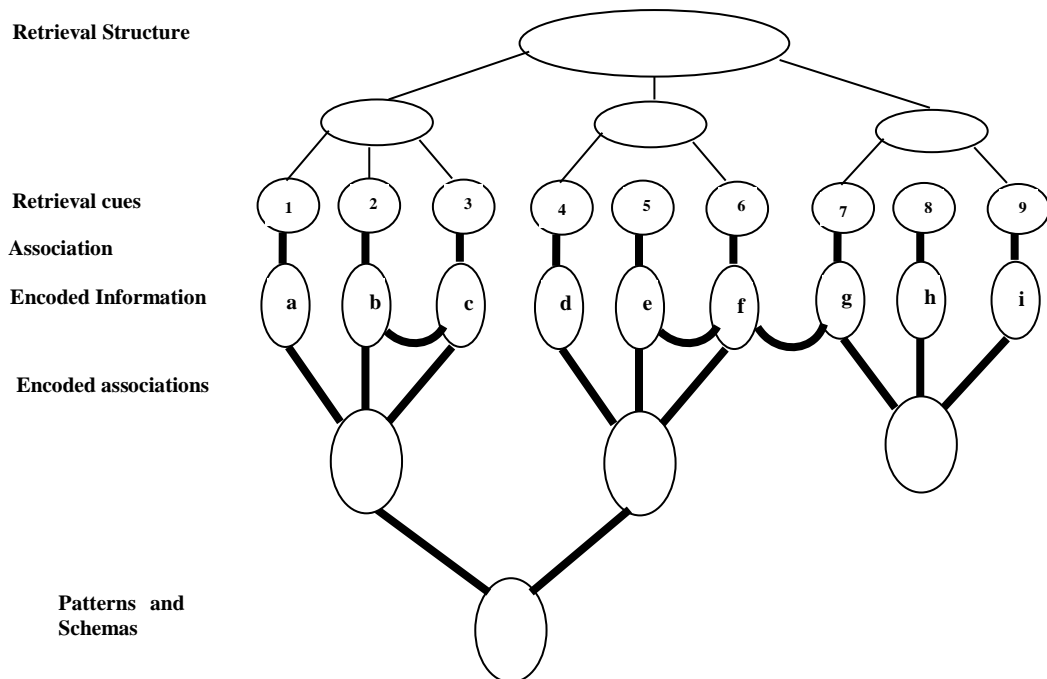


Figure 4.1 Hierarchical representation of retrieval structures. Based on: Ericsson, K.A., & Kintsch, W. (1995)



Sternberg argues (1996a) that some of the domain-tied constraints identified in memory retrieval may be due to the limited kinds of expertise studied in laboratories for methodological purposes and they may not apply strictly in real life situations or in domains such as expert chefs or gardeners which cannot be studied or contained effectively within the laboratory confines.

Template Theory (Gobet & Simon, 1996b) allows for a range of access routes to expert chess memory: “chunks and templates may be accessed by contextual cues, by descriptions of strategic or tactical features, by the moves leading to the position, by the name of the opening the position comes from, or by the names of players known to often employ that type of position [...] these routes may be modelled by discrimination nets” (Gobet, 1998, p. 127). It is possible that, having developed the appropriate “meta-heuristics that are transferable” (Gobet, 2005), individuals will be able to adapt to changing circumstances. Depending upon how discrimination nets are developed to build up templates, they may have more or less freedom from their ties to a specific domain because, when the nodes in the discrimination net can be accessed through several paths, templates can apply to a range of situations depending upon how open their process slots are to being filled by non-stable features that will be used adapt them.

Abstract conceptual knowledge avoids an “overreliance on intact, pre-packaged schema-like knowledge structures that will not account for enough of the variability in the ill structured domains” (Feltovitch, Spiro & Coulson, 1997, p. 139) and is more context-sensitive and adaptable to new or non-habitual situations. Maximal cognitive flexibility will be maintained when (a) concepts or principles are explored across many diverse cases when learning how to tailor

abstractions to accommodate different situations and (b) a variety of actual cases are explored to learn how sets of concepts and abstractions actually influence and interact with each other in varying contexts (Feltovitch, Spiro & Coulson, 1997).

#### ***4.1.2.5.3 Non memory based expertise***

Questions have also been raised about the primacy of the role of memory in expertise. A range of research has identified non-monotonic relationships between memory and expertise, for example when comparing melody recall between musicians and non-musicians (Sloboda, 1991); in volleyball (Allard & Starkes, 1980) where studies showed mixed results in memory recall of both structured and unstructured schematic plays; and in medical case recall (Patel & Groen, 1991) where expertise corresponded more to identifying the relevancy of data to medical diagnosis than recall of case detail.

The centrality of cognitive and semantic approaches to expertise have also been questioned: “There has been protracted debate in the motor control and learning field as to whether a consolidated theory of movement control and learning requires mental representations and other cognitive constructs to be invoked as a basis for explanation [...] Issues viewed as particularly problematic relate to the use of verbal reports as data, the omission of the role of incidental and especially implicit learning in expert performance [...] and the exclusive reliance on cognitive mechanisms as the locus of expertise” (Abernathy, Farrow & Berry, pp. 364, 369, 2003). Systems-based approaches such as Adams’ (1971) *closed loop theory*, Keele’s (1968) *motor programme model*, and Schmidt’s (1975) *schema theory* all present expertise models that focus less on memory and more

on feedback loops, comparator systems and control systems to explain expert behaviour, particularly when addressing the acquisition of motor skills.

### **4.1.3 Expert processes: flexibility and generalisability**

Following this overview, we can address a central issue in this dissertation: is expertise generalisable, does cognitive flexibility support this generalisation and if so what kind of cognitive flexibility will enable individuals to generalise expert knowledge and processes from one domain to another? I shall summarise some of the main arguments first against cognitive flexibility and expert generalisability and, then, for cognitive flexibility and expert generalisability.

#### **4.1.3.1 Cognitive inflexibility and the non-generalisability of expertise**

There is a large body of research that shows how expertise is domain specific and that experts cannot readily apply expertise from one domain to another.

##### ***4.1.3.1.1 Domain processes tied to domain knowledge***

There are arguments that the cognitive processing abilities developed during the acquisition of expertise in a particular domain will be domain-knowledge tied and relatively non-transferable (Chase & Simon, 1973; Ericsson & Kintsch, 1995; Gobet & Simon, 1996; etc.). As mentioned earlier, most expert models utilise memory mechanisms that store and retrieve domain knowledge in *context dependence* ways (Chi, 2006). When the context changes, predictions and solutions based upon previous experience may be inappropriate (Feltovitch & Barrows, 1984). *Encoding specificity* can limit the ability to access knowledge except through (domain-specific) traces encoded with the knowledge itself (Tulving & Thomson, 1973). Tying expert knowledge to domain specific

algorithms and related cognitive processes may enhance expert performance but limit its generalisability, reducing flexibility and adaptability (Wiley, 1998; Chi, 2006). Experts can respond poorly to changes in rules for processes, e.g. changing the ground rules in bridge (Frensch & Sternberg, 1989) or chess (Simon & Chase, 1973) significantly reduces performance. There would appear to be limitations of transfer of expertise even between very similar domains. For example, even though games players in Go and Gomoko use similar pieces and boards, there is relatively little transfer of expertise in either direction (Eisenstadt & Kareev, 1979). In the domain of medical diagnosis and surgery, expertise does not necessarily transfer to related fields (Norman, Eva, Brooks & Hamstra 2006).

**4.1.3.1.2 Domain specific cognitive processing mechanisms**

Experts in different domains within the same field will develop and use different kinds of cognitive processing mechanisms which can be very domain specific. Salthouse (1991) identified seven types of processing limitations characteristic of representative activities in domains where overcoming these limitations differentiates experts from non-experts (Table 4.1).

*Table 4.1 Activity domains, by processing limitations. Based on Salthouse (1991)*

Hypothesised processing limitation of non-experts	Activity/Domain where operative
1. Not knowing what to expect	Planning/managing Chess, Music, Sports
2. Not knowing what to do and when to do it	Planning/managing Chess, Sports
3. Lack of knowledge of interrelations among variables	Planning/managing Decision making, Physics
4. Not knowing what information is relevant	Decision making Physics
5. Difficulty in combining information	Decision making
6. Insensitivity to sensory/perceptual discriminations	Music, Sports
7. Lack of production proficiency	Music, Sports

Ste Marie (2003) proposed that specific cognitive processing limitations could also contribute to or even characterise the different expertise-specific

requirements or different role requirements of different (sub)domains within the same field. She identified four of Salthouse's cognitive processing limitations that could differentiate coaches, referees and players.

1 *Sensitivity to perceptual discriminations* in which expert referees were more accurate in identifying fouls or infractions than players or coaches – particularly in identifying the type of foul.

2 *Knowing what information is relevant* which is reflected in expert referees' abilities to seek and detect different sources of information than players and to attend to information more relevant for penalties, rule infractions, etc.

3 *Knowing what to expect* in which expert referees were better at anticipating what might happen or be coming than novice referees which in turn reduced their processing demands allowing them to focus on other areas of the game.

4) *Knowing the interrelations among variables* in which referees knew the rules better and were able to articulate and were more effective in using semantic representations of them.

For example, referees were better at stating rules, knowing signals for rules and naming fouls whereas coaches were better at recalling accuracy for structured game plays. Coaches are not required to develop the declarative knowledge essential for refereeing nor the abilities to access this knowledge. Different kinds of knowledge about the same game would be accessed through different sets of cues, retrieval systems, or templates that might be tightly tied to the kind of processes and knowledge they are accessing. Knowledge of the content of the domain would not be sufficient to make a transition: to move from one domain to

another, even within the same field such as from playing to coaching, will require training to develop the different cognitive mechanisms specific to the type of expertise in the domain.

#### 4.1.3.1.3 Reductive bias

The term *reductive bias* is used to describe the process whereby individuals who acquire expertise tend to treat or interpret complex situations and issues as simpler than they in fact are (Feltovitch, Spiro & Coulson, 1993). In the field of medicine and medical diagnosis in particular, there are recurring examples of reductive bias operating to limit a medical practitioner’s flexibility in diagnosing non-normal cases or cases that present unusual or conflicting symptoms. Feltovitch, Spiro and Coulson (1993) identify a number of oppositions between reductive bias and non-reductive bias some of which are listed in the Table 4.2.

*Table 4.2 Reductive bias vs. Non-reductive bias. Based on Feltovitch, Spiro and Coulson (1993)*

Discreetness vs. Continuity	-	In which processes can proceed by discreet step or in an unbroken continuity.
Static vs. Dynamic	-	Are the important attributes of a situation capture in fixed “snapshots” or are they observable in changes and movement from shot to shot?
Sequentiality vs. Simultaneity	-	Do processes only occur one at a time or can multiple processes take place at the same time?
Mechanism vs. Organism	-	Are cause and effect directly, simply and casually linked or do they need to be understood as part of a more systemic, organistic function?
Universality vs. Conditionality	-	Do principles operate in the same way across different situations or are they more context sensitive?
Separability vs. Interactiveness	-	Do processes occur independently (or with weak interaction) or do they have interdependence and interaction?
Regularity vs. Irregularity	-	Is the domain (and expert performance) characterised by high routinisation or do cases and situations differ even if called by the same name?
Surface vs. Deep	-	Are the important aspects of understanding a situation and guiding action apparent on the surface or are they deeper, more covert, abstracted?
Single vs. Multiple	-	Do elements of a situation present single interpretations and functional uses or do they provide many or have multiple representations?

If a practitioner routinely engages in a single point of view when multiple views are possible, then cognitive choices become limited (Spiro, Coulson, Feltovich & Anderson, 1989). Where principles are taken to be universal, individuals will not make condition-specific adjustments (Spiro, Coulson, Feltovitch & Anderson

1988) which over time can become self-reinforcing and lead to a rigidification of thinking and acting (Spiro, et al, 1987; Coulson, Feltovich & Anderson, 1989). Generally quality of learning can be diminished when issues are viewed in an oversimplified manner (Schommer & Walker, 1995). Cognitive generalisability can be limited by highly structured training, narrow educational objectives with exposure to a single domain, or education focussed on convergent thinking.

#### ***4.1.3.1.4 Routinisation and Automatisation***

Sternberg and Frensch (1992) argue that, when acquiring expertise which leads to automaticity, some cognitive resources will be freed up to enhance performance. But because the expertise itself becomes automatised or routinised it may not be interrupted easily. This routinisation can drive cognitive processes down reified pathways to foregone conclusions and limit the ability to approach existing problems with a fresh mind. Automatisation can be inimical to the generalisability of information since “automatic information processing is preconscious and not under the conscious direction of the individual” (Sternberg, 1985, p. 93). Many cognitive schemata, templates, frames, and their associated production systems are susceptible to routinisation and automatisation which may produce non-conscious and automatic responses to a new or different situation that are inappropriate.

Chi (2006) proposes that another consequences of this automatisation process is *glossing over* in which experts don't pay attention to details or fail to recall the surface features of a situation or information, particularly if it doesn't fit into their framing of the situation or their contextual understanding of what is important. This might be reinforced by limitations in cognitive processing

mechanisms determined by specialisation within a field as discussed earlier (Salthouse, 1991; Ste Marie, 2003). It may lead to ill-considered and inappropriate responses to unfamiliar or new situations encountered during transitions where non-normal but significant information is ignored or “glossed over.”

#### ***4.1.3.1.5 Functional fixedness***

Dunker (1945) first named the phenomenon of *functional fixedness* following his well-known study in which participants were given a hammer, box of tacks and a candle and told to fix the candle to the wall so it would burn safely. Few of the participants identified the solution which involved emptying the box of tacks and then fixing it to the wall with the tacks to operate as a “platform” for the candle rather than a “container” for the tacks. Chi (2006) suggests that it is often the more knowledgeable participants in problem solving studies who can exhibit functional fixedness in their problem solving approaches. Wiley (1998) has identified the similar issue of “mental sets” in which association is constrained by expert knowledge in which information is organised according to pre-existing sets. Sternberg (1988) stresses how even the testing of cognitive skills must consider contextual factors. Luria (1976) demonstrated this in his classic study in which a hammer, saw, hatchet and log are all identified as similar or ‘combined’ by central Asian peasants because together they are needed to make a house, whereas a Muscovite participant typically identified the first three as ‘tools’ and the last as a material. Denzin and Lincoln warn against the implicit contextual dependencies overlooked by many research methodologies (2003).



#### **4.1.3.2 Cognitive flexibility and expert generalisability**

There is, however, equal amounts of research and evidence supporting expert cognitive flexibility and there are a range of ways in which expert cognitive processes and experience are generalisable and so not bound to a specific domain. The first three points that follow will address the nature of cognitive flexibility and how experts may be able to generalise their cognitive processes developed in their primary domain of expertise. The subsequent two points will discuss more general cognitive processes that individuals use to manage themselves which are not domain specific and may be used during transitions. The former are more directly related with expert process generalisability, the latter are more concerned with self-management processes that can be used to manage transitions but can also contribute to cognitive flexibility.

##### ***4.1.3.2.1 Cognitive Flexibility***

*Cognitive Flexibility Theory* proposes that individuals can develop a personal epistemology (Spiro et al, 1988; Spiro et al, 1989) during the acquisition of expertise which recognises that the learning process and knowledge associated with the acquisition of expertise are not all neat and tidy: they may be irregular, full of exceptions, contradictory, unpredictable and generally messier than presented in the abstract. Maladaptive rigidity can be avoided by developing multiple perspectives and modes of representation to avoid “fixation errors” (Woods et al., 1994). Experts, can even over-ride schema-driven processes and engage in reasoning based on deeper “first principles” such as when dealing with difficult cases with conflicting data (Hoffman, 1987; Chi, Feltovitch & Glaser, 1989; Chi, 2006). In studies of cognitive flexibility in medical diagnostics, diagnosticians were given a preliminary set of data suggesting a standard

diagnosis of a disease – “a garden path route” – but were later given contradictory evidence indicating a different or non-traditional diagnosis. Novices were less flexible in changing their preliminary conclusion whereas experts were able to detect the need for a switch because they had an “extensive, rich, differentiated schematization” (Feltovitch et al., 1984).

The characteristics of the acquisition, learning and practice contexts involved in expertise development will make the expert cognitive process and – by implication – the utilisation of expert knowledge more or less flexible (Spiro et al., 1987). To deal with ambiguity and complex situations learners can develop a variety of adaptable cognitive and interpersonal processes when learning their expertise which will enable them to adapt to subsequent variations in problems (Woods et al., 1994). These include “multiple ways of representing concepts and phenomena [...] multiple languages and other formalisms; multiple connections amongst elements of knowledge; the ability to adopt multiple perspectives and frames of reference; and the ability to respond from multiple past cases and precedents” (Feltovich, Spiro & Coulson, 1997, p. 138). The nature of the acquisition of expertise and ongoing expert performance which incorporate the process described above will enable an individual to remain more cognitively flexible within domains and during transitions.

#### ***4.1.3.2.2 Minimising cognitive processing limitations as transition expertise***

Salthouse (1991) suggests that there are three categories of processing limitations that affect the ability to acquire and use knowledge and experience generally. The success of the strategies that individuals develop for circumventing such

processing limitations is a significant contributor to the development of expertise. These ‘circumvention’ strategies will also influence how well individuals manage transitions and acquiring expertise in a new domain. 1) Some types of processing mechanisms are *specific to expert tasks* as discussed earlier in Ste Marie’s (2003) comparison of sport coaches, players and referees. Of the three categories, this one is least amenable to generalisation and the limitations of these kinds of processing mechanisms will be difficult to circumvent when making a transition because new situations and new positions e.g., coaching as opposed to performing, may simply require the use of different types of processing mechanisms. Individuals will not be able to rely upon applying ‘old’ mechanisms in new situations. 2) Some processing limitations are *inherent* – memory constraints being the most common. However, these kind of inherent constraints have a long history of being circumvented in the service of expert performance (Luria, 1975; de Groot, 1965; Chase & Simon, 1973; Simon & Chase, 1973; Wilding & Valentine, 1994). These mechanisms for getting around inherent processing limitations, though often applied in a specific domain, are not necessarily domain specific and could be applied to deal with processing challenges in a new domain or during transitions. Their generalisability will be subject to the same considerations as discussed in the sections dealing with knowledge retrieval and how closely these mechanisms have become tied to a specific domain knowledge through deliberate practice, constrained learning objectives, narrow domain application, etc. (3) Salthouse also maintains that there are a number of *general cognitive mechanisms* and that these mechanisms such as situation analysis and problem solving are not domain specific. Experts regularly use meta-processes to circumvent these general limitations. Such meta-

processes include the capacity to see and represent problems in at a deeper, more principled level (Hoffman, 1987; Chi, 2006); the ability to abstract information into representations such as MACRs (Zeitz, 1997) that enable them to distinguish the important from non-important or what is relevant to new situations or during transitions; high level executive meta-components that are non-domain specific (Sternberg, 1985); and higher level cognitive processes that are also non-domain specific (Gardner, 1987). In both specific and general cognitive mechanisms, the way individuals are taught to overcome cognitive limitations in order to attain excellence in their performance domain will influence how generalisable they are i.e. when developed as non-reductive, non-functionally fixed heuristics or in conjunction with other expert domains, they would be more useful during transitions. “[T]he best option seems to supplement the teaching of specific knowledge with the teaching of meta heuristics that are transferable [...] These may include strategies about how to learn, how to direct one’s attention in novel domains, and how to monitor and regulate one’s limited resources, such as small STM capacity and slow learning rates” (Gobet, 2005, p. 194).

#### ***4.1.3.2.3 Domain vs creative relevant skills***

Though this study does not directly address the role of creativity in transition expertise, Therese Amabile’s highly regarded study of creative performance presents conclusions which further describe the kinds of processes that may provide the kind of cognitive flexibility that one could encounter amongst experts. The model has three elements: domain relevant skills, creativity relevant skills and task motivation (Amabile, 1996). *Domain relevant skills* are synonymous in many ways with expertise and include factual knowledge, technical skills and domain-relevant talents encompassing both “innate cognitive,

perceptual and motor abilities, as well as formal and informal education in the domain of endeavour [and include the] set of cognitive pathways for solving a given problem” (Amabile, 1996 p. 85). Newell and Simon have called these the problem solver’s “network of possible wanderings” (1972, p. 82) and they represent the potential adaptability of the problem solving/decision making processes that are built into discrimination nets and templates. When they have been developed in a complex or multifaceted learning environment, they produce an enriched network of associations and cues and “the larger the set [of cognitive pathways] the more numerous the alternatives available for producing something new” (Amabile, 1996 p. 86).

Amabile’s *creativity relevant skills* produce a “cognitive style” (Amabile, 1996, pp. 88-89) which is congruent with the kind of cognitive flexibility one might expect in transition expertise. The incomplete list below has correspondences with cognitive flexibility discussed earlier.

- *Breaking perceptual sets* which is comparable to avoiding functional fixedness (Dunker, 1945)
- *Breaking cognitive sets* in which unsuccessful problems solving strategies are abandoned to enable searches in new directions (Newell, Shaw & Simon, 1962; Klahr, 1984)
- *Understanding complexities* in which an individual appreciates and can work with complexity (Woods et al., 1994; Spiro et al., 1989)
- *Using wide categories* which is similar to non-reductive bias (Feltovitch, et al., 1984)
- *Breaking out of performance scripts* which reflects schemata restructuring (Glick & Holyoak, 1983; Goldman & Pellegrino, 1984)

These (and other processes) contribute to what Amabile calls “creativity heuristics”. While it would be misleading to equate transition expertise with creativity, it is entirely probable that a number of the cognitive processes and

heuristics that are used to successfully manage transitions are also used in creative efforts.

#### ***4.1.3.2.4 Expert abilities that are non-domain specific***

Chi (2006) identified a large number of characteristics of experts, four of which are not tied to domain-specific applications or expert theory in particular but could be considered to be either general cognitive processes or personality traits. *Qualitative analysis* is used by expert's to include general as well as domain specific approaches to their problem analysis. Individuals can use qualitative analysis to consider more general, systemic, contextual, personal, organisational, or cultural constraints in defining a problem (Voss et al., 1983). It could be used in a musical performance requiring adaptation to a new environment, for interrupting football training session to deal with interpersonal team issues, or for stopping a business meeting to reassess objectives in light of new data. *Self monitoring* (Flavell, 1979) and self-regulation (Zimmerman, 2006) which enables individuals to observe their performance contemporaneously will be discussed in Chapter 6 when discussing the role of personal intelligences in transitions. Sternberg's (1985) meta-cognitive components are executive processes that are used by individuals to manage problems solving and decision making. They are non-domain specific and are used in expert performance more generally to develop new kinds of expertise and manage transitions. *Choosing appropriate strategies* characterises experts, particularly those with more life experience in their domain (Chi, Feltovoch & Glaser, 1981; Chi, 2006). Experts can base decisions on strategies that go beyond short term objectives and criteria. This will also enable them to establish problem solving and decision making tactics that extend beyond their expert domain. *Opportunism* is a personality trait

that has been identified in a wide arena of creativity theories (Koestler, 1964; Csikszentmihalyi, 1990; Amabile, 1996; Sternberg, 2000a; etc.) as well a general personality models dealing with personal resilience (Block & Block, 1980; Deci & Ryan, 1985; Garmenzy, 1993; etc). It could be said to characterise individuals who are able to step out of the constraints of automatisisation (Sternberg, 1985).

## **4.2 Data analysis**

Based upon the foregoing discussion it is possibly to examine the data to consider whether expert knowledge and processes can be generalised and what expert cognitive structures will support transition expertise. I hope to address these issues through three main research questions.

- 1. How might early cognitive flexibility be developed?*
- 2. Are experts able to generalise from their primary domain a) expert knowledge and b) expert processes during transitions?*
- 3. Do individuals continue to remain cognitively adaptive and avoid cognitive rigidity subsequently in their career and during transitions?*

### **4.2.1 Demonstration of early cognitive flexibility**

If an individual is repeatedly successful in career transitions they might demonstrate early indications of general cognitive flexibility and adaptability. Firstly, there might be indications of general *early cognitive flexibility* within their domain such as development of multiple applications of their expert knowledge, reacting to challenges in their professional development with adaptive behaviour, and responding quickly to changing circumstances. Secondly, they there might be demonstration of early involvement in *multiple*

*domains of expertise* with different skill sets and intelligences which would make their expert process less tied to single domain expertise.

#### **4.2.1.1 Data: Early cognitive flexibility**

Table 4.3 contains some representative statements by participants indicative of early cognitive flexibility.

*Table 4.3 Some statements indicative early cognitive flexibility*

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##### **EALY COGNITIVE FLEXIBILITY**

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*“I think there’s always been an element of looking at the context within which anything sits”*

*“It was natural for me to go across departments and structures”*

*“I can abstract things”*

*“I’ve always been better at standing back and looking at the bigger picture”*

*“This was a way of broadening out”*

*“Make my playing deeper and richer”*

*“I sort of threw myself into everything”*

*“There was a lot of opportunity and space to be entrepreneurial”*

---

As a student, one individual talks about “standing back and looking at the bigger picture”:

*I’ve always been better at standing back and looking at the bigger picture than the little bits. I think it actually started at University because I remember thinking at the time, as I looked at the Finals papers, the day I got to see what was in store for me in 3 years time and I noticed that you couldn’t answer any of the questions— so if it was a great literature paper or a Roman history paper, you couldn’t any answer of the questions based on your Roman history course, Greek literature course – you had to put the whole 3 year programme in a great big pot and synthesize. (BSN R1 Mark)*

The same individual continued this approach when developing his expertise in his primary domain:

*I think also in trading, I was always much better at the sort of 2 to 6 week plays – well ‘these differentials are going to compress or this spread is going to blow out’, whereas there were others on the team that would day rate and they’d just feel – ‘ooh many buyers out and that’s going to go up’ and they’d jump in and they’d buy and then sell out. I was never any good at that, so I think there’s*



*always been an element of looking at the context within which anything sits in the bigger pictures. (BSN R 2Mark)*

Another cut across structures in his early positions:

*It was natural for me to go across departments and structures, you just go wherever you get an answer. (BSN R2 Peter)*

A musician described a non-reductive “broadening out” beyond the constraints of his formal educational training:

*This was a way of broadening out to find out what the European approach to playing was and make my playing deeper and richer and indeed that happened; I suddenly had a completely new view of playing the instrument. (MUS R7 Richard)*

Several individuals talked about seeing the bigger picture or deeper structure:

*I can abstract things and say well, if you do it like that here, that means for that problem over there, there must be generic dynamics which you can create maybe out of them. (BSN R 2 Peter)*

Another musician demonstrated non-reductiveness when straddling different roles:

*I was the school captain of my school...., so I was consciously thinking ‘how do you lead a school of about 1100 boys and stand as a representative of them, yet be sufficiently distinguished from the management of the school not to appear to be their stooge – how did you do that in academic terms, how did you do that in sporting terms, how did you do that in social terms?’ And music also fitted within that; I was consciously thinking ‘well what are the strategies if you’re the leader of the orchestra as the leading first violinist – how do you actually lead in a way that is collaborative – is collegial. (MUS R8 Thomas)*

Another monitored different disciplines within the same field:

*I used to go the piano accompaniment class because I had a very fine teacher and I would do my piece – when you get feedback but I would also stay and listen to everybody else’s piece, so I might sit there for 2 hours or so... I*

*probably should have been doing my practice, but again it gave me a huge repertoire – huge reach. (MUS R 6 Vivian)*

The same individual became involved in multiple arenas within one domain:

*I sort of threw myself into everything really. It also had a flourishing amateur scene in {city} so I started from the Music Appreciation classes – the lady who gave those classes was in the choir which I sang in as well – gifted amateurs – I was a singer for a chamber choir so I started singing from that. From the Youth Orchestra I had made all sorts of contacts – even played with the Police band a couple of times as a soloist in the park, all sorts of things; it really was a very flourishing musical life. (MUS R2 Vivian)*

Sports people applied coaching from another sport to their own:

*So I had never been coached in sailing, but I'd been coached in Rugby. (SPT R1 George)*

Many musicians mention being “entrepreneurial” and avoiding functional fixedness:

*There was a lot of opportunity and space to be entrepreneurial, to follow one's ideas, to put on concerts. In a lot of ways then it was a much more stimulating environment. (MUS R1 Robert)*

#### **4.2.1.2 Data: Multiple domain expertise**

The development of expertise in another domain in parallel with the development of one's primary domain expertise can contribute to cognitive flexibility and ultimately the ability to apply knowledge and processes across domains.

### **Sport**

Amongst business people sport frequently emerged as a parallel domain:

*I learnt a lot being a sports captain back to making decisions to who goes to open to bowl and who's going to bat – telling people they've got to do things, so*

*it's nice to learn without knowing you're learning and I think those early days of my sporting life, probably stood me in great stead for what I've subsequently done in my career because I think I've probably behaved the same. (BSN R1 Lawrence)*

And in amongst musicians as well:

*I used to run races and win them like mad and I now regret that I didn't go on being an athlete because I ran the mile in 4 minutes 28 at 17. That was quite important to me at that stage. (MUS R2 Richard)*

## **Language**

A musician amalgamated multiple perspectives on a problem:

*Tight linguistic training, tight educational training and tight musicological training because my thesis was – as I look back on it later – a perfect amalgamation of three tendrils that were hanging; one from each of those fields. (MUS R10 Thomas)*

And some sports people, similarly to musicians, developed an academic approach to sport in parallel with physical performance:

*So I was in the first cohort that went on to {university}[....] We took an entry exam, we were examined orally and because they didn't know what to do with us, they made us take medical-anatomy and neuro-anatomy [....] I did psychology, sociology and I wrote a dissertation which you could do instead of a paper. (SPT R1 Diane)*

## **Education**

Teaching is another parallel expertise developed early in a career. This is particularly the case with musicians:

*So when I came out of Cambridge; the other thing I had started to do then and that goes back to my teens, was teaching people and I have always really been interested in having a child or an adult and simply listening and trying to help them interpret a piece of music, do technique – so all that business of imparting*

*and encouraging and being the sort of force behind other people progress has also been also hard wired into me. (MUS R3 Richard)*

Sports people, like musicians, developed coaching early in their career:

*I'm good at sailing and by then I had passed my instructors certificate – just as something to do as a teenager – you know a coach at the minimum coaching qualification. (SPT R2 George)*

They also took up teaching, in this case in areas not related to sport:

*I was teaching at {school} either side of the second Olympics I had taken the role to teach. So I taught A' Level economics, O' Level commerce, non-exam, RE, basketball, athletics, remedial weight training, photography. (SPT R1 Harold)*

### **Other parallel domains**

A sports person trained as a lawyer:

*You know, I remember sitting in exams and you know leaving the exam early so I could make the fencing competition or at school doing all my homework at lunchtime so I could go fencing at night. So those two always [law and sport] and I think as you get later on in life, the fact that they were always there together, meant that running a career and fencing or administration and a career, there's always been at least two strands to everything I do. (SPT R1 Claire)*

A sports person trained as a musician:

*I had music lessons on a Friday for piano when I got home from school, I was taking cello lessons on a Wednesday morning before school from the age of 7. (SPT R1 Diane)*

A football player trained as a lift engineer:

*So I then decided that I had to do something else; even though they asked me to stay on as an amateur, so what I did do, was, I applied for other apprenticeships – mechanical apprenticeships – and I ended doing a 4 year apprenticeships as a lift engineer. (SPT R1 Brian)*

### 4.2.1.3 Discussion: Early cognitive flexibility and multiple domain expertise contribution to transition expertise

The interviews in this study were focussed primarily on transitions rather than the development of expertise and the data on how the expertise was acquired is relatively limited. Nonetheless, participants were given an opportunity to discuss their studentship and early stages of their professional career in the preliminary stages of the interviewing process. Their responses (see Table 4.4) suggest that most participants demonstrated early cognitive flexibility in their primary domain and through acquiring expertise in multiple domains or, indeed through both routes.

*Table 4.4 Early expertise in multiple domains and early cognitive flexibility*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Early cognitive flexibility	8	41	5.13	8	29	3.63	6	25	4.17	22	95	4.32
Early Multiple Domain Expertise	7	23	3.29	3	8	2.6	3	5	1.67	13	35	2.77

#### 4.2.1.3.1 Discussion: Early cognitive flexibility

Of the 24 participants in the study, 22 demonstrated *early cognitive flexibility* averaging 4.32 references per participant. They talked about engaging in “entrepreneurial thinking”, “stepping back” from specifics, “looking at the bigger picture”, etc. indicating the capacity early on in their career to move beyond specific domain content (Feltovitch, Spiro & Coulson, 1997) and to look for ‘first principles’ (Hoffman, 1987; Chi, 2006). Cognitive flexibility can be developed when concepts or principles are explored across diverse cases to learn how sets of concepts and abstractions actually influence and interact with each other in varying contexts (Spiro et al., 1988). This was demonstrated repeatedly when participants made conscious choices to assure that they would be exposed to

learning experiences which would enhance their flexibility, such as taking on different roles within their school, studying multiple disciplines tangential to their primary domain, seeking educational experiences that broaden out their perspective, and cutting across departments in the early stages of their career. This early cognitive flexibility was particularly common amongst musicians (5.13 references per participant) in their studentship and early performing career in which they adapted, adjusted, took up multiple tracks, and explored multiple routes through which they could develop and express their musical potential. They seemed to avoid single points of view when multiple views were possible (Spiro, et al., 1989). Business people (4.17 references per participant) and sports people (3.63 references per participant) demonstrated this early cognitive flexibility as well, though to a lesser degree.

Almost none of the participants mentioned learning experiences which had the characteristics of *deliberate practice*. Participants talked about focussing on their early skill development and making sure that they organised it systematically. They studied hard, “worked like stink,” and in one case became exhausted from holding down a full time job, studying for bar exams and training in fencing simultaneously. But generally there was little mention of repetition or structured practice or issues like dealing with boredom which are said to characterise deliberate practice. Rather their descriptions of training were more about the engagement, challenge, and excitement in line with Young and Salmela’s (1998) study of athletes.

#### ***4.2.1.3.2 Discussion: early multiple domain expertise***

Another way in which cognitive flexibility could be developed at early career stages was through *multiple domain expertise* developed concurrently. Such expertise in a second or third domain was mentioned by 13 of the 24 participants. Some sports people (3) develop expertise in completely different domains e.g. law, engineering and music. Business people (3) also mentioned secondary domain expertise, sport being the most common example. It is noteworthy that 7 out of 8 musicians developed expertise in secondary domain including sport (3) and verbal/linguistic skills (4) usually linked to research. They also frequently mentioned exploring principles across diverse domains in order to learn how concepts and abstractions operated in varying contexts (Feltovitch, Spiro & Coulson, 1997). A number of the participants also demonstrated early abilities or skills associated with a secondary domain expertise that would support their subsequent career development e.g., interpersonal skills as cricket captain would be helpful for running an engineering operation; expert performance as a head of music faculty contributed to leading a business operation; leading a string section in an orchestra enabled one to run an academic faculty; engineering experience contributes to a systemic approach to energy trading. This kind of generalisation across different domains reflects the use of inference and analogy as will be described in Chapter 5.

In developing multiple expertises, individuals would developed a wider range of types of processing mechanisms (Salthouse, 1991; Ste Marie, 2003), avoiding starting all over again when making a transition e.g., from player to coach or from performer to department head because they had already developed the kinds of processing mechanisms appropriate to their new expert task when they were a

student or early performer. It also broadened the possible application of the operation of templates (Gobet, 1998) beyond a specific domain. Maybe the process slots in a template can be accessed through paths in the discrimination net that link them to other knowledge or other cues. In developing parallel expertise at an early age a larger number of process slots will be fillable by non-stable features. If a number of templates used in a specific domain are accessible via different routes, have many non-stable features or can be activated by a broad range of semantic cues, then they may not be nearly as tied to a domain and its specific knowledge as would otherwise be the case. It possible that redundancy in the system is precisely the attribute of templates that make them applicable beyond their domain. It also seem that most of the participants in the study, through exposure to various other domains of expertise in their studentship and early performance career developed some of Feltovitch's adaptive cognitive processes such as "multiple languages and other formalisms; multiple connections amongst elements of knowledge; the ability to adopt multiple perspectives and frames of reference; and the ability to respond from multiple past cases and precedents" (Feltovich, Spiro & Coulson, 1997, p. 138).

#### **4.2.2 Cognitive flexibility during transitions**

We now move to the discussion of indications of the operation of cognitive flexibility in career transitions themselves in which one would hope to see repeated and explicit examples of cognitive flexibility in a variety of forms. The data indicative of cognitive flexibility has been organised into three sections: 1) indications of general cognitive flexibility and adaptivity; 2) indications of individuals breaking out of reductive-bias and functionally fixed cognition; and



3) indications of individuals interrupting automatic or habitual patterns of thinking and behaviour (See Table 4.5.)

Table 4.5 Some statements indicative career cognitive flexibility

<i>GENERAL COGNITIVE FLEXIBILITY</i>
<i>“That entrepreneurial streak was always there”</i>
<i>“You can contribute better because you’ve come without the baggage”</i>
<i>“I adapted”</i>
<i>“Instinct - the history of my life – instinct”</i>
<i>“You can have an eight carriage motorway and the art is how you sneak in and out of your carriageways”</i>
<i>NON-FUNCTIONAL FIXEDNESS OR REDUCTIVE BIAS</i>
<i>“Taking away the labels”</i>
<i>“I was starting to think about the game more from a contribution point of view, a tactical point of view”</i>
<i>“Then there is no strategy - It all needs to be revalidated”</i>
<i>“When you’re managing managers as opposed to managing teams of people, it’s a totally different set of skills”</i>
<i>“I do not see how you would ever be able to lead a large entity in your own country without having left your country”</i>
<i>NON-AUTOMATISATION</i>
<i>“I’ve taken one step backwards before I’ve gone forwards”</i>
<i>“There is always ‘The more you know the less you know’”</i>
<i>“Let a year run so you watch how your horse performs before you start pulling the reins too hard”</i>
<i>“So I thought no, you take the time to learn”</i>

#### **4.2.2.1 General cognitive flexibility during transitions**

General cognitive flexibility was described as important in transitions by a number of participants.

Musicians talked about having an “entrepreneurial streak”:

*I was the person who wrote the letters saying ‘dear so and so, would you like the ensemble to come’... I am still doing it actually. And then that lead to in the 1980’s, I was a founder partner of a music agency; we actually formally set up a music agency and we were managing 60/70 artists worldwide, so that entrepreneurial streak was always there and I think that took me away from being this narrow thing that I started with. (MUS R1 Richard)*

A business person spoke about being “quick on the uptake” and “without the baggage”:

*And I have the ability to be relatively quick on the uptake, so if I go to a meeting on which I don't know much background, I listen for a long time and eventually you hear it all and then you find you can contribute as if you'd been in it for years or as if you'd read it all and often you can contribute better because you've come without the baggage. So the ability to listen and take on what the salient points are quite quickly saved a lot of unnecessary work. (BSN R1 Michael)*

A sports person adapted:

*I adapted. I adapted because it was a club I wanted to be at; there were frustrations but I think maybe my personality allows me to adjust and allows me to perhaps accept to a degree. That's how it is - I've taken a job under their conditions; if I don't want a job under their conditions then it's time to move on elsewhere. So I consciously used what I had then to better myself, further myself and further my knowledge as a coach. (SPT R6 Brian)*

One individual described their cognitive flexibility as “instinct”:

***‘How would you characterise your ability to identify those next....?’** Instinct. Instinct. The history of my life, instinct. I think I've got fantastic instinct. I mean that's what keeps me going in this place. I kind of know what to do. (MSN R1 William)*

Another talked of running his life as it were on a “eight carriage motorway”:

*I worked out early on, that you don't just need to do that... you can have an eight carriage motorway and you can run all sorts of things in your life and the art is how you sneak in and out of your carriageways and achieve what you want to do and get out of life.....going all over the world with them as well as with my ensembles, and then the teaching began in 1984, so the {conservatoire} approached me in 1984 to go in and fill for somebody and then I stayed on staff and I did nearly 10 years at the {conservatoire}; it was my double Academy decade. And we were pretty busy and also running this music agency. (MSN R3 Richard)*

Cognitive flexibility supported taking on whatever jobs, tasks, duties one can to continue to develop as a coach:

*I found that I had far more other responsibilities – not just on the training pitch, so I had other responsibilities .... I welcomed that....I found in that period of time that I was throwing myself into other things and taking on other responsibilities. Players, the club secretary would come to me regarding any player appearances, the liaison between the commercial and players and other departments, sponsorship and players, and so I found it became a far more rounded person. (SPT R8 Brian)*

#### **4.2.2.2 Non functional fixedness or reductive bias**

Non-functional fixedness was in evidence during transitions as when this business person merged two teams:

*I also had to manage these two teams that had become one and so the most development aspect of that – apart from the technical side – was the leadership needed to say to two sets of people from two different internal cultures ‘you’re now one... you know you guys in finance you don’t look down on these people as if they’re not very clever anymore and you guys in operations, you don’t look at them as if they’re nerds’... there was a very strong cultural divide and my mission and my aim which was successful – the thing I’m most proud of at that time – was taking away the labels and making people no longer have... you couldn’t tell where they were from; it’s like a merger. (BSN R2 Nicola)*

Performers avoided functional fixedness, developing a capacity to think about tactics from a coaching perspective:

*I was starting to think about the game more from a contribution point of view, a tactical point of view....heightened my desire to think more about the game, to get involved in more coaching and to sort of try and improve my knowledge of the game. (SPT R1 Brian)*

Breaking out of functional fixedness was necessary to adapt strategy to changing circumstances:

*I suddenly realised that we were taken over. I observed that for about 3, or 4 days and then realised that if you’re working on a strategy and you’re taken over, then there is no strategy. It all needs to be revalidated and so I wrote the ‘wallpaper’ I called it; so I took 3, or 4 of my guys and I said, ‘look what we*

*need to do now, we need to put our thoughts down on this paper and send it to the top people in the bank and see if they believe there is value in that thinking'. And within 2 days somebody was there and wanted to know and that's how I turned out to be Head of IT. (BSN R2 Peter)*

Recognising cultural contextualism and consciously moving into different environments broadened perspectives:

*The fact that I've lived abroad and have had to lead a high performance environment in a completely foreign set up has helped me tremendously... I mean I do not see how you would ever be able to lead a large entity in your own country without having left your country – I mean I would say you're not fit to do so. The insight it has given me into myself but also into what is the culture of the country that I'm from has been – at times –mind-blowing and I'm really grateful for that part of experience; I find it's a very important one. (SPT R8 Hendricks)*

Another individual changed his style to suit a more senior advisory position:

*I'm no longer the executioner; I'm the guy who influences others, but they can decide what they want and what they don't want to do [....] So work with those people to make sure it's non-threatening and invite them to participate. (BSN R2 Peter)*

“Managing managers” required cognitive flexibility in use of skills:

*I think the main breakthrough for me in management was recognising that when you're managing managers as opposed to managing teams of people, it's a totally different set of skills. You can't just kind of talk to someone, find out what they're doing and say 'do this differently or you need that' context. You've got to work through other leaders that then have to inspire those people. (BSN R4 Mark)*

#### **4.2.2.3 Interrupting automatisisation**

Interrupting automatisisation was also indicative of transition expertise.

For example taking a step back to consider if you are “doing the right thing”:

*I think, whenever I've gone in a new role – as I think many people do – I've taken one step backwards before I've gone forwards so it's the old bath tub analogy. And I probably do – each time I've changed job, I go through a transitional phase where I do question 'am I doing the right things? Am I contributing as much as I was before?' (BSN R1 Lawrence)*

Resisting the inclination to act automatically based on assumptions from existing knowledge:

*There is always "the more you know the less you know" because you suddenly see all these various options that exist and the probability of not addressing the right thing. (BSN R4 Peter)*

A musician at senior levels interrupted the tendency to act and instead consulted and assessed a situation before moving ahead:

*Let a year run so you watch how your horse performs before you start pulling the reins too hard and – I think – so you consult widely with colleagues don't you? You observe the rhythm and pattern of an Institution that's already under momentum and start to make analysis of who's strong, who isn't strong and what is strong and what's weak, what attributes need changing? (MUS R8 Richard)*

Non-automatisation can take the form of consciously taking time to develop longer term career plans:

*I also knew I had a skills deficit in a whole lot of areas which I believed I had the aptitude for – in other words I could do it, but I needed to learn. So although I could perhaps have jumped into a higher position more readily, I'd seen how many people failed in high management positions – let's put it bluntly: most of them fail – some fail tragically... I mean so tragically they even die in office. So I thought no, you take the time to learn so that you build the skill set so that you can be a very efficient really senior leader; you could say took nearly 10 years to do that. (MUS R2 Thomas)*

#### 4.2.2.4 Discussion: Cognitive flexibility during transitions

Most studies of expertise focus on the acquisition and continued refinement of elite performance ability in a particular domain in order to develop stable expert states. Transitions on the other hand can be characterised as dynamic states which require more cognitive flexibility and even change oriented heuristics. General cognitive flexibility as well as non-reductive heuristics were demonstrated across all domains. All 8 musicians and 8 business people demonstrated cognitive flexibility during transitions averaging a total of 4.63 references to cognitive flexibility for each individual. Only 5 of the sports people made references to cognitive flexibility and their average was less, only 3.2 references per individual (See Table 4.6).

*Table 4.6. Cognitive flexibility in transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
General cognitive flexibility	6	14	2.83	1	2	2	5	8	1.43	16	24	1.5
Non-fixedness or non-reductive bias	7	21	3.14	4	6	1.75	7	15	2.14	18	42	2.44
Non-automaticity	2	2	1	3	8	2.33	7	14	2	12	24	2
Totals	8	37	4.63	5	16	3.2	8	37	4.63	21	90	4.26

There were repeated references amongst participants to going to deeper levels or returning to first principles, trying to understand what was happening, seeking more information, knowing what you don't know, seeing the bigger picture, and so forth which are all indicative of non-reductive heuristics (Feltovitch, et al., 1993; Chi, 2006). Participants in the study were concerned with understanding new role requirements, business situations, stakeholder requirements, and new decision-making processes, which required conscious assessment of contemporary contexts to assure that courses of action during transitions were

appropriate (Sternberg, 1988). Such conditionality and a context sensitive approaches to situations are indicative of non-functional fixedness (Dunker, 1945; Luria, 1976). General cognitive flexibility was also demonstrated through simultaneity and multiple representation (Feltovich, Spiro & Coulson, 1993), e.g. “travelling on an eight lane highway” which not only enabled individuals to keep multiple options and career streams open at earlier career but also gave them the flexibility to meet the multiple demands of more senior roles. The high level heuristics used by expert may have been developed and used in multiple applications even if they had been developed to optimise their performance within their primary domain.

Interruptions of automaticity went beyond simply stopping habitual behaviour: the participants interrupted automatic algorithmic processes and mechanical decision making in order to look for patterns across situations and time and avoided “mental sets” (Wiley, 1998) that limited their options or choices. Business people mentioned this more than the other two domains and in fact business people regularly take part in training programmes designed to teach them to interrupt automaticity such as brainstorming (Osborn, 1963) and lateral thinking (de Bono, 1970). Experts need not always be constrained to standard algorithms when confronted with new or non-conforming situations (Patel & Groen, 1991). From a perspective of production systems, when individuals interrupted automaticity e.g., the business person who stated “the more you know the less you know,” they are operating self-modify productions (Klahr, 1984) which utilise processes like discrimination and generalisation. Interrupting automatisisation avoids Chi’s (2006) *glossing over*: when something doesn’t fit,

they stop and consider it. “You observe the rhythm and pattern of an institution” before you act on your experience.

It is noteworthy that only two musicians made reference to non-automaticity as opposed to 7 of the business people. Musicians seemed less inclined to step back and interrupt their approach or consider their options before pursuing a course of action. One explanation for this could be that they already maintained a broader, non-reductive perspective consistent with their early development of cognitive flexibility (Table 4.4). This non-closure of approaches and search for broad perspectives (Feltovitch et al., 1997) would contribute to their general cognitive flexibility during transitions: there might have been less need to interrupt automatic responses consciously because they had operated with higher levels of non-functional fixedness which enhanced their ability to pursue a broader range of actions without being ‘boxed’ in. Another indication of this non-fixedness was in what individuals called ‘radar’ (sport) or ‘instinct’ (music) which enabled them to identify what was not apparent in the surface details of a situation and to formulate responses which would address emergent or implicit issues. Though business people used such non-analytical processes also, these references were more characteristic of sport people and musicians in this study.

When setting up the parameters for data coding, the category of early cognitive flexibility was by definition limited to periods of studentship and early professional career stages whereas coding for more general cognitive flexibility during transitions was more in evidence in statements about transitions in the middle and later stages of a career. However, if we compile early and later



cognitive flexibility, then cognitive flexibility is in evidence throughout the careers of all 24 participants in the study (See Table 4.7).

Table 4.7 Cognitive flexibility

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Early cognitive flexibility	8	41	5.13	8	29	3.63	6	25	4.17	22	95	4.32
Cognitive flexibility during transitions	8	37	4.63	5	16	3.2	8	37	4.63	21	90	4.26
TOTAL	8	77	9.63	8	45	5.63	8	62	7.75	24	185	7.71

However, the application of cognitive flexibility seems to be different between the earlier and later career stages. The earlier mentions of cognitive flexibility and multiple domain expertise more often involved *interrupting* early tendencies toward automaticity, *avoiding* domain limiting algorithms even in their area of expertise, *resisting* functional fixedness, or even *breaking* perceptual and cognitive sets (Amabile, 1996). Mentions during later career stage transitions tended to focus more on *generalising* from their early expertise to emerging situations, *applying* previous experience to new domains and *developing* different types of expertise within their general fields. This progression from developing cognitive flexibility in earlier career stages to applying it in later stages seems, on reflection, to be a reasonable progression and one which may also reflect the development of expertise. The early stages of an expert career focuses on developing one's expertise, in this case cognitive flexibility and expertise generalisability. The latter stages of an expert's career are more focused on applying expertise and adapting it to the range of situations and opportunities that emerge throughout the course of a career.

### 4.2.3 Domain expertise generalisability

The next issue to address is whether expertise itself can be generalised. A useful differentiation within expertise has been to divide it into “factual (declarative) knowledge” and “procedural knowledge” (Baltes & Staudinger, 2000). Though they are interdependent and intertwined (Tulving & Thomson, 1973 Chase & Simon, 1973; Gobet & Simon, 1996b), they are not synonymous. Consequently, the following review of data indicative of generalising expertise will address two areas: 1) the *generalisation of expert knowledge* using domain specific information and accumulated expert knowledge in new situations during transitions; and 2) *generalising expert processes* such as assessment of situations, problem solving, and decision making that have developed in conjunction with their primary domain expertise to a new situation (See Table 4.8).

*Table 4.8 Some statements indicative of knowledge and process generalisation*

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#### **EXPERT KNOWLEDGE GENERALISATION**

*“A specific remit to be somebody with performance experience [to] help the board make investment decisions”*

*“So spoke to coaches from other sports and took a real interest in how other sports did it”*

*“Wrote stuff from sport that could be used in management which is now being used in the schools”*

*“The thing that’s really excited me intellectually through my whole career has been taking from one field and applying to another”*

*“I think I’m quite a strategic person, but also being a lawyer I’m into the details [...] if I’ve got to get to the Commonwealth Games, got to make the Scottish team”*

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#### **EXPERT PROCESS GENERALISATION**

*“I had developed physical and then cultural capital and I converted it into professional capital”*

*“All the time using research and politics together”*

*“The actual trading bit [...] I thought there was almost a more engineering piece”*

*“So instead of being a coach, I got involved in running a pressure group for women’s sports”*

*“For me, even being a manager is always a bit of a performance”*

*“Just dealing with more money and bigger decisions and ‘I’m going to close that factory’ instead of ‘I’m going to shut this door’”*

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#### **4.2.3.1 Generalising expert domain knowledge**

In sport individuals can move from being a performance leader in one’s own sport to being an expert in performance development for all sports:

*[I was] asked to go on the {national institution} Board with a specific remit to be somebody with performance experience – they had different people with*

*different competencies and they wanted somebody with performance experience who would help the Board make investment decision and institute a performance management programme with the governing bodies that would lead to us coming fourth in the medal table in 2012. (SPT R5George)*

Some sports people moved out of their sport and became expert consultants to different sports:

*I'm now this kind of pretty established independent expert in my sport and in the field of I guess effective applied sports science, so my first real engagement with this isn't the cycling – it's actually {national institution} who were the distributor at the time getting on the phone saying 'We want to pay you to be an expert advisor to evaluate these plans that are coming in'. So my first encounter with world-class investment across all sports, was being invited to review the canoeing plan or to advise whichever sport that was going to write the plan. (SPT R2 Edward)*

Conversely one individual drew upon knowledge from other sports and applied it back to his own sport:

*So I spoke to coaches from other sports and took a real interest in how other sports did it, that had got a longer tradition of coaching than we had and then spent a lot of time thinking about which bits of it were relevant and what their proportional importance was in our sport. (SPT R3 George)*

Business people brought their expert knowledge to bear in a different division:

*There was a transition of different jobs and although I had this big managerial role in the lab, they asked me if I would become Director of Research for one of the business areas - the refinery marketing business – so I moved to that job which was a smaller people management job, but a very complex in terms of the interface between the business and research so I started working in different circles and working, understanding business problems in a different way etc. (BSN R1 Oliver)*

Musicians generalised from teaching to accrediting teachers:

*I became an Associated Board Examiner for the Associated Board of Royal Schools of Music and I'd always wanted to do that as well because I enjoy, you*

*know, the examining thing [...] So I qualified as an examiner at thirty and I started to do a lot of work for them and again, that was another parallel that ran with my academy growing and my playing growing. (MUS R3 Yvonne)*

One person applied knowledge from sport coaching to business management training and then back to sporting education for children:

*[I]wrote stuff that could be used in management which is now being used in the schools so that the body, mind, emotion, spirit elements are valued based leadership can go right into the life development journal for the kids – same thing: it's just a human being whether they are a senior executive or a teenager. (SPT R8 Harold)*

A sports person cross-fertilised from academia in music to academia in sport:

*I suppose the thing that's really excited me intellectually through my whole career has been taking from one field and applying to another. I'll give you one example that's been very important to me and that's music notation. I developed sport notation in the '80's – I developed a written notational stave and I analysed positions on the field and every passing pattern and so I could read it like a piece of music. (SPT R4 Diane)*

Another sports person took knowledge from her legal training back into managing her personal training strategy:

*I think I'm quite a strategic person, but also being a lawyer I'm into the details, so when somebody that can work out what the bigger picture is – work the path through – saying if I've got to get the Commonwealth, got to make the {national} team, how am I going to do that and work back. (SPT R3 Claire)*

#### **4.2.3.2 Generalising expert domain processes**

It seems important that individuals would be able to generalise their expert processes developed in their primary domain to subsequent domains and career stages. Generalising these processes will be important during transitions and in for successful performance in subsequent career stages. There were in fact

numerous illustrations of applying general processes acquired in the primary domain expertise to a different field.

Generalising problem solving process from engineering to energy trading:

*The actual trading bit of deciding when to hedge, how to hedge, did you want to be long shot with the market going up / down – that was all new. So I thought there was almost a more engineering piece which was which crudes will be the best crudes to deliver at the most value. I kind of find that much easier – that was more of a puzzle – the kind of figuring out which way to market was going how best to take advantage of that. I mean that was another puzzle but one that did seem to follow engineering rules: if you ran a model you could predict these things and you put these inputs in and you’ve these outputs. (BSN R1 John)*

Moving from performing and coaching to lobbying and running a business:

*We talk about physical capital in sport that you can actually cash it on, but I had developed physical and then cultural capital and I converted it into professional capital. (SPT R7 Diane)*

Moving from sporting performance to education and government policy:

*What I’ve been doing with the 21st century legacy I see as being utterly congruent with sport and participation, the health of the nation and the wellbeing of the nation sits with [...] empowering the children to make choices of a healthy intent in your future. So it’s only just an extension of the same values and intent. (SPT R10 Harold)*

From managing swimmers and musicians to managing businessmen:

*I was leading a group of men who were all senior to me in their respective institutions and I realised quite quickly on – a bit like the swimming – ‘I have a natural feel for this.’ It’s not that I’m going to get it right all the time but I’m going to be able to keep them motivated, keep them happy with the programme....it was a bit like when I discovered I was a really, really good actress which I’d never known until I started doing it; I suddenly realised I can do this stuff – I can do this leadership. (MUS R2 Susan)*

Generalisation from sport to political and social arenas:

*So instead of being a coach, I got involved in running a pressure group for women's sports and became an active feminist by this point; I'd brought those two interests together. So I took my feminist awareness and consciousness into lobbying for discrimination and a better situation for women in sports and helped to set a pressure group called {institution} in 1984 and ten years later set up an international version. (SPT R2 Diane)*

Musicians applied process used to manage their careers to manage a department:

*I think that sense of being able to work progressively and logically and you know, when one practises, one sets oneself milestones and one continually evaluates what one does and then one manages one's work in order to reach the next milestone, one does all of that subconsciously when you practise and yet those are exactly the sort of skills that you need when you are then in a managerial position. (MUS R3 Stephen)*

Being a “performer” in a management situation:

*And the other thing is that willingness and that ability even to express oneself, to be sort of naked in public, if you like.... For me, even being a manager is always a bit of a performance. (MUS R6 Stephen)*

There were a number of illustrations of individuals generalising from different domains back into their original domain. One individual generalises from other educational domains back to music:

*I was suddenly directly relating to the highest nationals of Government and the research community and I learnt from some wonderful people there – fellow heads of academies, other people who we would employ as consultants; I learnt a lot of the skills that I would never have learnt as even a Dean of a faculty of arts, let alone the faculty of music. So that gave me a huge... again learning opportunity from people who were really world leaders in their fields and gave me light understandings of issues in medical sciences and technology and natural sciences which often then became role models for things you could take back to areas of humanities and social sciences. (MUS R4 Thomas)*

This same musician generalised from his personal experience of how he successfully developed his career to a philosophy of education in general:

*And so hence it's not surprising I'm a big proponent of people studying more than one subject at undergraduate level or having a breadth of fundamental and professional application and not being locked into a programme which some other people determine. In other words not letting your career be run because someone thinks that they know exactly what you will need in the next 50 years of your life. (MUS R2 Thomas)*

One businessman explained how he generalised from decision making processes about engineering technicalities to broad corporate business decisions:

*Even when you're running a company you still sit down with people and decide what you're going to do and it happens at every level and you're just dealing with more money and bigger decisions and 'I'm going to close that factory' instead of 'I'm going to shut this door', but in a sense it's just people making decisions; it's not, it isn't radically different[only]the time you've got to spend doing it and the expertise you need to have around you to make the right decision gets to be of a different order. (BSN R4 Michael)*

#### **4.2.3.3 Discussion: Generalising expert domain knowledge and processes during transitions**

The data supports the proposal that both expert knowledge and processes are generalisable (See Table 4.9).

*Table 4.9 Domain process and knowledge generalisability*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Domain Process Generalisability	8	23	2.88	4	12	2.6	4	12	3	16	47	2.94
Domain Knowledge Generalisability	8	18	2.25	7	20	2.86	3	8	2.67	18	46	2.56
TOTAL	8	41	5.13	7	32	4.57	4	20	5	19	93	4.89

Of the 24 participants, 16 (66%) mentioned generalising expert domain processes and 18 (75%) mentioned generalising expert domain knowledge. In total 19 (79%) mentioned one or the other. All 8 musicians made references to generalising both domain processes and knowledge. Of the sports people, 4 mentioned domain process generalisation and 7 knowledge generalisation,

though only 4 mentioned knowledge generalisation more than once. Only 4 (50%) business people mentioned knowledge or process generalisability and with less frequent references (20) than those by sports people (32) or musicians (41). Eliminating cases where mentions were singular, i.e. only one mention of domain knowledge or process generalisability, the data indicates that (16) 66% of the participants regularly generalised domain specific knowledge or processes during career transitions. These generalisations of expert processes and knowledge operated in one of three modes: (1) early expertise generalised to subsequent stages of a career in the same field, e.g. from performing to coaching to development of a curriculum for the same sport; (2) primary domain expertise generalised to a different domain, e.g. from leading a string section in an orchestra to a running business; and (3) expert knowledge from a different domain generalised back to the primary domain, e.g. from being a lawyer to running a sports training programme. This third type of generalisation is, strictly speaking, not from primary domain expertise to a secondary domain expertise but its reverse. However, this type of generalisation will use the same mechanisms and it is one more way in which the participants generalised expert processes to bridge expertise between domains.

On the simplest level, expert knowledge generalised across domains would conform with Tulving's proposition that the more links an experience has in semantic memory, the more that memory can be retrieved through a variety of routes (Tulving & Thomson, 1973) and be applied in a variety of domain specific episodes. Memory management processes like schemata can access expert memory from multiple routes and under the right conditions in multiple domains (Hoffman, 1987; Woods et al., 1994; Chi, 2006; etc.) for example from sports



coaching to business coaching or from musical notation to sports notation. On another level, generalising knowledge from one domain to another by participant e.g., generalising principles from teaching to accrediting teachers or from cycling to other sports, often involves more abstract conceptual knowledge which might be less domain tied avoiding “intact, pre-packaged schema-like knowledge structures” (Feltovitch, Spiro & Coulson, 1997).

The mechanisms for generalising expert processes may reflect higher order structures less tied to domain expertise (Gardner, 1983) or the broader non-domain processes associated with high levels of expert performance (Krampe & Charness, 2006). If templates used in a specific situation have many non-stable features and can be activated by a broad range of semantic cues or via different routes, then they are not necessarily tied to a domain and its specific knowledge as would otherwise be the case, particularly if this flexibility is built in at an early stage of developing expertise. Development of broader discrimination nets or retrieval structures beyond the domain where they were originally applied (Gobet, 1998) may build in process slots that may be open to broader associations beyond domain expertise. The redundancy in the system is an attribute of templates that would make them generalisable beyond their domain.<sup>2</sup>

All 8 musicians demonstrated the ability to generalise from their primary domain knowledge and processes. This might also reflect the longer performing career of

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<sup>2</sup> It is also possible that some of this generalising capability may reflect the operation of more general meta-cognitive self-management processes, e.g. Sternberg’s (1996) meta-components or Zimmerman’s (2006) self-regulation that are not generally domain linked as will be discussed in Chapter 5. These permutations in the operation of templates and schemata in general could also be similar to those used to minimise decline in memory (Baltes & Staudinger, 2000) or manage expert performance at later career stages (Horn & Masunaga, 2006) and will be discussed further in Chapter 8.

musicians (of the three domains only musicians were continuing to perform at high levels in their primary domain when interviewed in this study). It might also be a contributor to the criteria for promotion to the most senior levels in music which often requires that the individual continue to perform publicly and be able to demonstrate up-to-date expert knowledge about the performance challenges facing young musicians. Their primary domain performance knowledge and expert processes would be maintained and developed throughout progressive career stages e.g., they may be making a budget decision in the morning, managing a faculty meeting in the afternoon and then performing a concert in the evening. Those business people who explicitly mentioned direct domain process or knowledge generalisability were more likely to have remained in touch with the expert knowledge of their primary domain even as they progressed to senior levels e.g., a Chief Scientist in an oil company, a head of design for an automotive manufacturer, and a senior risks analyst in banking. It is reasonable to conclude that the further away from primary domain experience one moves, the less accessible previous processes and particular knowledge become for use in subsequent situations. The cognitive processes used for generalisation from primary domain expertise will be “stretched” farther as the current career situation and performance becomes more different and contextually remote than their earlier career as an expert performer.

### **4.3 Concluding discussion**

Analysis of participants’ discussion of their studentship and early professional careers indicated that most of the participants acquired their expertise in ways which contributed to its generalisability. They developed expert performance in

contiguous domains, becoming singers as well as pianists, dancers as well as lacrosse players, computer analysts as well as risk analysts. They also developed high levels of expertise in different domains: sports women were lawyers, musicians were swimmers, business men were linguists. The early development of broad expertise and multiple types of expertise helped create general and expert knowledge and processes that were less domain tied, less-rigid, less reductive, more open to variation and combination, more accessible from a multiple routes and generally more flexible. There was little mention of deliberate practice contributing to their acquisition of primary domain expertise.

Participants used various higher level heuristics to make successful transitions. These included non-reductive bias, non-functional fixedness, and non-automaticity. They could revert to first principles not limited to domain specific applications and use deeper levels of meaning to gain insight into new situations and arrive at new courses of action during transitions. These higher level cognitive approaches enabled them to analyse data, consider alternatives, make decisions, seek out new knowledge, and utilise existing knowledge in new contexts and during transitions.

There were clear examples of individuals applying previously acquired expert knowledge and processes to new domains. However, it seems likely, and almost common sense, that the closer a subsequent career stage is to the primary domain, the more likely it is that the individual will be able to generalise both domain knowledge and processes.

To conclude, the combination of adaptable early learning contexts, exposure to multiple expert domains, avoidance of automaticity and reductiveness,

application of expert knowledge and processes across domains, and the general use and development of cognitive flexibility will contribute to how effectively individuals will manage transitions from one career stage to another.

# Chapter 5. Intelligence: Inductive, Inferential, and Analogical Mechanisms

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## **Introduction**

This chapter will be organised into four parts. The first part will briefly review general theories of intelligence as they identify elements that relate to transition expertise. The second part will review how certain common elements of many theories of intelligence – generally called inference, induction, and analogy – can operate in conjunction with cognitive flexibility to support generalisation of expert knowledge and processes during transitions. The third part will analyse the data and discuss it in light of the theory to show where and how participants in this study used these mechanisms to apply the processes and knowledge developed in their primary expert domain to perform successfully in a variety of transition situations and other domains. The fourth part will present conclusions.

## **5.1 Intelligence and cognitive generalising abilities**

Intelligence has been studied for centuries but in the last 150 years almost exclusively through differentiating it into (often numerous) measureable sub-components. Most models of intelligence – regardless of the apparent divergence amongst the measures and measured – include certain fundamental elements or abilities that are usually identified as inference, induction, and analogy which enable individuals to apply knowledge and experience to changing situations and which would enable experts to make transitions from one domain to another and

progress from one career stage to a subsequent one. I will first review a number of the better-known intelligence models and will then discuss how induction, inference and analogy are central in the operation of most of them.

### **5.1.1 Trait and factorial models**

#### **5.1.1.1 Simple sensory or complex cognitive processes: Galton vs. Binet**

Francis Galton (1869) focused on measuring relatively simple sensory processes like *auditory reaction times, visual discrimination abilities, reaction times, etc.* which reflected his belief derived from British empiricist philosophers that complex cognitive processes were based upon knowledge derived from more simple sensations. J. Mc. Cattell (1890), a protégé of Galton, identified 10 psychological functions such as tactile discrimination, thresholds for pain, reaction time for auditory stimuli, etc. that were correlated to intellectual performance. Alfred Binet and Theodore Simon (1908), on the other hand, contended that individual differences in intelligence reflected complex cognitive processes that were themselves measurable and which they initially divided into four major categories– *direction, comprehension, adaptation and autocriticism*. Galton and Binet represent a philosophical/methodological divide for measuring intelligence with implications for transition expertise: 1) how linked are cognitive processes to specific sensory functions and domain knowledge and 2) does this linkage make them more or less generalisable during transitions?

#### **5.1.1.2 Factorial analysis and traits: Spearman, Thurstone, & Carroll**

Charles Spearman, like Galton, maintained that that the “*common and essential element in the Intelligences coincides with the common and essential element in the Sensory Functions*” (Spearman, 1923. p. 37). Spearman (1927) developed

*factor analysis* to identify positive correlations between measures of these sensory functions and more general measures of academic achievement commonly associated with intelligence. Spearman maintained that all intellectual activity had in common one fundamental function (or group of functions) called 'g' or *general intelligence*. Certain specific cognitive skills and abilities such as arithmetic computations or vocabulary were associated with distinct measures which he called 's' or *specific communities* of domain specific factors which were organised subsequently into groups (Holzinger, 1938). Intelligence operated in accordance with three *noegenic laws* and associated processes: "(1) *The apprehension of one's own experience* [...] that a person has more or less power to observe what goes on in his own mind [...]. (2) *The eduction of relations* that when a person has in mind any two or more ideas [...] he has more or less power to bring to mind any relation that essentially holds between them [...]. (3) *The eduction of correlates* [...] that when a person has in mind any idea together with a relation, he has more or less power to bring into mind the correlative idea" (Spearman, 1923, pp. 162-166).

Louis Thurstone (1938, 1947) like Thorndike (1903) promoted a more heterarchical organisation of intelligence in which he maintained that there was no overriding general intelligence factor 'g' as proposed by Spearman. He used a different factor analytic procedure than Spearman to analyse 57 different variables eventually arriving at 7 (possibly 8) relatively independent and equally important primary mental faculties which made up intelligence consisting of: *verbal comprehension, verbal fluency, numerical fluency, spatial visualisation, associative memory, perceptual speed and inductive reasoning*.

Raymond Cattell (1957, 1963) subsequently proposed that *g* could be differentiated into *fluid intelligence* (*gf*) which involves abstract reasoning, creativity, dealing with novelty, inductive reasoning, etc. and *crystallised intelligence* (*gc*), which involves accumulated knowledge, deduction from existing knowledge and the control of procedures. Burt (1949) proposed a similar hierarchical structure and Vernon (1950) identified a tiered approach as well with a broad *g* at the most general level and then *v:ed* (verbal-educational) and *k:m* (practical-mechanical) at the next level under which further subdivisions could be identified. Horn collaborated with Cattell (1966) to further define *gf* as a *relational/inferential* ability to perceive relations between stimuli, draw inferences and understand implications whereas *gc* was considered to be more *educationally* derived and consist of abilities acquired (or at least optimised) throughout a lifetime such as verbal comprehension and semantic relationships. Horn and Masunga (2006) subsequently renamed *gc* *Acculturation Knowledge* because it included culturally-tied knowledge and was highly correlated to performance on standard IQ test like Stanford-Binet (SB5) (Roid & Barram, 2004) and Wechsler (WAIS-III) (Wechsler, 1997). *Gf* was viewed as biologically and genetically influenced, declining from age 40 onwards. *Gc* was more determined by cultural and educational exposure and did not begin to decline until age 70 (Baltes & Baltes, 1986). Subsequent research demonstrated that both *gc* and *gf* have distinct cultural and heritable attributes (Horn, 1994).

Guilford (1956, 1967) did not posit the existence of a general ‘g’. Nor did he rely explicitly on factor analysis in the development his *Structure of Intellect* (*SI*) model. Rather he generated factors morphologically using the intersection of three dimensions: *operations* with five subcategories of cognition, memory,



divergent production, convergent production and evaluation; *contents* with four subcategories of figural, symbolic, semantic and behavioural; and *product* with six subcategories of units, classes, relations, systems, transformations and implications. The intersection of these three dimensions identified the possible existence of up to 150 factors contributing to intelligence (See Figure 5.1). He fitted existing data from previous research in intelligence into his model and then isolated and measured factors that would fit into his empty categories.

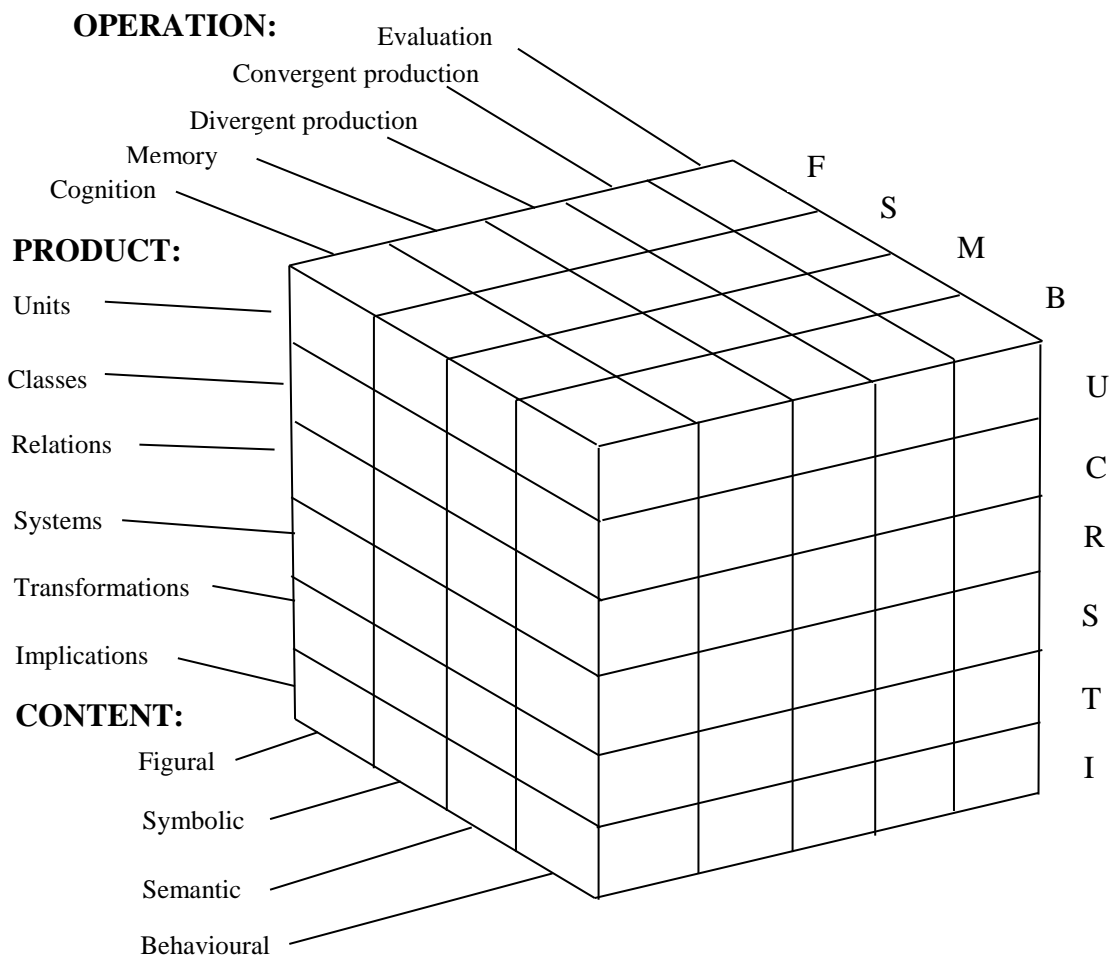


Figure 5.1 Guilford's structure of intellect model. Based on Guilford (1967)

Carroll's (1976, 1993) highly regarded meta-analysis of 477 data sets delineated intelligence into a three stratum hierarchical structure (see Figure 5.2). There were 40 *Stratum I*, narrow first order abilities (which incorporated and reformulated most of Thurstone's factors). These were then organised into eight *Stratum II* or second-order factors which, when ranked from highest to lowest loading of Spearman's *g*, were: *fluid intelligence*, *crystallised intelligence*, *general memory and learning*, *broad visual perception*, *broad auditory perception*, *broad retrieval ability*, *broad cognitive speediness* and *processing speed*. These were all then subsumed under a single *Stratum III General Intelligence* (G or G3) higher order factor which corresponded roughly with Spearman's *g*. In many ways Carroll's work integrated the best of his three most well known predecessors incorporating Spearman's two factor conceptualisation of a general intelligence 'g' and specific communities of factors 's', Cattell's hierarchical ordering of Spearman's work and his differentiation of *gf* and *gc*, and Thurstone's differentiation of factors into broader groups of sub-factors.

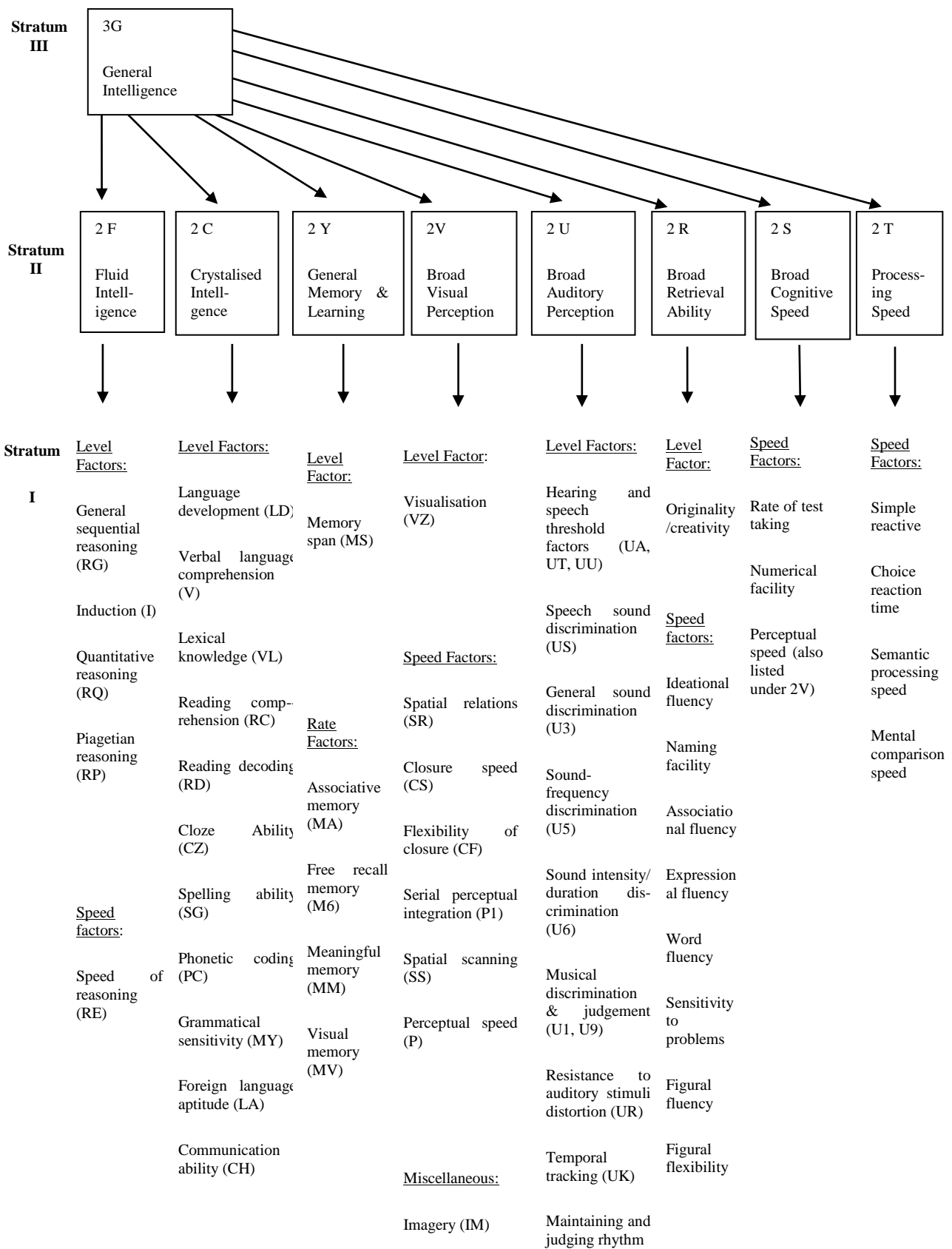


Figure 5.2 Human cognitive abilities. Based upon Carroll (1993)

### 5.1.1.3 Common elements for transition expertise in factorial models

In all of these models intelligence is differentiated into a variety of sub-factors or categories of factors, a number of which could operate as the cognitive mechanisms for generalising experience from one domain to another. These include *adaptation, associative memory, inductive reasoning, education of relations, education of correlates, cognitive flexibility, the production of creative answers, fluid intelligence, relational/inferential ability, flexibility of closure, originality/creativity, and associational fluency*. Even the most recent Stanford/Binet measure, the SB5 (Roid & Barram, 2004) includes element like *toleration of ambiguity, pattern recognition, synthesis of information, cognitive flexibility, visualisation of whole from its parts and the production of creative answers*.

### 5.1.2 Modularity and intelligence

There are a number of theorists who maintain that intelligence needs to be understood as a modular phenomenon that consists of a number of relatively discrete faculties as opposed to categories of factors or abilities.<sup>3</sup> Jerry Fodor (1975, 1983) is one such theorist who is of interest because he sought to reconcile a *faculty or modular* conception of intelligence with information theories and cognitive science which form the basis of most theories of expertise. He organised cognitive processes and structures into three primary categories.

(i) *Complied transducers* are equivalent with perceptual systems such as seeing, hearing and touch – though some are not strictly speaking perceptual.

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<sup>3</sup> They often have theoretical associations with structuralists like Binet and Simon (1916), Piaget (1954), and Levi-Strauss (1962).

(ii) *Input systems* mediate between transducer inputs and central (or general) cognitive mechanism. Their characteristics include: (a) *domain specificity* which makes input systems essentially modular so that even within the domain of language there are different types of input systems such as phonology versus semantics e.g., the difference between hearing the word “cow” versus talking about a cow; (b) *shallow outputs* which do not deliver abstract information or categorisations to the central systems; and (c) *information encapsulation* which ties them to the information they process making them “cognitively impenetrable” (Pylyshyn, 1980, 1986) and preventing them from being broken down into components.

(iii) *Central systems* are not informationally encapsulated and not necessarily modular. They are “relatively non-denominational” (i.e. non-domain specific) cognitive systems typified by mental processes such problem solving. More complex central systems might utilise inference whereas more fundamental inputs systems may inform behaviour directly (Ullman, 1980).

If processes and operations are not content blind and are informationally encapsulated, then mental representations, propositional structures, processes, schemas, central systems, etc. may be tied to a domain and differ from domain to domain and so not be readily accessible for generalisation during transitions. For example, there are obvious content-binding distinctions amongst Carroll’s (1993) Stratum III factors such as semantic processing speed, numerical fluency, musical discrimination and spatial relations. Each of Guilford’s (1967) five operations, when utilised with his five kinds of content would be a different type of operation e.g., evaluation operations on semantic content would be different

than evaluation operations on figural or visual content. Content ties would tend to make the operations less generalisable. However, cognitive scientists have developed models that operated with a content-blind bias i.e. the cognitive processes are considered to be general and consistent regardless of content which would make them adaptable and supportive of transitions (e.g., Miller, Gallanter & Pribram, 1960; Newell & Simon, 1973; Rumelhart, 1980)

#### ***5.1.2.1 Modularity and transition expertise***

Fodor (1983) identified several cognitive and neuropsychological issues involving content blindness/boundedness that may influence cognitive generalisability and transition expertise specifically.

- 1) How neurologically bound or sensorily tied are cognitive processes?
- 2) How much is domain knowledge encapsulated and how tacit is this knowledge?
- 3) What is the nature of the experience, knowledge, cognitive process and structures that are more easily generalisable?
- 4) Are the processes which tie experience, knowledge and cognition into fixed architecture reversible or malleable and if so how?
- 5) How much the generalisability of cognitive processes might be due to the nature of how cognition is acquired or learned?
- 6) What kinds of acquisition processes would help mitigate some of the considerations in the previous questions?

These questions will be borne in mind when discussion the following models of intelligence.

### **5.1.3 Componential theory of intelligence**

#### **5.1.3.1 Sternberg's Triarchic Mind**

Robert Sternberg's (1977) *Triarchic Theory of Intelligence* was developed as a componential model which sought to incorporate the best of factor analytic and information processing models. Sternberg (1985) organised his components into

three subtheories – *componential*, *experiential* and *contextual* – each with multiple sub categories.

#### **5.1.3.1.1 Componential aspects subtheory**

The *componential* subtheory has three further sub elements: Metacomponents, Performance Components and Knowledge Acquisition Components.

*i. Metacomponents* (Sternberg, 1988, p. 59) are processes used to plan, monitor and evaluate problem solving. There are several sequential sub-categories:

- a. *decision as to what the problem is* – that needs to be solved
- b. *selection of optimal lower order components* - for solution of a problem
- c. *selection of representations or organisations for information* – such as linguistic or spatial and which allow appropriate analogic processes
- d. *selection of a strategy for combining lower order components* – including *global* ( macro and strategic) or *local* ( micro and specific) strategies
- e. *allocation of attentional resources* – for short and long term
- f. *solution monitoring* – keeping track of actions, modifying goals appropriately
- g. *sensitivity to external feedback* – understanding feedback and acting upon it.

Meta-components have an agentic or executive function and operate as control processes for intelligence in human behaviour. Sternberg maintains that they are also an indicator of a general intelligence factor like 'g' because they “have a much higher proportion of general components among them than do any of the other kinds of components, presumably because the executive routines need to plan, monitor and possibly re-plan performance are highly overlapping across widely differing tasks” (Sternberg, 1985, p. 119). This would make them non domain specific and of use for generalising knowledge and processes.

*ii. Performance components* like *encoding*, *inferring*, *mapping*, *applying*, *justifying*, and *responding* are “lower order” and used to implement the

commands of the metacomponents (Sternberg, 1988, p. 59). Several of these are clearly components of intelligence that will contribute to generalisability.

*iii. Knowledge Acquisition components* are used to learn how to solve problems. *Selective encoding* involves perceiving in a stimulus features that had previously been non-obvious so that information originally viewed as being non-relevant now becomes relevant. *Selective combination* involves putting together parts of a situation in ways that had previously been non-obvious that can lead to a change in the mental representation of the problem. *Selective comparison* involves comparing past and new information, thereby discovering a non-obvious relationship which leads to the solution of a problem (Sternberg, 1988, pp. 170-205). Knowledge-acquisition processes can operate separately or together to enable what Sternberg calls *insightful* learning whereby new ideas are developed.

#### **5.1.3.1.2 Experiential subtheory**

Sternberg's *experiential* aspects of intelligence operate along a continuum from automatisisation to novelty. *Automatisisation* frees up cognitive capacity from more familiar tasks to deal with more complex or unresolved issues. *Novelty* enables individuals to respond to new and emerging situations. *Insight* during knowledge acquisition processes enables an individual to move from automatised conceptual systems to novel ones: selective encoding insight sifts out relevant from irrelevant information; selective combination insight includes what initially might be irrelevant information into a unified and usable whole; and selective comparison insight relates newly acquired information to information acquired in the past (Sternberg, 1981).



#### **5.1.3.1.3 The contextual subtheory**

*The Contextual* aspect of intelligence is Sternberg's third sub-theory and concerns how intelligence operates in relationship to the environment. "In the triarchic theory, intelligence in everyday life is defined as the *purposive adaptation to, selection of, and shaping of real-world environments relevant to one's life and abilities*" (Sternberg, 1988, p. 65). The contextual aspects of Sternberg's model will be addressed in more depth in Chapter 7 when discussing Practical Intelligence.

#### **5.1.3.2 Componential theory and transition expertise**

Sternberg makes a strong argument for the plasticity and non-domain specificity of cognition. Unlike Fodor, he does not link intelligence to domain knowledge or information specific representational systems. Many of his components have been associated with measures of fluid intelligence (*gf*) (Cattell, 1943). His inclusion of processes like *induction, elaborating, inferring, mapping, combining, comparing, insight*, etc. provides a comprehensive and systematic organisation for how cognitive processes could operate during transitions to generalise from one domain's experience and knowledge to applications in another domain.

#### **5.1.4 Multiple Intelligences**

While intelligence has usually been organised into specific categories of traits, abilities, and cognitive processes, it has also been organised into typologies. Gross (1974) developed a model of intelligence based on five modes of communication: lexical, social-gestural, iconic, logico-mathematical and musical. Hirst (1974) suggested seven forms of knowledge as the basis for an

intelligence typology: mathematics, physical sciences, interpersonal understanding, religion, literature and the fine arts, morals and philosophy. Case (1992) identified six domains – quantities, space, social behaviour, narrative, music, and motor behaviour – each of which had “central conceptual structures” with core processes used to organise and represent experiences within these domains and executive control structures used to regulate performance within each domain. Demetriou (1998) proposed six environmentally oriented systems: (1) the categorical system deals with similarity/difference relations; (2) the quantitative system deals with quantitative variations and relations; (3) the causal system deals with cause and effect relations; (4) the spatial system deals with orientation in space; (5) the propositional system addresses the validity of representations about the environment; (6) the social system concerns understanding social interactions.

#### **5.1.4.1 Gardner’s Multiple Intelligences**

Howard Gardner’s well known Multiple Intelligence (MI) (1983, 1993, 1999) model identified seven distinct kinds of intelligence: *Linguistic, Musical, Logical-Mathematical, Bodily-Kinaesthetic, Spatial, Intrapersonal and Interpersonal*. I will address what I am calling the five ‘domain’ intelligences in Gardner’s model in this chapter. The two ‘personal’ intelligences will be addressed in Chapter 6 on Personal Intelligence.

##### ***5.1.4.1.1 Logical/Mathematical Intelligence***

This intelligence is the ability to handle skilfully long chains of reasoning (Gardner, 1983, p. 139) and has had an overweening influence on the study of intelligence because it is used so frequently and is easily measured. It is linked to

performance in the businesses domains under study in this dissertation, particularly those fields that include mathematical or scientific subject matter such as energy traders, engineers, and scientists. This intelligence figures in most models of intelligence such as Binet and Simon's mathematical measures (1916), Spearman's education of relations (1927), Thurstone's numerical fluency (1938), Carroll's quantitative reasoning (1993), the plans and strategies of Miller, Gallanter and Pribram's (1960), Bruner. Goodnow and Austin's (1956) long strings of logic, and Newell and Simon's (1972) human problem solving. Gardner contends that Piaget's four developmental stages are a closer fit to the development of this particular intelligence than to the general development of cognitive processes in human children. Carroll (1993, p. 641) associates Gardner's logical/mathematical intelligence with his own Fluid Intelligence (2F).

#### ***5.1.4.1.2 Musical Intelligence***

Musical intelligence is not generally assessed as a primary component of intelligence in 'g'. Developmentally, it is one of the earliest intelligences: infants as young as two months are able to match pitch, loudness and melodic contours of their mother's songs (Papoušek, 1982). Gardner's research (1983) with composers suggests that musical intelligence is not dependent on other intelligences and does not use language as an intermediate function: composers use tonal memory, sounds, rhythms, aural imagination, etc. Carroll (1993) links musical abilities to Stratum II broad auditory perception (2U).

#### ***5.1.4.1.3 Bodily Kinaesthetic intelligence***

Kinaesthetic intelligence is the ability to use one's body in highly differentiated, skilled ways for expressive and goal-directed purposes (Gardner, 1983, p. 207).

It is the basis of expertise in the third population in this study, athletes. Revesz and Berkeley (1950) identified a combination of tactile and kinaesthetic perception called “*haptics*” which develop independently of visual and auditory content. Guilford (1967, p. 94-95) included kinaesthetic systems in the figural content of his cognitive abilities. Bodily kinaesthetic intelligence does not conform to standard definitions of intelligence and most cognitive models “don’t measure psychomotor abilities” (Carroll, 1993, p. 641).

The two remaining domain-related intelligences are not addressed directly in this study but may be associated with performance in the domains under study.

#### ***5.1.4.1.4 Spatial Intelligence***

This is a discrete intelligence (Gardner, 1983, pp. 170-205), though it is often linked operationally with other intelligences e.g., dance combines bodily kinaesthetic and spatial intelligence, architecture combining logical-mathematical intelligence with spatial intelligence. Lohman (2000) says most experimental work with spatial intelligence has focussed on four attributes: (a) the ability to conduct analog transformations such as rotation tasks (Lohman, 1986); (b) the capacity to generate and maintain mental representations in transformations and storage (Guilford, 1967; Ekstrom et al., 1976); (c) the ability to remember systematically structured stimuli which enhances the amount and complexity of spatial information that can be maintained (Pellegrino & Kail, 1982); and (d) the use of sophisticated and flexible strategies for solving spatial tasks (Lohman, 1988; Carroll, 1993; Guilford, 1967).

#### **5.1.4.1.5 Linguistic Intelligence**

Linguistic intelligence along with mathematical intelligence is one of the intelligences most subject to measurement in models of intelligences such as 'g'. It utilises the predominant cultural symbolisation system and is evident in the domain expertise of academic scholars, poets, writers, and political orators. The overlap with other models of intelligence is extensive e.g., Thurstone's (1938) verbal comprehension and verbal fluency; the use of verbal measures for all five categories of the Stanford Binet cognitive abilities (Roid & Barram, 2004); and Carroll's (1993) language development, verbal language comprehension, etc.

#### **5.1.4.2 Gardner's criteria for an intelligence and critical thinking**

Gardner says that intelligence is a "*biopsychological potential*" (Gardner, 1993b) and he criticises models such as those of Gross (1974) or Hirst (1974) that use *a priori* categorisations of abilities and understanding. He identified 8 criteria for observing and measuring his intelligences to determine whether they were an "empirically grounded set of faculties." Three of these criteria concern cognitive generalisability. 1) *Identifiable core operations* are the "basic information processing operations or mechanisms" that deal with the specific kinds of input utilised by an intelligence e.g., sensitivity to pitch for musicians or the ability to imitate movement for sports people. These will differ from intelligence to intelligence and their domain and knowledge ties will affect their generalisability. 2) *Susceptibility to encoding in a symbol system* implies that different domain specific symbolisation systems such as language, picturing, or mathematics symbols will be used by different intelligences. These "culturally contrived systems of meaning" could tie the cognitive processes and domain knowledge of an expertise to a specific intelligence limiting its generalisability.

3) *A distinct developmental history with a definable set of expert 'end state' performances* implies that the developmental history and training systems used to 'channel' intelligence into performance in an expert domain could influence the generalisability of the domain expertise.

Gardner also maintains that specific domains of human competence utilise their own non-generalisable type of *critical thinking*. "The kind of thinking required to analyse a fugue is simply different from that involved in observing and categorizing different animal species, or scrutinizing a poem, or debugging a program, or choreographing and analysing a new dance" (Gardner, 1993, p. 44). This modular/faculties view (Fodor, 1983) of the operation of intelligence would limit the ability to generalise from expertise.

#### **5.1.4.3 Higher level cognitive operations**

Gardner is contradictory. On the one hand he presents a faculties-oriented model of intelligence in which the core processes of his different intelligences are tied to their intelligence-specific *critical thinking* which is tied to unique symbolisation systems. On the other hand, he identifies four *higher level cognitive operations* that are non-domain specific and do not fit into his seven intelligences and operate with processes that are not linked to a specific intelligence. These are *common sense, novelty or innovation, metaphorical capacity and wisdom* (Gardner, 1983). They are aggregations of motivation, personality factors, domain specific cognitive abilities, and non-domain specific cognitive abilities. But Gardner ignores these higher level operations for the most part even though they contain many of the inferring, inducing and analogising functions which are central to many intelligence models and which are precisely

the kinds of processes that would enable generalisation across specific intelligences and domains during transitions. This segregation and marginalisation of these higher-level processes in his exposition is, in the opinion of the writer, an inadequacy.

## **5.2 Induction, inference, analogy and the generalising processes of intelligence**

The common threads of induction, inference, and analogy run throughout almost all models of intelligence. These multifaceted, inter-related, largely cognitive processes are the primary mechanisms through which intelligence can generalise processes, knowledge and information from one domain or experience to another during transitions. I will first describe these cognitive processes briefly. I will then revisit the main theories of intelligence discussed above and to examine how these three types of mechanisms are represented in them.

### **5.2.1 Induction**

*Induction* is generally defined as the generation of a more universal principle from specific or particular instance. If swan ‘a’ is white, swan ‘b’ is white,.....swan ‘x’ is white, then it is possible to make an inference that all swans are white. Green et al. (1953) proposed that induction could be divided into 3 factors: “education of perceptual factors,” “education of conceptual relationships” and “education of conceptual patterns.” Adkins and Lyerly (1952) proposed three factors that combined to produce education or induction: perception of abstract similarities, concept formation and hypothesis verification. Induction is frequently measured in analogy tests and is sometime wrongly equated with inference which uses induction.

## 5.2.2 Inference

*Inference* is the process whereby individuals apply properties, rules, propositions or other characteristics of experiences, sets or collection of sets to draw conclusions about different sets or experiences that may share some of the same attributes. “All men are mortal. Socrates is a man. Therefore Socrates is mortal.” is a classical inferential syllogism. Carnap’s (1962) five categories of *inductive inferences* presents the main forms through which inference operates.

1. “*Direct inference* typically infers the relative frequency of a trait in a sample from its relative frequency in the population from which the sample is drawn.” E.g., if most musicians who practice 4 hours a day will be successful, then students who practice 4 hours a day will succeed.
2. “*Predictive inference* is inference from one sample to another sample not overlapping the first.” E.g., if members of an athletic team respond positively to praise, then members of a management team will respond positively to praise.
3. “*Inference by analogy* is the inference from the traits of one individual to those of another on the basis of the traits that they share.” E.g., if shipping of oil has certain types of bottlenecks, then shipping soybeans may encounter similar bottlenecks
4. “*Inverse inference* infers something about a population on the basis of premises about a sample from that population.” E.g., if football players from one’s own team performed well under certain circumstances, then it is likely that players from a team that one manages will perform similarly under similar circumstances.
5. “*Universal inference* is inference from a sample to a hypothesis of universal form.” E.g., if involving stakeholders in a strategic plan for development of a policy on inclusion of women in sport is essential for success, then inclusion of stakeholders in development of all strategic plans is essential. (Vickers, 2010, pp. 19-20. Comments in quotation marks are by Vickers. Subsequent illustrative examples are by this writer)

The accuracy of inferences cannot be assured because the validity of the inferential process is different than the accuracy of the premises e.g., “All apples



are blue, a banana is an apple, therefore bananas are blue” is a valid inference but based upon false premises. Inference is implicit in most cognitive processes in which individuals draw conclusions about the future based upon previous experience.

The capacity to engage in inferential and inductive thinking will be the major cognitive mechanisms through which experience and knowledge are generalised throughout career transitions. In the foregoing overview of factor analytic models of intelligence cognitive processes like generative thinking, cognitive flexibility, and analogical reasoning all use inferential processes. It is the use of inference in various cognitive abilities that would enable individuals to generalise knowledge and experience from primary domain expertise to subsequent domains in support of successful transitions. Fodor (1983) suggests that his inputs systems are the “aboriginal prototypes of inference-making psychological systems. Cognitive evolution would thus have been in the direction of gradually freeing certain sorts of problem-solving systems from the constraints under which input analysers labor – hence of producing, as a relatively late achievement, *the comparatively domain-free inferential capacities* which apparently mediate the higher flights of cognition” (Fodor, 1983, p. 43, *Italics inserted*).

### **5.2.3 Analogy**

*Analogical thinking* is a specific type of inferential process in which “the function of analogy is to allow transfer of knowledge from a known situation to a novel one, even if the two situations are superficially dissimilar” (Holyoak, 1984, p. 200-201). Polya (1965) argued the case for analogy in mathematics. Bruner,

Goodnow and Austin (1956) studied the role of analogy in the acquisition of knowledge in the classroom. Openheimer (1956) and Hesse (1966) argued for the role that analogy played in science. Scientific discovery is “isotropy in the purest form: a process which depends precisely upon the transfer of information among cognitive domains previously assumed to be mutually irrelevant” (Fodor, 1983, p. 107). Generally problem solving is also isotropic and non-modular: “there seems to be no way to delimit the sorts of informational resources which may affect, or be affected by, central processes of problem solving” (Fodor, 1983, p. 112).<sup>4</sup>

#### **5.2.4 Induction, inference and analogy in trait and factorial models**

The next discussion will review how induction, inference and analogy are evident in most trait models of intelligence.

##### **5.2.4.1 Guilford**

Guilford defined *induction* as “going from the particular to the general.” Though it is not one of his operation categories itself, it was applied to his classificatory, relational, systemic and implicational categories in which the products derived from induction are *transposable*. “This is the generalising aspect of induction [...] Every experienced product has general as well as specific aspects, the former aspects being transferable and having transfer effects and the latter not” (Guilford, 1967, p. 206). The operation category of *divergent production abilities* is of particular interest when an individual is required to apply existing

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<sup>4</sup> Fodor suggests this may reflect the neurology of the brain: “computational isotropy comports naturally with neural isotropy” (Fodor, 1983, p. 118). However, neurophysiological issues such as isotropy, equipotentiality and neuroplasticity (Lashley, 1950) will not be addressed in this dissertation.

experience or knowledge to a new situation during transitions. It includes *originality* and *elaboration* as well as *fluency* and *flexibility* of thinking: “abilities concerned with the ready flow of idea and with readiness to change direction or to modify information” (Guilford, 1967, p. 139). For example divergent production in *classes* within Guilford’s morphology is illustrated by a classic test concerning the use bricks (Wilson et al., 1954). Fluency would be indicated by rapidly generating multiple uses for bricks such as building a house, barn, silo, school, bank, or a wall. Flexibility of thinking was indicated by divergent answers such as building a house, throwing at a cat, making a doorstep, writing a message, or making a tombstone for a bird. Similarly in divergent production of *systems* he uses the illustration of a student (Guilford, 1967, p. 148) who is given the task of determining the height of a building using a barometer. Contrary to expectations the student first proposes going to the top of the building, tying the barometer to a rope, lowering it to the ground and then measuring the length of the rope needed to reach the ground; then he proposes dropping the barometer from the top of the building and measuring the time it takes to hit the ground and using the formula  $S = \frac{1}{2} gt^2$  to determine the building height; then taking the barometer out on a sunny day measuring its shadow and that of the building and using simple ratios; and finally taking the barometer to the superintendent of the building and offering to exchange it for information about the height of the building. Divergent production abilities such as flexibility, elaboration, induction, originality, transposing, etc. would characterise the cognitive process of individuals who demonstrate transition expertise.

#### **5.2.4.2 Thurstone and Spearman**

Thurstone (1938) used a variety of analogies test amongst his measures. He found loadings of .44 for pattern analogies on the primary factor for perceptual speed (P), a loading of .60 for verbal analogies on his verbal comprehension factor (V) and a .39 loading for pattern analogies on his inductive reasoning (I) factor. A number of abilities associated with Spearman's 'g' involve cognitive processes such as "generalisation" and "analogies" (Spearman 1927, pp. 165-181); the operation of "imagination" and "creativity" including the generation of "new mental content" (ibid, p. 186-189); the use of "association" and "adaptability to new situations" as ways in which memory and information can be accessed for utilisation (ibid, p. 271-281). Spearman identified 11 relations that might be found specifically in the operation of analogies: attribution, identity, time, space, cause, objectivity, constitution, likeness, evidence, conjunction and intermixture.

#### **5.2.4.3 Carroll**

One of the Stratum I factors in Carroll's Stratum II Fluid Intelligence (2F) is *Induction (I)*. Inductive tasks "are those that require subjects to inspect a class of stimulus materials and infer (induce, educe) a common characteristic underlying these materials – a concept, a class membership, a rule, a process, a trend, or a causal relation, for example" (Carroll, 1993, p. 238). Stratum II General Learning and Memory (2Y) includes the Stratum I factors *Associative Memory (MA)* and *Meaningful Memory (MM)* (Carroll, 1993, pp. 266-274). These encompass the ability to recall one side of a paired association. Their operation will reflect how closely and exclusively two halves of an associated pair are tied to each other. Tight dyadic or unidirectional links may reduce ability to make

associations outside of the pairing and limit generalisability during transitions whereas the retrieval of memories, ideas, processes or representations which are linked to a number of partners will offer more adaptability and would contribute to the ability to generalise from prior knowledge and experience to a variety of situations. Gobet's (Gobet & Simon, 1996b) Templates would probably use Carroll's Associate Memory (MA) and Meaningful Memory (MM) Stratum I factors to adapt to different situations (Carroll, 1993).

Stratum II Broad Visual Perception (2V) includes *Flexibility of Closure* (CF) which is "the ability to keep one or more definite configurations in mind so as to disembed it from other well-defined perceptual material" (French et al., 1976, p. 19). This would allow an individual to hold parallel thoughts and conclusions that arise from simultaneously comparing options, information and experience from multiple domains and would free them from a closed associative pathway and enable them to develop a course of action appropriate for a new situation. Stratum II Broad Retrieval Ability (Gr or 2r) has also been described as "Abilities in the Domain of Idea Production" (Carroll, 1993, p. 394) and includes *Flexibility of Use* (FX) as measured by tests such as the brick test (Wilson et al., 1954) or barometer test (Guilford & Hoepfner, 1971) mentioned earlier. It also includes *Cleverness* (FC). Flexibility of use was measured by test performance such as combining objects, substitute uses, making groups, and different uses all of which would prove useful during transitions<sup>5</sup>. *Figural Flexibility* (FX) is another Stratum I factor derived from tests in Guilford's laboratory which measured the ability to deal with figural tasks that require a variety of approaches

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<sup>5</sup> The FX and FC categories were subsequently collapsed into the *Originality/Creativity* (FO) category by Carroll.

to achieve a solution to a problem (Carroll, 1993, pp. 612-613). Several factors in the Stratum II category of Broad Retrieval Abilities will enable individuals to deal appropriately with ambiguity, uncertainty and challenges during transitions.

## **5.2.5 Induction, inference and analogy in Sternberg and Gardner**

### **5.2.5.1 Sternberg**

Sternberg's meta-components are neither knowledge encapsulated nor modular (to use Fodor's taxonomy). Consequently they are not necessarily tied to a specific intelligence or knowledge base and can operate in and potentially across any expert domain. Amongst his performance components (Sternberg, 1988), *inference* is probably the most important because it enables individuals to discern relationships between objects or events and to draw conclusions about these relationships. Sternberg identified at least 13 types of inferences drawn from his work with the Millers Analogies Test and a further 19 different types of inferential fallacies (Sternberg, 1977). *Mapping* involves recognising the relationship between two relationships and using this to connect higher order relationships. *Application* involves applying a relationship that has already been inferred to a different situation, for example when mapping relationships derived from lower order domain-specific inferences either to a higher order situation in the same domain or possibly across to another domain. These three performance component categories – inferring, mapping and application – are parallel to Goldman and Pellegrino's (1984) stages of the analogic process – discovery, comparison, and evaluation. Amongst his knowledge acquisition components,

*selective comparison* could enable individuals to respond during transitions and in post-transition situations with innovative ideas and insightful thinking. Sternberg's knowledge acquisition components often use metaphor and analogy (Sternberg, 1988; Davidson, Deuser & Sternberg, 1994) which contribute to comparing knowledge and experience across domains.

### **5.2.5.2 Gardner**

All of Gardner's higher level cognitive processes – novelty, originality, common sense and wisdom – operate outside the constraints of the domain specific modularity of the intelligences of his model.<sup>6</sup> Gardner (1983, p. 289-291) maintains that *novelty* is usually displayed in an expert domain associated with an intelligence: an individual is an original dancer, musician, mathematician or poet. In part this is because genuine innovation requires a fairly high degree of expertise or at least knowledge in a domain before it can generate innovation or novel solutions. However *originality* – while drawing from domain knowledge – can also ignore boundaries, is not fixed to a specific function and is not restricted by requirements for a single interpretation of a problem. Furthermore, inconsistencies or departures from convention are not a problem for original thinking. There are correspondences with Guilford's (1967) divergent production operations which include originality, elaboration, fluency and flexibility. Sternberg (1985) also used originality to describe responses to new situations that require non-automatisation.

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<sup>6</sup> *Common sense* and *wisdom* are also higher level cognitive functions that are not tied to one of Gardner's intelligences nor to specific domains and can be used to generalise experience across boundaries and domains. Both have implications for transition expertise. *Common sense* will be addressed at more length in the Chapter 7 and *wisdom* in Chapter 9.

Gardner says that *metaphorical capacity* (1983, pp. 291-294) is characterised by its ability to see beyond content or knowledge limitations and to form “illuminating connections.” Gardner does assert that – like novelty – the preferred locus from which to metaphorise will be in the domain in which one has the deepest knowledge and experience: a football player will develop kinaesthetic analogies for a management situation, a scientist will develop metaphors drawn from the domain of science or a musician will develop performance based metaphors. Metaphorising operates directionally by inferring from one set of knowledge to develop cognitive constructs in other sets of knowledge in ways similar to schemata induction (Holyoak, 1984), rule induction (Egan & Greeno, 1974), mapping with performance components (Sternberg, 1977), and conceptual isotropy (Fodor, 1983) transfer knowledge.

## **5.2.6 Generalising operation of intelligence**

### **5.2.6.1 Constraints on generalisability**

Despite the foregoing discussion, the literature on intelligence contains numerous constraints on the generalisability of experience, knowledge and cognitive processes. For example, the content elements – figural, symbolic, semantic, and behavioural – of Guilford’s tri-part morphology (1956; 1967) will mean that one type of cognition will differ from other cognitions even though they may share a common operation and product. Case (1992) maintains that the executive central structures of his six domains do not generalise across to other domains. Fodor (1983) limits the generalisability of information attained through his modular input systems. Gardner (1983, 1985) maintains that the different representational systems used by different intelligences restrict inference across domains and his



critical thinking is domain specific. A number of Carroll's (1993) Stratum I factors such as *quantitative reasoning*, *lexical knowledge*, *grammatical sensitivity*, *spatial scanning*, *speech/sound discrimination*, *musical discrimination*, *absolute pitch*, *word fluency*, *semantic processing speed*, etc. are domain specific and non-conducive to generalising. Inference and metaphor themselves may still be limited by their basis in domain experience and knowledge. A football player may be able to infer the third pass in a goal scoring sequence based upon the previous two passes but they may not be able to infer the third note of a musical chord progression. Nor will inferential ability necessarily ensure that a football player will predict the behaviours of teammates or understand the management accounts of a club.

#### **5.2.6.2 Generalisability.**

On the other hand there are numerous arguments from the foregoing review of literature that support the non-domain specific nature of intelligence and its generalising potential. Spearman's (1923) noegenic laws of "education of correlates" and "education of relations" lay clear foundations for the generalisation of intelligence. Thurstone (1938) found strong correlations between the use of analogy and most of his measures of primary mental faculties. Guilford's (1967) divergent production category included *fluency*, *flexibility*, *elaboration*, *induction*, *transposability*. Carroll's (1993) *flexibility of closure* enables individual to keep multiple configurations in mind to help disembed them from domain knowledge constraints and his *generative flexibility* enables individuals to make associations not explicit in previous experience. All three of Sternberg's (1987) sub-theories use processes that are neither knowledge encapsulated nor modular and so not innately tied to a specific type of

Gardnerian intelligence or knowledge base. Holyoak (1984) maintains that individuals utilise a range of analogical processes such as mapping, comparative analysis and metaphor to generalise rules and propositions from their previous performance to make new combinations with underlying schemata from previous experience in association with their current situation. Gardner's (1983) metaphorising and novelty are composites of inference, induction and analogy that enable individuals to generalise expertise.

### **5.2.7 Expert reasoning and information processing: The use of inference, induction and analogy for generalisation**

Most cognitive models of reasoning identify a range of inferential mechanisms which contribute to the ability to generalise cognitive processes across problems and enable individuals to adapt to and respond successfully to change. This is also true of information processing and schemata and models of intelligence. Pellegrino and Glazer (1979) maintain that to understand the operation of intelligence it is necessary to study inductive reasoning tasks. Egan and Greeno (1974) identify rule induction as a key process for how analogical reasoning operates in problem solving and concept formation when developing interconnections between the nodes of a network structure. Goldman and Pellegrino's (1984) divide analogy into performance and process components and identify three types of processes used in analogy: (1) *attribute discovery* or encoding processes in which the important components of the problem are labelled and internally represented; (2) *attribution comparison* processes between pairs of terms in which inference attributes relationships, mapping compares possible correspondences and application applies the specific rules inferred from

the foregoing two processes; and (3) *evaluation components* which determine the adequacy of the completion of the analogic process.

Schemata (Rumelhart, 1980) position analogy and induction centrally in memory retrieval processes used in human problem solving. Glick and Holyoak (1983) contend that analogical cognition works because, though the two bases of an analogy may have very different domain knowledge, they can have a shared schema (usually including a shared propositional structure) even when the analogues themselves aren't highly convergent in terms of content. They give as an example of the use of analogy to compare a military problem involving assaulting a fortress with a medical problem involving the use of radiation to attack a cancerous tumour in which each problem is from a different domain and involves very different knowledge and experience (Figure 5.3).

#### Military Problem

##### Initial State

Goal: Use army troops to capture fortress

Resources: Sufficiently large army

Constraint: Unable to send entire army along one road

Solution plan: Send small groups along multiple roads simultaneously

Outcome: Fortress captured by army

#### Radiation Problem

##### Initial State

Goal: Use rays to destroy tumour

Resources: Sufficiently powerful rays

Constraint: Unable to administer high-intensity rays from one direction

Solution Plan: Administer low intensity rays from multiple directions simultaneously

Outcome: Tumour destroyed by rays

#### Convergent Schema

##### Initial State

Goal: Use force to overcome a central target

Resources: Sufficiently great force

Constraint: Unable to apply full forces along one path

Solution Plan: Apply dispersed forces along multiple paths simultaneously

Outcome: Central target is overcome by force

*Figure 5.3 Example of correspondences among convergent problems and their schema. Based on Glick and Holyoak (1983)*

Both face analogous problems with different content: the risk of concentrating and using power from one direction. Attacking a fortress with all one's resources from one direction will lead to a heavy attrition due to the ability of the defence to concentrate their forces. Destroying a tumour using radiation through directing x rays from one direction at full force will destroy the surrounding tissues. Analogy addresses the similar process rather than content leading to a solution: divide the attack forces into smaller groups and attack simultaneously or reduce the intensity of the x-rays and then direct them from multiple directions simultaneously.

When information is retrieved from the memory, schemata are vehicles for potential analogies and they operate as an interface between otherwise passive memory storage and the generation of new ideas. Analogical reasoning relies on "eliminative induction" to minimise non-relevant content and "schema induction" to identify and build the shared bridge for analogic transfer of knowledge and experience. It is noteworthy that failure to identify a potential analogy can occur when "the problem solver fails to encode elements of the schema, in either the base or the target" (Holyoak, 1984, p. 212) which suggests that the ways in which expertise is acquired and elements of expert schema are encoded and subsequently enriched will influence their generalisability as discussed in Chapter 4.

Cognitive processes aligned with models of intelligence such as inference induction, analogy, and metaphor can explain how cognitive representations, memory, schemata, mental models, and expert systems in general can be modified and adapted to changing situations through processes like production

system modification (Klahr, 1984), schema restructuring (Rumelhart & Norman, 1978) or schema induction (Holyoak, 1984) which explain how individuals can adapt existing expertise to domains other than their primary domain. Mechanisms in information processing models like *elaboration, elongation, strengthening, discriminating, generalisation, accretion and restructuring* will enable individuals to adapt and modify knowledge and processes from one expert domain to another in transitions. Repeated generalising from existing structures to new ones could make these various mental models and their processes more ‘transition-friendly.’

## **5.3 Data Analysis**

The review of data will show how the inductive and inferential mechanisms discussed above operated to generalise expert knowledge and processes across domains during transitions. Three research questions were considered:

- 1) *How does intelligence used in the primary domain transfer to similar or like-for-like situations at later career stages?*
- 2) *How does are inference and induction used to generalise to situations significantly different than those encountered during performance in the primary domain?*
- 3) *How does the use of analogy and metaphor enable individuals to bridge wider knowledge and process gaps between domains?*

### **5.3.1.1 General transfer of knowledge and experience**

There was transfer of general knowledge and experience during transitions from earlier to subsequent work stages. (See Table 5.1 for some indicative statements.)

*Table 5.1 Some statements indicative of the ways in which intelligence transfers domain knowledge through induction and inference*

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**GENERALISATION THROUGH TRANSFER**

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*"I had through all of these working assignments a front to back experience a lot of generic type skills"*

*"It just sort of happened because I had the experience and expertise"*

*"I suppose there isn't a huge transition between teaching somebody a set of mechanical skills to actually the tactical knowledge about sailing"*

*"Be an expert advisor to evaluate these plans"*

*"I'd brought those two interests together"*

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***Simple transfer: like for like***

**Generalising from previous knowledge**

*I had through all of these working assignments a front to back experience and again the desire to have an impact for the bank in a way that I can explore all those 'learning's' but even learn more on top of it. (BSN R7 Peter)*

And:

*There is another time when I was going to come into something which I had less technical knowledge on, but a lot of generic type skills. Probably again would be seen more generalist skills in terms of people, process, some of the interaction with IT, technology projects which I have been doing. Those were transportable. (BSN R3 Nicola)*

**Generalising from running an operation to building an organisational structure:**

*Nobody had any experience of running derivative operations which is what I had been doing for some of the time and even when I wasn't directly in that field, it's related in finance. So there was a lot of - there was just total freedom for me really as far as designing organisational structures, designing technology concepts. I wasn't doing the technology work but 'the architecture should look like this'. (BSN R1 Nicola)*

And again:

*I suppose there isn't a huge transition between teaching somebody a set of mechanical skills to actually the tactical knowledge about sailing. You could say that it is just one step from a ladder and all the rest, but I found that I was, without thinking about it, I was reasonably articulate. (SPT R1 George)*

And from running a research department to running a small business:

*So I moved to that job which was a smaller people management job, but a very complex in terms of the interface between the business and research so I started working in different circles and working, understanding business problems in a different way etc., so I became much more involved in the business side and kind of structuring the research programme of this business. (BSN R1 Oliver)*

Moving up in an organisation:

*And then I managed to get the Chief Programme Engineer job and again I went backwards before going forwards. "I am in charge of this car now." But that transition didn't take long actually as I had been a programme manager and was now a CPE and I haven't really looked back since then. (BSN R1 Lawrence)*

Moving from running one operation to consulting a variety of operations:

*I continue to evolve. I do a mixture of business things, government advisory things and educational charitable roles and some of them have more people management and some have more business and strategy and policy (BSN R3 Oliver)*

### **5.3.1.2 Intelligence generalising through inference and induction**

There were a number of illustrations of participants using induction and analogy to apply expertise from their primary domain to subsequent work and professional situations. (See Table 5.2 for some indicative statements.)

Table 5.2 Some statements indicative of the ways in which domain intelligence is generalised through transfer of processes

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**INDUCTION AND INFERENCE**

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*"I can abstract things"*

*"Therefore derive from there what kind of logic is implied in order to translate it"*

*"It's a bit like teaching really, I find organising departments the same kind of skill that you need"*

*"I used the same skills"*

*"In order to teach well I need to be playing seriously"*

*"I was asked to go on the UK Sports board with a specific remit to be somebody with performance experience"*

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***Abstracting from the specific to the general***

Abstracting from specifics to general principles:

*I can abstract things and say well, 'If you do it like that here, that means for that problem over there' there must be generic dynamics which you can create maybe out of them. (BSN R1 Peter)*

And:

*I think I started to realise that and because as I realised the limitations of what exercise physiology could ever tell me about my sport, I started to understand better I think the rules of science and it's real power (SPT R 2 Edward)*

Applying systems and models from primary domain such as computer programming to tracking trading performance:

*I used the same skills for doing accounting, basically position maintenance you had to be on top for P&L calculations and positions. I used Lotus 123 and spreadsheets – the very first one and I did it and again it was very magic for these people. (BSN R1 Peter)*

***From specific performance to management***

From teaching to running a department:

*I feel quite, yes, it's something I've developed myself, but I feel that I'm, it's a bit like teaching really, I find organising departments the same kind of skill that you need. (MUS R1 Yvonne)*

And:



*I mean it's this whole transferable skills thing and I think that sense of being able to work progressively and logically and you know, when one practises, one sets oneself milestones and one continually evaluates what one does and then one manages one's work in order to reach the next milestone, one does all of that subconsciously when you practise and yet those are exactly the sort of skills that you need when you are then in a managerial position. (MUS R1 Stephen)*

And:

*So you need to be in a position to structure working patterns and therefore derive from there what kind of logic is implied in order to translate it into a developing programme structure (BSN R1 Peter)*

From self managing to running a performance department:

*I ended up landing the job there of head of strings at {conservatoire}. But even though I'd had to have a degree of management and administrative ability to run the outreach project, they sort of took me on board there on the basis of my, if you like, practitioner's experience.....And I think, you know, there's a sense that musicians at their best, because of the way that they have to learn, and the way the commitment, the discipline, but the way that they have to be very self-aware and self-analytical, are capable of being very adaptive. (MUS R3 Stephen)*

Generalising from performance to teaching:

*I found that even from the point of view of teaching, in order to teach well I need to be playing seriously – not necessarily playing a lot, but I couldn't teach well if I just let it go, so there is that sort of inter-connection. (MUS R6 Robert)*

And:

*You know I went from being responsible for 20 to 30 full-time equivalents to 80-90 full-time staff and the budget in those days... probably £11m. And looking after the recreation side of the sport... so it was cruising, motor boating... the whole thing – legal, membership, marketing, publishing (SPT R 2 George)*

### ***From specific domain experience to developing policy in the field***

Becoming an intellectual leader in their field:

*And I don't know, I just took to it and I was able to provide to the people like me, I was able to provide scientific leadership to the group, I went around and talked to people in other groups we had got on so I was accepted as a good scientist by them (BSN R4 Oliver)*

From running a sport to setting policy for sport nationwide:

*In 2005 I was asked to go on the {National} Board with a specific remit to be somebody with performance experience – they had different people with different competencies - and they wanted somebody with performance experience who would help the Board make investment decision and institute a performance management programme with the governing bodies that would lead to us coming fourth in the medal table in 2012. (SPT R5 George)*

Leading negotiations in one's area of expertise:

*He wanted me to lead for the company on the European scene. That this was big negotiations; it had big implications and they needed somebody and I was the person who could do it both technically and managerially (BSN R6 Oliver)*

From winning an Olympic Gold medal to delivering an Olympic Games legacy in sport education:

*Well our intention for the legacy programme for 2012 ... from 2012 is to teach those skills to young people so they would get, I hope integrated into the national curriculum to have them become peer mentoring skills (SPT R1 Harold)*

And:

*You know Vice Chancellors some are more managers, some are more leaders and ultimately these really senior positions like the conductor or the Vice Chancellor demand both leadership and management (MUS R2 Thomas)*

### 5.3.1.3 Intelligence using analogy and metaphorising to make large leaps in generalisation of expert processes and knowledge

Of particular interest are the examples where individuals generalise from primary domain intelligence and expertise to different application domains other than their original performance domains. Here the cognitive bridge that has to be crossed is more substantive and the use of metaphorising and analogy is more explicit and larger scale. (See Table 5.3 for some indicative statements.)

*Table 5.3 Some statements indicative of the ways in which domain intelligence is generalised through analogy and metaphorising*

#### **GENERALISATION THROUGH ANALOGY AND METAPHORISING**

*“Now you learn that through being part of any musical texture; you don’t learn that in management school it seems to me”*

*“I sort of used to present them in a very performance orientated way”*

*“I often do use music in artistic analogies as a way to confronting an issue”*

*“For me, even being a manager is always a bit of a performance”*

*“I realised quite quickly on – a bit like the swimming – ‘I have a natural feel for this’ “*

*“I would have said everyday – the musical training is being activated countless times”*

*“I developed a written notational stave and I analysed positions on the field and every passing pattern and so I could read it like a piece of music”*

*“I think your brain becomes quite like a flow diagram if you do Latin and Greek”.*

*“Another puzzle but one that did seem to follow engineering rules: if you ran a model you could predict these things”*

*“Borrow ideas from one discipline or field of science if you like and apply them in a useful way to another field of science”*

*“You’re just dealing with more money and bigger decisions and ‘I’m going to close that factory’.. instead of ‘I’m going to shut this door’, but in a sense it’s just people making decisions; it’s not... it isn’t radically different”*

#### **Analogies from one domain’s processes to another domain**

Generalising from systemic engineering models to financial trading models:

*The kind of figuring out which way to market was going how best to take advantage of that. I mean that was another puzzle but one that did seem to follow engineering rules: if you ran a model you could predict these things and you put these inputs in and you’ve these outputs. (BSN R1John)*

Intelligence identifies correspondence between the study of classical language and mathematical intelligence used in trading:

*Maths was quite interesting because a large part of me likes logic and actually I believe if you do Latin and Greek your brain is trained in logic because you can’t translate without a continual process of elimination of looking at word*

*endings to work out what words go with what and I think your brain becomes quite like a flow diagram if you do Latin and Greek. (BSN R4 Mark)*

And:

*I often do use music in artistic analogies as a way to confronting an issue....I am coming at it from a view point of whether I hear things and see things which I can trust or which appear to me to have a chance through the working of normal human systems to work out or not work out and that it is down to musical training, so I would have said everyday – the musical training is being activated countless times. (MUS R8 Thomas)*

Generalising from engineering decisions to business decisions:

*Even when you're running a company you still sit down with people and decide what you're going to do and it happens at every level and you're just dealing with more money and bigger decisions and 'I'm going to close that factory'.. instead of 'I'm going to shut this door' But in a sense it's just people making decisions; it's not, it isn't radically different. Now the consequences of the piston not working could be you have to recall thousands of vehicles, but that's a lowly kind of decision. Deciding when you're going to close a factory or buy {company} and {company}, or sell {company} and {company} – still just people sitting there and deciding. (BSN R7Michael)*

### ***Analogies from one domain's expert knowledge to another***

Intelligence uses analogical correspondences to transfer knowledge acquired in one domain to another. From music to sport:

*Music notation. I developed sport notation in the '80's and at that time - I mean it's a huge industry now, we're driven by the computing world – but at that time, we only just had the very first BBC computers; they were almost steam driven old things [...] I developed a written notational stave and I analysed positions on the field and every passing pattern and so I could read it like a piece of music. (SPT R2 Diane)*

Intelligence transfers knowledge acquired as a coach to run an interest group:

*So instead of being a coach, I got involved in running a pressure group for women's sports and became an active feminist by this point; I'd brought those two interests together. (SPT R2 Diane)*

Intelligence generalised knowledge from sport to business to education:

*Wrote stuff that could be used in management which is now being used in the schools so that the body, mind, emotion, spirit elements are valued based leadership can go right into the life development journal for the kids – same thing. (SPT R1 Harold)*

Using the mechanics of engines to think about a body as a machine:

*Now that started off as a real curiosity with what appeared to be a really simple science, you know there's an engine here - some are bigger than others, some are better tuned than others. So understand engine, answered question, move on. So we got some figures and some stuff from the lab and the lab was pretty crude at the time, but I really wanted to know what these figures meant. (SPT R1 Edward)*

### ***Analogous thinking from performing to leading in a field***

Generalising from roles taken in an orchestra to roles taken in an organisation:

*Fascinatingly I think, fascinating in a complex way – you get that through the roles you have to play but same in an orchestra. You're playing a tune for one minute; you're the second violinist the next and I played the viola for a number of years – you're filling in a third of the chord of the ensemble and then all of the next minute you're in fact completely silent while other people have their role. Now you learn that through being part of any musical texture; you don't learn that in management school it seems to me. (MUS R1 Richard)*

Using performance skills developed as a professional musician to making presentations to a board:

*The governing body loved me because I sort of used to present them in a very performance orientated way [...] and generally I seemed to get away with it. (MUS R2 William)*

Generalising from musical aesthetics to how one approaches a work situation:

*Above all, it colours the way I see the world [...] I often do use music in artistic analogies as a way to confronting an issue and sometimes will be exceedingly trusting or exceedingly rigid on an issue because I'm not coming in from text book management 101, I am coming at it from a view point of whether I hear things and see things which I can trust or which appear to me to have a chance through the working of normal human systems to work out or not work out and that it is down to musical training, so I would have said everyday – the musical training is being activated countless times. (MUS R2 Richard)*

From a swimming team to a business department:

*I was completely untried - and I was leading a group of men who were all senior to me in their respective institutions. And I realised quite quickly on – a bit like the swimming – ‘I have a natural feel for this.’ It's not that I'm going to get it right all the time but I'm going to be able to keep the motivated, keep them happy with the programme, I'm going to be able to be tough when I need to be but not a harridan. I suddenly realised I can do this stuff. I can do this leadership. (MUS R2 Susan)*

The correspondence between a conductor and manager:

*What role do I play in this leader/manager role which gets the best out of that like the orchestra gets the best out of the ensemble? [That] is done by a conductor who actually doesn't say a word, doesn't play anything, doesn't even make a sound but gets that ensemble playing best. And that's the kind of model that I do consciously think about. How can something by a deft appointment by a deft invitation by a particularly well turned word of encouragement, get the ensemble playing better. (MUS R3 Thomas)*

And across sports:

*I'm now this kind of pretty established independent expert in my sport and in the field of I guess effective applied sports science, so my first real engagement with this isn't the {his sport} saying to me ‘Bloody hell, { Edward }, we need to get you on board to help us create our World class programme’ It's actually Sport {Country} who were the distributor at the time get the phone saying ‘We want to pay you to be an expert advisor to evaluate these plans that are coming in’.*  
(SPT R2 Edward)

And generalising from creativity in music to creativity in management:

*Be creative, in music anyway and that's not just musically creative but creative within your managerial ways that you deal with people, how you use people, how you get them to work for you. You know, lots of thinking. (MUS R5 Yvonne)*

### 5.3.2 Discussion: Intelligence used in the generalisation of knowledge and cognitive processes

Table 5.4 shows the number of statements by participants indicating inferential mechanisms used to generalise experience and expertise during transitions.

*Table 5.4 Intelligence generalised during transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
General experience transferred	7	17	2.43	4	7	1.75	6	19	3.17	17	43	2.53
Generalising through induction & inference	8	19	2.36	5	18	3.6	5	17	3.4	18	54	3
Analogies & metaphor	5	11	2.2	5	5	1	6	11	1.83	16	27	1.69
<b>TOTAL</b>	<b>8</b>	<b>47</b>	<b>5.88</b>	<b>7</b>	<b>27</b>	<b>3.86</b>	<b>8</b>	<b>47</b>	<b>5.89</b>	<b>23</b>	<b>124</b>	<b>5.4</b>

#### 5.3.2.1 Discussion: General experience transfer

As one would expect, individuals were able to apply the intelligences they had developed during the acquisition of primary domain expertise to a subsequent career stage. More musicians (7) and business people (6) did this than sports people (4) and more often. Musicians made decisions based upon what they had learned managing their career as a performer to managing a faculty of music; business people who had run a small department in a larger division, widened their management scope to cover all aspects of leading a small regional business; sports people jumped from regional coaching operations to running national organisations bringing management skills to bear in a larger arena. This type of inference might fall under Carroll's (1993) *substitution of uses* factor in his

category of *Flexibility of Use* or what Sternberg (1977) called *inference application*, particularly where knowledge and experience is transferred across domains or applications. In their transitions it is possible to see *direct* and *predictive inference* (Carnap, 1962).

### **5.3.2.2 Discussion: Domain specific intelligence and knowledge generalisation**

There were also numerous examples amongst the participants of generalisation of domain specific intelligence from their performing career stage to divergent applications in subsequent career stages. These usually involved induction or inferential analogy. All 8 musicians, 5 sports people and 5 business people mentioned generalising their primary domain intelligence, averaging 3.5 times per individual. Applications of previous knowledge to broader contexts are characteristic of Guilford's *cognitive generativity* (1967). Most used *induction* (Carroll, 1993) to open possibilities from previous experience to subsequent generalisation. In the earlier transitions to career stages two or three e.g., from performer to coach, individuals often applied *direct inferences* (Carnap, 1962) from their experiences as a performer to coaching or teaching individual and teams. Later career transitions might use *predictive inference* (Carnap, 1962; Vickers, 2010) to enable wider generalisations e.g., predicting performance from members of an energy futures team based upon experience as an oil trader. From a production system perspective this could be explained by *rule induction* (Egan & Greeno, 1974) used to modify production systems (Klahr & Wallace, 1976) from one domain to apply them to another. Lateral transfer of knowledge or experience involves a higher degree of generalisation e.g., from coaching a national sports team to running a research consultancy or from running an



academic research department to running a research division in an organisation. Those individuals who made lateral transfers to a different field e.g., from academic research to business, from coaching to academic research, or from music conservatoire to an academic university, frequently had developed a high level of expertise previously in a parallel domain, though often associated with academic research. *Attribute comparison* (Goldman & Pellegrino, 1984) would operate during such transfer of knowledge and such generalisations are indicative of Carroll's (1993) *cognitive flexibility* rather than *cognitive fluidity*: it is not the quantity of ideas that are important so much as how knowledge is adapted to meet changing circumstances. This wider generalisation might reflect Carroll's *different uses* category within his *Flexibility of Use* category (1993).

A number of individuals, most often musicians, referred to experiences acquired in career stages one and two as the basis for generalisation to very different requirements at career stages five and six e.g., from leading a string section of an orchestra to leading a management committee. Carnap's (1962) *inference by analogy* and *universal inference* are the types of inference in which individuals might generalise from principles and rules of a specific expertise to transitions to broader arenas. Sternberg (1988) might suggest that this would involve *selective comparison* and *selective application* leading to *insight*. Goldman and Pellegrino (1984) called such processes *mapping*.

### **5.3.2.3 Discussion: Cross domain analogising and metaphorising**

While 16 out of the 24 participants gave illustrations of using metaphor to generalise domain knowledge, they only averaged 1.69 mentions per individual and the 5 sports people only mentioned metaphorising 1 time per person.

However, where individuals used metaphor to generalise experience during transitions, they were clear and striking: they included metaphors like guiding academic teams as if they were string sections in an orchestra, dealing with the logic of a business operation in the same way they used logic in Greek grammar, or recognising trends in energy trading through how engineering systems operated.

Metaphor relies on *flexibility of closure* to “keep one or more definite configurations in mind” (Carroll, 1993) so as to help *disembed* (Ekstrom et al., 1976) mental concepts or configurations from previously well-defined contexts. It could incorporate most of Guilford’s various “divergent production abilities” (Guilford, 1967) such as *flexibility, elaboration, induction, originality and transposing* to achieve more radical generalisations from primary domain experience to new situations. Individuals frequently juxtaposed knowledge from previous experiences with outcome requirements from new situations with different content and different contexts (Holyoak, 1984). In some cases this process would be more analogous e.g., from dance notation to sporting notation. In other cases it is more metaphorical e.g., from deciding on a piston finish to deciding whether to keep a manufacturing plant open. When the analogies or metaphors are quite close the individual could use *attribute comparison* (Goldman & Pellegrino, 1984) or *selective comparison* (Davidson, 1986). When the two domains of applications are quite far apart, then processes like Guilford’s *transposing* (1967) might operate. All of these cognitive processes would enable individuals to enrich their schema and mental models (Rumelhart, 1980) and would contribute to *schema sharing* (Glick & Holyoak, 1974) and *schema*

*restructuring* (Rumelhart & Norman, 1978) so as to build stage-appropriate expertise and knowledge throughout their careers.

## **5.4 Concluding discussion**

Individuals who were successful in career transitions seemed to be able to use a range of cognitive processes to generalise knowledge and experience developed during the acquisition of their primary domain expertise. Inference was the fundamental cognitive process that was repeatedly used in a multitude of ways to transfer knowledge and processes from previous experience to later career stages particularly during transitions where individuals were able to bring forward previous experience to apply to new situations. Inductive inference allowed an individual to generate new ideas and possible applications of existing knowledge whether this was a straight forward like-for-like transfer, from one domain intelligence to another, or from one type of situation to a completely different one. Associative memory retrieval enabled past experience to be generalised to current situations. Cognitive flexibility enabled individuals to remain open to a variety of new approaches when encountering uncertainty or new challenges. Analogical processes enable individuals to generalise laws and propositional structures from experience in one domain to experience in another. Metaphor and broad analogy bridged the largest domain divisions. Rules, propositions, production processes, and schema could all be adapted to operate in new and emergent situations. Both process and rule induction seemed particularly useful. Gardner's argument that originality and metaphor draw upon a antecedent development of specific intelligence (or expertise) seems to be generally borne

out as most individuals who used metaphor and wide analogies drew upon early experience in their primary domain.

Sternberg's Triarchic Intelligence model and Carroll's Human Cognitive Abilities provided a comprehensive and systematic compilation of cognitive and inferential processes that could operate to generalise knowledge and expertise. However, it was not readily apparent that there were common patterns of usage of cognitive inferential mechanisms amongst all the participants. Rather they seemed to pick and choose their cognitive generalisation processes according to predilections which were not readily identifiable: some matched past experience closely with new situations, others generalised more broadly from knowledge or processes, some were almost profligate with their use of analogy, others more targeted and specific, some stayed more within their domain and others used knowledge from an array of domains or experience transferring it quite readily across domain boundaries.

Generalisations from specific Gardnerian intelligences beyond their domains of application were often used despite the theoretical constraints placed by Gardner (1983) on how domain specific symbolisation systems, critical thinking, and modular processes would limit general application. While there may be some validity in his conceptualisation, individuals seemed to constantly 'over-ride' or circumvent these constraints. It seems likely that there must be some permeability between his higher-level cognitive processes and his specific intelligences. Nor were there indications that participants were highly reliant on Sternberg's meta-component process or that they followed then in the linear, sequential way prescribed by Sternberg. Cognition probably does not operate so

logically and sequentially in real life, though it may also be that these processes and their missing stages are tacit or unconscious to varying degrees and therefore not readily accessible to the interview process. Participants did not necessarily following a linear process or logical structures often imposed by cognitive scientists seeking to order the workings of the mind. Nor did they range randomly or indiscriminately over the full range of cognitive inferential mechanisms. What seemed apparent is that each person developed and refined their personal repertoire of mechanisms through repeated and systematic experimentation to arrive at their own internally validated constellation of protocols and heuristics which they would apply and repeatedly adapt to manage career transitions as they emerged.

# Chapter 6. Personal Intelligences in Support of Transition Expertise

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## **Introduction**

Most theories of intelligence include personal intelligence in the arena of human performance even if linguistic/semantic and mathematical/logical symbolisation systems are not always up to the job of measuring it. Personal intelligences are important for transition expertise because, as a person makes transitions beyond their career stages as an individual performer, they generally move into arenas where the need for personal intelligence suddenly pushes to the foreground. The role that personal intelligences play in transitions will be approached in this chapter in three parts. The first part will review personal, metacognitive, self-regulatory and social-learning theories associated with personal intelligences. They will be compared using the simple dichotomy of intrapersonal and interpersonal intelligence and their implications for transition expertise will be assessed. The second part of the chapter will analyse and discuss the data as it relates to the theories, first addressing intrapersonal intelligence and then interpersonal intelligences followed by summaries of the findings. The final part will present a brief discussion of the findings.

## **6.1 Personal Intelligences theory**

I will attempt to address the very different perspectives on the nature of personal intelligence in this chapter, reviewing a number of approaches to understanding the operation of personal intelligences in light of models which can be broadly organised under the categories of 1) trait and abilities, 2)

intrapersonal/interpersonal differentiation, 3) metacognition and self regulation, 4) social intelligence and 5) emotional intelligence models.

### **6.1.1 Trait theories**

Within most trait theories of intelligence (See Chapter 5) there are personal intelligence elements. These are more substantive than one might initially conclude. The first of Spearman's three "noegenic" laws is "the apprehension of one's own experience [...] that a person has more or less power to observe what goes on in his own mind." Spearman also included what he called "the psychological relation" amongst the processes associated with 'g' which addressed how individual responded to interpersonal situations (Spearman, 1927, pp. 162, 179-181). Spearman believed that it was possible for an individual to know the mental states of others and this ability could be measured in tests like Binet's Interpretations, Decroly's Sequence, and Healy's Pictorial Completion. In Spearman's laboratory, Wedeck (1947) conducted studies focussed on the ability to judge feelings, moods and motivations of individuals – what he called "the psychological ability." Carroll's reanalysis of data sets from Wedeck's studies divided the findings into a "factor concerned with ability to choose appropriate verbal characterisations of personalities from verbal descriptions" and "a factor concerned with ability to recognise feelings and emotions portrayed by pictures of facial expression, poses and the like" (Carroll, 1993 p. 527).

Thorndike (1920) divided intelligence into the ability to understand and manage ideas, concrete objects and people. Vernon (1950) identified insight into the states and traits of others as one of his human abilities. Guilford (1967) included elements of personal intelligence in his Structure of Intelligence model through

the area of behavioural operations which he thought were reflected in Thorndike's third category, the ability to understand and manage people. Amongst his four categories of figural, behavioural, symbolic and semantic content, he subdivided information in his behavioural content category into behavioural (other) – “the kind of information involving the awareness and management of others” – and behavioural (self) – “information concerned with the awareness and management of ourselves. We not only know, but we know that we know, and we know that we have feelings, emotions, intentions and actions” (Guilford, 1967, p. 238. See figure 6.1).

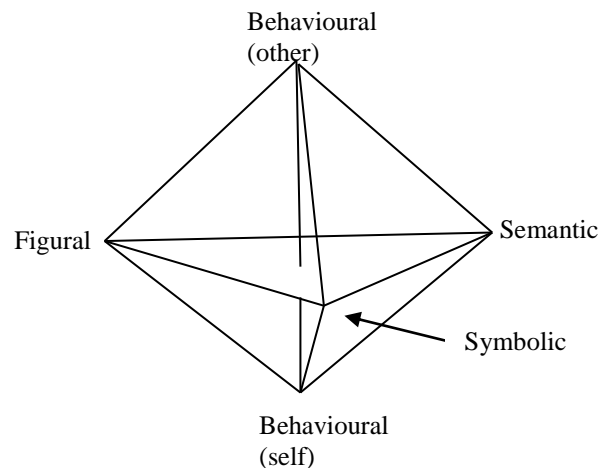


Figure 6.1 Informational tetrahedron. Based on Guilford (1967)

Early psychometric instruments such as the George Washington Social Intelligence Test (Hunt, 1928) were developed to measure social intelligence. The GWSIT was composed of seven subtests: judgement in social situations, memory of names and faces, observation of human behaviour, recognition of mental states from facial expression, recognition of mental states behind words, social information and sense of humour (Moss, 1930). Even Wechsler (1958) who rejected the idea of personal intelligence *per se* still identified the facility in



dealing with human beings as an important part of human intelligence, though he considered it to be general intelligence applied to a social situation.

Personal intelligence makes up an important part of most trait based intelligence models, almost all of which contained two common elements: intrapersonal awareness of self in the form of “apprehension of one’s own experience” and “knowing that we know” and interpersonal awareness of others for the purpose of “psychological relations” and “managing others”.

### **6.1.2 Intrapersonal and interpersonal intelligences**

In his Multiple Intelligence (MI) theory Howard Gardner (1983) identified two personal intelligences - *Intrapersonal* and *Interpersonal Intelligence* - to which he gave equal stature with the other five domain intelligences. Though he suggests that the personal intelligences are developed together, in co-dependent ways and more interlinked than his other intelligences, they pass the same criteria that he used to identify the first five of his intelligences e.g., unique core operations, susceptibility to encoding in a symbolic system, developmental histories, etc. Gardner considers the personal intelligences to be ‘information processing capabilities’ – one directed inwardly and the other outwardly (Gardner, 1983, p. 253). He maintained that both intrapersonal and interpersonal intelligence have their own unique “biopsychological potency” (Gardner, 1993b). Jerison, for example, presents biopsychological evidence for the differential between the perception of others and perception of self in the brain (Jerison, 1973). Without conceding the trait nature of personal intelligences, Gardner acknowledges the contribution of social construction to the development of

personal intelligences as described in the work of mediationists like Vygotsky (1978) and Luria (1976).

#### **6.1.2.1 Intrapersonal intelligence**

*Intrapersonal intelligence* from Gardner's perspective is "access to one's own feeling life – one's range of affects or emotions: the capacity instantly to effect discriminations among these feelings and, eventually, to label them, to enmesh them in symbolic cues, to draw upon them as a means of understanding and guiding one's behaviour" (Gardner, 1983, p. 240). Gardner proposes that intrapersonal intelligence is active when an individual is charting a life course and making decisions about the next direction that they will take in their development. As such, one would expect it to play a central role in transition expertise as individuals plan and choose course of action leading through major transitions. Gardner identifies intrapersonal intelligence in particular as the basis of or predicate for the conceptualisation of a sense of self, a concept which he prefers to that of an executive function represented in Sternberg's (1988) meta-components or Flavell's (1979) metacognitive feedback system: "The phenomenal experience of an executive sense of self may make sense in our society, but it does not appear to be an imperative of successful human functioning" (Gardner, 1993b, p. 43).

#### **6.1.2.2 Interpersonal intelligence**

Gardner describes interpersonal intelligence as: "*the ability to notice and make distinctions among other individuals* and, in particular among their moods, temperaments, motivations, and intentions" (Gardner, 1983, p. 239-240). This is consistent with Guilford's Structure of Intellect model in which tests were

developed for the cognitive abilities that might affect an individual's social behaviour including "feelings, thoughts, intentions, attitudes as well as psychological dispositions in which expressive behaviour, more particularly facial expressions, vocal inflections, postures, and gestures, [which] are the cues from which intentional states are inferred" (O'Sullivan, Guilford & deMille, 1965, p. 6). Guilford's six behavioural/product categories encompass the ability to identify the internal mental states of individuals, group other people's mental states on the basis of similarity, interpret meaningful connections among behavioural acts, interpret sequences of social behaviour, respond flexibly in interpreting changes in social behaviour, and predict what will happen in an interpersonal situation (O'Sullivan, Guilford & deMille, 1965). Normative studies and factorial analysis of the tests developed for each of these abilities indicated that these main categories were not contaminated by semantic and spatial abilities. Though subsequent studies (Shanley, Walker & Foley, 1971) found correlations between scores on more general IQ tests and the subtests developed by O'Sullivan and her colleagues, these correlations were not strong enough – contrary to Wechsler's assertions (1958) – to characterise interpersonal intelligence as merely the application of general intelligence in the social arena.

### **6.1.3 Metacognition**

#### **6.1.3.1 Metacognition**

Metacognitive theory presents a different perspective on the nature of personal intelligence. Research on *metacognition* draws heavily on information processing and systems theories. Nelson and Narens (1990) cite, amongst others, Hilbert's

(1927) 'metamathematics,' Carnap's (1934) 'metalanguage', and Bateson's (1972) systems theory in their discussion of the nature of metacognition. Metacognition theory covers the operations and interactions of four types of phenomena. *Metacognitive knowledge* is an individual's "stored world knowledge," particularly relating to people as "cognitive creatures." It is stored in Long Term Memory (LTM) and like most other knowledge is activated by retrieval cues. (2) *Metacognitive experiences* are "conscious cognitive or affective experiences" that accompany "intellectual enterprises." Metacognitive experiences can occur before, during or after an enterprise and are cognitive or affective responses to those enterprises. (3) *Goals* are the "objectives of a cognitive enterprise." (4) *Actions* are the "cognitions or behaviours" initiated to achieve the goals. "Cognitive strategies are invoked to *make* cognitive progress, metacognitive strategies to *monitor* it" (Flavell, 1979, p. 907, 909) and they form the basis for learning, development and adaptation. Most research in metacognitive theory has focussed primarily on metacognitive knowledge and experience which actually align closely with concepts of personal intelligence. The operation of goals and actions are addressed primarily through metacognitive knowledge and experience. Flavell suggests that even when activated, metacognitive knowledge does not necessarily enter into consciousness, as is the case with *tacit knowledge* (Sternberg & Horvath, 1999).

### **6.1.3.2 Metacognitive Monitoring and Control**

The metacognitive model is essentially a feedback model in which introspection and self awareness in the form of metacognitions contribute to self-regulation and learning adaptation (Nelson, Gerler, & Narens, 1984; Nelson & Leonesio, 1988; Butterfield, Nelson & Peck, 1988; Shimamura & Squire, 1986; Leonesio &

Nelson, 1990, Bjork, 1996). Cognitive processes are divided into two inter-related levels: the *object level*, which is involved in activities like answering a question, and the *meta-level*, which is the cognition about the object level cognitive process such as being aware of how the answer was recalled (Nelson & Narens, 1990, 1996). This meta-level is further divided into *control* and *monitoring* functions which together help regulate behaviour as individuals adapt and modify their cognitions about persons, environment and tasks through feedback. Many researchers in metacognition – not unlike intelligence and expertise researchers – have focussed on the operation of human memory because it is a measurable, ‘model-able’ component of cognitive processes. They have studied meta-memory in the form of the controlling and monitoring cognitive processes associated with each of the three memory stages – acquisition, retention and retrieval. Controlling processes include processes such as selection of strategy, allocation of time, selection of search and termination of search. Monitoring processes include subjective evaluations such as *Ease of Learning* judgements (EOL), *Judgments of Learning* (JOL) and *Feeling of Knowing* judgements (FOK) such as *Tip of the Tongue* phenomena, ‘warmth’ or closeness to solutions (Nelson & Narens, 1990). Metcalfe (1996) used the CHARMS computer based model to study human episodic memory retrieval. Metacognitive theory uses studies of memory retrieval, self reflection, self reports on test performance, etc. and considers introspection to be informative, predictive and heuristic in its function (Lieberman, 1979). In monitoring and control, we see a clear differentiation of intrapersonal intelligence into self-awareness and execution.

#### 6.1.4 Self-Regulation

*Self-regulation* theory, like metacognition, is often conceptualised in terms of a systems model of human behaviour but differentiates itself from metacognition in its inclusion of subjective, non-cognitive factors such as doubts, fears and beliefs about performance situations which influence the sense of personal agency and which are viewed as different from the knowledge states and reasoning process which are the main characteristics of metacognition (Zimmerman, 1995). The main feedback loops in this systems model are *behavioural self-regulation*, which involves self observing and strategically adjusting performance processes, *environmental self-regulation*, which involves observing and adjusting performance processes to respond to different or changing environments, and *covert self-regulation*, which is a recursive form of self-monitoring and adjustment of cognitive and affective states to maintain the systems stability or change of direction as required (Demetriou, 2000, p. 209). The self regulation model considers itself to be an *open loop* system which can incorporate proactive increasing of discrepancies through elevating goals or seeking more challenging tasks (Zimmerman, 2000; Kuhl, 2000). Self regulation is often formulated as a circular, three stage – before, during and after – model. *Forethought* sets the stage for performing and includes processes which influence and motivate efforts to act; *performance or volitional control* operates during action or effort and influences attention and action; and *self-reflection* occur after performance in response to one's experience and also feeds back into the first stage, forethought (Figure 6.2).

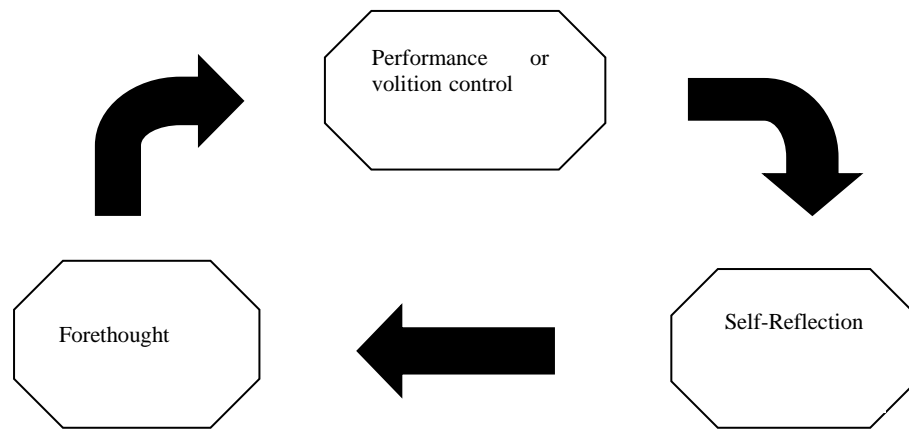


Figure 6.2 Cyclical phases of self regulation. Base on Schunk and Zimmerman (1998)

The three stages of the self regulation model (Zimmerman, 2000) give some indications of how intrapersonal intelligence might be used to develop a career and ultimately to manage transitions. Each stage has a number of different processes which help individual sustain performance or adapt their behaviour to enhance performance. While they stray into territories like motivation, goal setting, use of imagery, environmental structures, attribution and defence strategies, they could be viewed as a comprehensive approach to delineating how personal intelligence is operationalised in performance (See Table 6.1).

Table 6.1 Cyclical self-regulatory phase. Based on Zimmerman (2006)

<b>Forethought</b>	<b>Performance/volitional control</b>	<b>Self Reflection</b>
Task Analysis	Self-Control	Self-Judgement
Goal Setting	Task Strategies	Self-Evaluation
Strategic Planning	Self-instruction	Causal attribution
	Imagery	
	Time Management	
	Environmental structuring	
	Help Seeking	
Self-Motivation Beliefs	Self-Observation	Self-Reaction
Self-efficacy	Metacognitive self monitoring	Self-satisfaction/affect
Outcome expectation	Self-Experimentation	Adaptive-defensive
Intrinsic interest/value		
Goal Orientation		

#### **6.1.4.1 Goals and multifinality**

While all elements of the three stages of the self-regulation cycle have been elaborated upon at length (See Zimmerman, 2006), it is worthwhile investigating one area, by way of illustration for how the model operates in more depth. *Task analysis* in the forethought phase, which includes goal setting and strategic planning, is of interest because the processes involve issues similar to those addressed previously when discussing cognitive flexibility. In self-regulation theory, goals and strategies help implement decisions and motivationally based choices (Eccles et al., 1983; Wigfield & Eccles, 2000). *Goals* are described as “motivational symbolisations” or “cognitive constructs” rather than primary sources of behavioural motivation. *Strategies* are the “purposive personal processes and actions directed at acquiring or displaying a skill...by aiding cognition, controlling affect and directing motoric execution” (Zimmerman, 2000, p. 17). One can see links to earlier models of information processing, problem solving, planning and strategies (Newell & Simon, 1972; Miller, Galanter & Pribram, 1960). Goals can have the properties of *equifinality* i.e. they can be attained by any number of combinations of lower order actions and *multifinality* i.e. any one means can serve more than one goal (Shah & Kruglanski, 2000). For example, the goal of keeping stakeholders informed in business can operate with multi-finality in that it will please one’s superiors at work, manage relations with other parts of the business, deliver accurate decisions, build connections for future work opportunities, etc. The equifinal goal of moving a football down the field to set up a scoring opportunity can be achieved by dribbling the ball, kicking a ball past opponents, kicking the ball to a



fellow player, kicking the ball at length across the pitch; etc. If one were to continue the illustration, it is possible to say that a multi-final goal of developing a computerised data system could be used to apply to sport performance training programmes, musician performance in changing environments or future trends in energy stocks. An equifinal goal of enhancing sporting performance could be attained by using business coaching strategies, musical notation systems or sports exercise physiology information.

The more means available for attaining an objective, the less strong are the dyadic ties between a particular means and goal. The more a means or goal can be used for different purposes, the more adaptable it will be to changing circumstances. This is important for transition expertise because both a variety of alternative means to achieve a goal (equifinality) and a variety of goals that can be achieved by the same means (multi-finality) would contribute to more flexible use and generalisability of knowledge and cognitive processes. Associations between goals and means form complex networks that are not fixed: they can evolve, change and adapt to experience and learning, which is what happens when individuals make transitions to coaching or teaching or administering an organisation. Highly stabilised, tightly linked goal network routes might limit one's ability to respond flexibly to new or challenging situations during transitions. Deliberate practice (Ericsson, Krampe & Tesch-Römer, 1993) is one way in which such means/goals networks might be developed. Such self-regulatory processes, while potentially enhancing performance, would contribute to reductive bias (Feltovitch, Spiro & Coulson, 1993), domain knowledge specificity (Newell & Simon, 1972; Simon & Chase, 1973), automatisisation (Sternberg & Frensch, 1992), functional fixedness (Chi, 2006), and so forth.

### 6.1.5 Social Intelligences

More recent study has attempted to understand personal intelligences as *social intelligence*. Kosmitzki and John (1993) identified seven categories of social intelligence which included four cognitive elements (perspective taking, understanding people, knowing social rules and openness to others) and three behavioural elements (ability to deal with people, social adaptability and interpersonal warmth). Wong, Day, Maxwell and Meara (1995) developed a model of social intelligence which included three groups of factors: academic intelligence, a combined social perception/social insight element and a general social knowledge. They were able to differentiate both the behavioural and cognitive aspects of social intelligence from more general academic intelligence. Cantor and Kihlstrom (1987, 2000) – whose work is founded in the social cognitive theories of Rotter (1954), Kelly (1963), Michel (1970), and Bandura (1997) – maintain that while social intelligence includes cognitive processes such as reasoning, memory, and perception, actual psychometric measures of the processes are inadequate for measuring social intelligence. They suggest that the successful measurement of social intelligence should include the different kinds of strategies utilised by individuals to accomplish social tasks and the ways in which individuals make plans, monitor progress and evaluate the outcomes of their plans (Kihlstrom & Cantor, 2000). Self regulation models like Zimmerman's (2004) attempt to map out the mechanisms of such processes.

While social intelligence is thought to be distinct from academic abilities, many measures of social intelligence still utilise both verbal ability and general reasoning abilities (for summary see Brown & Anthony, 1990) and a number of

studies suggest that there are strong correlations between social and academic intelligences putting into question, as Weschler maintained, the existence of personal intelligence as separate from other general measures of intelligences. In order to confirm the validity of the behavioural components of social intelligence as separate from measures of verbal and academic abilities, tests were developed that used more nonverbal measures in an attempt to delink social intelligence from more general measures of intelligence efforts. Sternberg's Social Competence Scale (Sternberg et.al., 1981) is typical of such measures of non-verbal skills used to assess social intelligence. In this test participants are asked to use non-verbal techniques to judge relationships in two pictures, one picture showing a man and a woman and another an academic supervisor and his/her supervisee. Non-verbal responses were measured and decoded and then compared against a variety of verbally-based social intelligence measures such as the Social Interpretation Test (SIT) (Archer & Akert, 1980), the George Washington Social Intelligence Test (GWSIT) (Moss et al., 1955), Empathy Scales (Hogan, 1969), the PONS Test (Rosenthal et al., 1979) and Self Monitoring Scales (Snyder, 1974). From the findings of their studies, Sternberg and Smith (1985) concluded that social intelligence could be measured accurately through decoding non-verbal communication. The findings also confirmed that the high accuracy of non-verbal decoding of social situations did not necessarily correlate with high scores in more general intelligence tests (Barnes & Sternberg, 1989). However, the study required repeated efforts to refine the non-verbal encoding process and required the inclusion of a more elaborate set of measures in which participants evaluated their responses to their choices before the researchers could claim with conviction that their non-verbal

measures accurately measured social intelligence in ways that were not linked to verbal and other cognitive intelligence measures. Ten years after these and other earlier studies, Sternberg and colleagues (Sternberg et al., 2000) comprehensively reviewed the research on social intelligence and its methodological issues and concluded that, while the initial conceptualisation of and research into social intelligences looked fruitful, researchers continued to find “little evidence of convergent validity among the measures of social intelligence, which likely reflects the complexity of the construct and the various ways it has been operationalised in the literature” (Sternberg et al., 2000, p. 80). Social intelligence suffers from its attempt to establish a unitary construct (Ford & Tisak, 1983) that is made up of so many divergent components: some intelligence and others skills, some inherent and others the product of social interaction, some structuralist and others mediationist based.

### **6.1.6 Emotional Intelligence**

Emotional intelligence (EI) is a popularised hybrid concept. It is probably a misnomer as its scope far exceeds the realm of emotions and it is not clear that the theory is actually proposing the existence of an ‘emotional intelligence’ but rather the capacity to respond to and use emotions rationally. It includes many personality factors amongst which personal intelligence figures prominently. Goleman (1995) utilised Gardner’s concept of personal intelligences as the core of his EI model. He also included some of Sternberg’s practical intelligence as well as other non-intelligence factors such as being able “to motivate oneself and persist in the face of frustrations; to control impulses and delay gratification; to regulate ones’ moods and keep distress from swamping the ability to think; to

empathise and to hope” (Sternberg et al., 2000, pp. 88-89). Bar-On (1997) also mixed affective, cognitive and personality elements into five general categories of emotionally intelligent behaviour which consisted of intrapersonal skills, interpersonal skills, adaptability, stress management, and general mood which he measured in his Emotional Quotient Inventory (EQi). Mayer, Caruso and Salovey (Mayer & Salovey, 1997; Mayer, Salovey & Caruso, 2000) defined emotional intelligences as a constellation of abilities which do not incorporate personality factors. Their four main categories of abilities are: (a) accurate perception of emotion in others and the accurate expression of one’s own emotions; (b) assimilation of emotional experience into one’s cognition for future use; (c) understanding and reasoning appropriately about emotions; and (d) managing one’s emotions and adapting to emotions in oneself and to emotions of others. They developed a Multifactor Emotional Intelligence Scale (MEIS), which has 12 measures of ability subsumed into these four general categories.

A comparison in Table 6.2 of the three models suggests that Goleman, Bar-On and Mayer & Salovey are addressing similar factors and also that Gardner’s intrapersonal and interpersonal categories remain a useful differentiation.

*Table 6.2 Comparison of three emotional intelligence models and the personal intelligences*

	Intrapersonal	Interpersonal
Mayer and Salovey (1997)	<ul style="list-style-type: none"> <li>• Identifying perception and expression of emotion in (a)oneself</li> <li>• Assimilating emotion in thought</li> <li>• Understanding and analysing emotion</li> <li>• Reflective regulation of emotions</li> </ul>	<ul style="list-style-type: none"> <li>• Identifying perception and expression of emotion in (b)others</li> </ul>
Barr-On (1997)	<ul style="list-style-type: none"> <li>• Intrapersonal skills</li> <li>• Stress-management scales</li> <li>• General mood</li> </ul>	<ul style="list-style-type: none"> <li>• Interpersonal Skills</li> <li>• Adaptability</li> </ul>
Goleman (1995)	<ul style="list-style-type: none"> <li>• Knowing one’s emotions</li> <li>• Management of emotions</li> <li>• Motivating oneself</li> </ul>	<ul style="list-style-type: none"> <li>• Recognising emotions in others</li> <li>• Handling relationships</li> </ul>

## 6.1.7 Personal Intelligences and Transition Expertise

### 6.1.7.1 Use of Gardner's Personal Intelligences Model

At the outset of this dissertation, Howard Gardner's intrapersonal and interpersonal intelligence was chosen as a simple dichotomy for the analysis of the data. Gardner and his colleagues have not developed a substantive body of research to support his conception of personal intelligences which might have reduced the usefulness of his model for this study. But the review of the research in the field indicated that most approaches to personal intelligence incorporate intrapersonal and interpersonal formulations even when they include other cognitive, affective, personality and socially constructed elements.

*Table 6.3 Some representative intelligence models and their correspond with intrapersonal and interpersonal intelligence*

	<b>Intrapersonal Intelligence</b>	<b>Interpersonal Intelligence</b>
<i>Trait Models</i>		
Spearman (1927)	• The apprehension of one's own experience	• The psychological relation
Thorndike (1920)	• The ability to manage and understand ideas	• The ability to understand and manage people
Guilford (1967)	• Behavioural operations (self)	• Behavioural operations (other)
<i>Emotional Intelligence Models</i>		
Mayer & Salovey (1997)	• Identifying perception and expression of emotion in self	• Identifying perception and expression of emotion in others
Barr-On (1997)	• Intrapersonal skills	• Interpersonal Skills
Goleman (1995)	• Management of emotions	• Handling relationships
<i>Social intelligence models</i>		
Kihlstrom & Cantor (2000)	• Planning & monitoring progress	• Social strategies
Kozmitski & John (1993)	• Perspective taking	• Ability to deal with people
<i>Self Regulation Models</i>		
Zimmerman (2000)	• Covert self-regulation	• Environmental self-regulation
Flavell (1979)	• Metacognitive self-monitoring	

Table 6.3 shows the representation of intrapersonal and interpersonal intelligence in some of the major theories. Together these models bring a more extensive

understanding to how personal intelligence operates in the world and during performance. They often provided a more operational and detailed approach to analysing the data in this study than was available through the research of Gardner and his colleagues. So Gardner's intrapersonal/interpersonal division was retained as an organising structure under which to investigate the role of personal intelligences during transition and to incorporate elements of other models that conformed to his bi-part model.

#### **6.1.7.2 Intrapersonal intelligence: Self awareness and self reflection**

Spearman's (1927) first noegenic law, "the apprehension of one's own experience," and Guilford's (1967) behavioural content category of "information concerned with the awareness and management of ourselves [...] we know that we know" capture the essence of intrapersonal intelligence. Gardner maintains that there are personal intelligence experts: politicians, psychotherapists, etc. who develop these intelligences into expertise. If that is the case, then one would expect to identify a range of knowledge and processes that could be developed to produce intrapersonal expertise just as expertise in sport and business, music and sport is developed based upon other Gardnerian intelligences. Self awareness should enable individuals to know themselves better both in terms of their abilities for planning action and in terms of their identity for making decisions about career changes and transitions. Metacognitive monitoring operates as a kind of intrapersonal intelligence that is contemporaneous with experience and action. Metacognitive knowledge about oneself can be accessed and then monitored through metacognitive experiences to understand more about how one is operating in one's expert domain (Flavell, 1979; Nelson & Narens, 1990.) This self-knowledge would be the basis for adapting and responding to changes

encountered during transitions. Many of the processes and plans of Zimmerman's self regulation (2006) model such as 'metacognitive self monitoring', 'self evaluation', and 'self satisfaction' would all rely upon self awareness as a basis for utilising self knowledge in ways which would enhance performance. It is in this way that intrapersonal intelligence generally and metacognitive experience specifically could be used by self regulation processes to enhance performance. This kind of self regulation may contribute to transition expertise.

Emotional intelligence places particular emphasis on intrapersonal intelligence as it relates to emotional management e.g., "identifying, assimilating, understanding and reflecting" on emotion (Mayer & Salovey, 1997) or stress management and general mood management (Barr-On, 1997). Much of emotional intelligence theory is focussed on 'managing' or controlling emotional states with a view to responding appropriately to situations in life. Again, intrapersonal intelligence would give one the awareness, though not necessarily the skills, to manage emotional states.

On reflection, it seems that self awareness as a function of intrapersonal intelligence will enable an individual to manage transitions in one of three ways: 1) being aware of one's own motivation, values, self concept and using this as a basis for deciding and acting; 2) being aware of one's abilities and skills so as to utilise them effectively or understand what one needs to do to develop or compensate for them; and 3) managing affective states so that they either support a transition process or at least containing unproductive states so that their deleterious impact is minimised.



### **6.1.7.3 Intrapersonal intelligence: Self regulation and execution**

Individuals may also use self awareness and self knowledge for successfully executing strategies and assuring that their strategies and actions are in line with motivation. Guilford (1967) particularly emphasised “knowing that we know” that we have not only feelings and emotions, but intentions and actions as well. While trait models for intrapersonal intelligence have not focussed in particular on the regulation of states and actions, information and system models have integrated intrapersonal intelligence into executive and implementation processes. Metacognitive goals and actions are self-referencing executive processes for implementing behaviour based upon self knowledge and experience (Flavell, 1979). Metacognitive control includes processes like strategy selection, control of time, selection of search, etc. Zimmerman’s self regulation theories (1995, 2006) build on metacognitive theory foundation by focussing on the cognitive processes and structures used for the maintenance or improvement of performance. Many performance control processes such as metacognitive self monitoring, self instruction, and self experimentation are all structured cognitive processes for controlling oneself during performance. Most elements of the third self reflection stage in self regulation theory include intrapersonal components, primarily in support of feedback mechanisms to feed forward information into planning and goal setting for future action. One would expect to see participants in the study using self-regulatory forethought, contemporary performance control and post event self reflection in the acquisition of expert skills, for example recognising one’s weaknesses and focussing on them as a musician, knowing when one has trained enough as an

athlete to avoid injury, etc. Whether these processes will be used to manage oneself during transitions will be addressed in the analysis of the data.

While self regulation and metacognitive theory tend to avoid the issue of intelligence *per se*, such explicit self-observation throughout the recursive self-regulation cycle would seem to be representative of *intrapersonal* intelligence as defined by Gardner (1983). It is worth noting that the neo-Piagetian *post formal operational stage* identifies the development of life-experience based structures that synthesise the personal and emotional experiences into mental structures in ways which enable them to operate more effectively in the world (Blanchard-Fields, 1994).

One could tentatively conclude that the operationalisation of intrapersonal intelligence in the management and regulation of goals and actions would play a role in transitions expertise. This process would most likely take the form of 1) consciously collecting information from the world and integrating it into an understanding of oneself and one's performance and 2) using intrapersonal awareness to steer and direct courses of action in the world

#### **6.1.7.4 Interpersonal intelligence: Self, others and environment**

Interpersonal intelligence by definition concerns awareness and understanding of others. It is noteworthy that most trait models seem to place more emphasis on interpersonal intelligence than intrapersonal intelligence. Spearman's (1927) "psychological relation" is very much concerned with how individuals responded to interpersonal situations; Guilford's (1967) "other" behaviour content category includes information about awareness and management of others; Thorndike's (1920) ability to "understand and manage people" and Vernon's (1950) "insight

into the states and traits of others” place emphasis on this understanding of others. Social intelligence models also deal almost exclusively with interpersonal intelligence. Interpersonal intelligence as characterised by social intelligence encompasses more than just interpersonal relations: it includes understanding the social context, stakeholder issues, and organisational climate (Kozmitski & John, 1993). Social intelligence makes people sensitive to the social environment in ways that contribute to the development of their social strategies (Kihlstrom & Cantor, 2000). Understanding, operating within and adjusting to the social context is emphasised by self regulation theory (Zimmerman, 1995) which includes environmental regulation as one of its three main feedback loops.

Torbert’s (2004) leadership development framework (LDF) discussed in the Chapter 1 is based upon four territories all of which have interpersonal and intrapersonal elements: either one is self assessing ones state and reflecting or one is garnering feedback from the environment (Table 6.4).

Territory 1 : Outside events	Results, assessments, observed behavioural consequences, environmental effects.
Territory 2: One’s sensed performance	Behaviour, skills, patterns of activity, deeds, as sensed in the process of enactment.
Territory 3: Action logics	Strategies, schemes, ploys, game plans, typical modes of reflecting on experience.
Territory 4: Intentional attention	Presencing awareness, vision, intuition, aims.

On reviewing the theories, it seems that interpersonal intelligence operates in three areas of application. 1) Through interpersonal intelligence individuals garner feedback and information about *themselves* which allows them to learn and adapt their behaviour. 2) Individuals learn to understand *other people*, their

moods and their states through interpersonal intelligence. This enables them to manage their relationships with other people to mutual advantage, to understand people more senior than them and to influence or develop other people who work with them. 3) Individuals understand the *environmental and social context* in which they operate through interpersonal intelligence. This enables them to operate more effectively within a given organisational context, to manage stakeholders, to be sensitive to organisational climate and ultimately to manage their behaviour to optimise their performance within the wider context.

#### **6.1.7.5 Emotions**

When emotions are addressed in intelligence models they are usually situated in the personal intelligences: Goleman's (1995) "knowing and managing one's emotions"; Mayer and Salovey's (1997) "identifying the perception and expression of emotion in oneself and others"; Zimmerman's "covert self-regulation which involves adjusting affective states" (Zimmerman, 1995; Demetriou, 2000); Guilford's (1967) "knowing that we have feelings and emotions"; Spearman's (Wedek, 1947) "ability to judge feelings and moods in others"; Gardner's (1983) "access to one's own feelings"; and so forth. Awareness of one's own and other's emotions are undoubtedly important for managing oneself and relationships with others. But it is not clear that emotional processes are primarily explicable in terms of intelligence or cognitive processes. Nor are the kinds of processes generally associated with intelligence necessarily the most appropriate ones for understanding the expression of and management of emotions. Consequently, where emotional expression arises and is managed by participants in this study it will be noted, but this study will not focus extensively on emotional management and expression.

## 6.2 Data analysis

For purposes of analysing the data, the Gardnerian division of the personal intelligences into intrapersonal and interpersonal intelligence will be maintained.

### 6.2.1 Intrapersonal intelligences data analysis

The data will be used to examine how intrapersonal intelligence contributes to transitions in three ways:

- *How do people use self awareness to understand themselves in transitions?*
- *How do people use intrapersonal intelligence to make decisions and execute plans during transitions?*
- *How do people use self regulation and metacognition to manage themselves during transitions?*

#### 6.2.1.1 Intrapersonal intelligence as self awareness during transitions

Intrapersonal intelligence includes general self awareness and the ability to self-reflect, without necessarily having a target or goal in mind. Table 6.5 indicates the kinds of statements made by participants of the study that were identified as indicative of self awareness.

*Table 6.5 Statements indicative of intrapersonal intelligence as self awareness*

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<i>"I knew what I had was valuable"</i>
<i>"I knew that I was always going to be able to"</i>
<i>"Being very adaptable and willing to change and learn"</i>
<i>"I suddenly thought I can do that"</i>
<i>"It was that amount of passion about it in my own mind"</i>
<i>"It's the question I keep asking myself"</i>
<i>"I think I felt very sort of self confidence"</i>
<i>"I have over time realised"</i>
<i>"You struggle and it feels a bit like turmoil at the moment"</i>
<i>"I recognise my faults and that's the way to mitigate them."</i>
<i>"Confident in my faults and my strengths and my person"</i>
<i>"I try and solicit, seek out areas of potential weakness or areas for improvement"</i>
<i>"So that's a lot of conscious effort"</i>

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## **Self Awareness and identity**

Self awareness can make identity accessible and explicit:

*I remember thinking then; just standing there going 'I am going to be a musician'. It was that amount of passion about it in my own mind that... (MUS R1 Richard)*

Self awareness assures that goals and choices reflect identity:

*It's the question I keep asking myself – I never set myself the really big hairy goal of winning the Gold medal because that would have meant giving up all my career to do it and I've always been somebody that's wanted my career and my sport. I've never wanted to be somebody that's wanted just sport or just a career. (SPT R1 Claire)*

## **Self Awareness and accurate self assessment**

Self awareness enables individuals to develop an accurate assessment of their actual abilities, temperament and standing in their field. This can contribute to making realistic assessments of their opportunities and courses of action, particularly during early career transitions:

*I knew what I had was valuable, but I also was so unhappy to be in a place where I was made to feel initially bad about what was going, to be basically vastly more marketable than many of the singers that they trained MUS R1 (Susan)*

And:

*I knew that I was always going to be able to make a living because I knew I had my backdrop of my academic, you know, my A levels, I had A levels so I knew I could do something or I knew that I could, this was at the age of eighteen, but I knew that I could teach and even at that stage, so I knew that I'd got a foundation there so in a way I suppose, it wasn't so worrying that I didn't think that I wouldn't be able to work. (MUS R1 Yvonne)*

## **Self Awareness and recognising limitations**

Recognition of one's limitations seems to be an important function of self awareness when making career transitions:

*One of the upsides – and in a funny sort of way it seems like a negative but it wasn't – is that I came out of the {conservatoire} with no pride, if you like, because as I say, you see these students who are really feted by the institution and they come out with a certain sort of, arrogance is the wrong word, but they perceive themselves as being at a certain level and of course as soon as you get out into the real world or better off you're in there at the bottom of the food chain again. So I went out there and I was prepared to do anything, absolutely anything, not because I was prepared to do anything to earn money but actually because I was, I really love music, because at the end of the day, I do this job because music is just the most fantastic job in the world. (MUS R2 Stephen)*

And:

*It did take quite a lot of self-belief to really feel that one had something because there were competitions I tried and didn't get anywhere in and I realised quite soon that I wasn't really a competition animal, that I sort of thrived under those circumstances, but I would do better by the gradual accretion, rather than meteoric. (MUS R1 Robert)*

## **Self Awareness and self acceptance**

Self awareness allows individuals to accept or be more comfortable with their situation and to not deny problems or challenges:

*I think to show a bit of humility and to be human about these things and be personable; it's okay. You struggle and it feels a bit like turmoil at the moment. (BSN R5 Lawrence)*

But also to then find ways to “mitigate” faults and not resist feedback:

*I think that's because I recognise my faults and that's the way to mitigate them. (BSN R5 Mark)*

And:

*Confident in my faults and my strengths and my person.... not feeling vulnerable necessarily. (BSN R3 Nicola)*

### **Self Awareness and adaptability**

Awareness of limitations – in this case of the risks of emotional attachment to theories and dogma – leads to being adaptable and flexible:

*You can't really do that and not start to appreciate the real limitations on it in the sense of the real risks in science and becoming attached emotionally to your own theories or lines of enquiry, the dogma that can come with that – that's dangerous stuff. And I think that links into being very adaptable and willing to change and learn and if something is no longer working, leave it and move on. (SPT R3 Edward)*

Self awareness supports the capacity to try “some different ways” to achieve what you want:

*Trying some different ways and some of the things that I have over time realised I may have to give up in order to achieve what I want, was quite a major learning because I guess is started out by straightforward. (BSN R7 John)*

### **Self Awareness and self confidence**

Self confidence is a composite structure that involves a combination of experience, personality and self awareness. In the development of self confidence intrapersonal intelligence often plays a role:

*I think I felt very sort of self confidence having been given the role and I suddenly sort of felt 'wow I do a really interesting job here' [...] yeah it was a huge career satisfaction, combined with a bit of sort of terror - you know – would you mess up, what is expected, what is the quality that's expected which was high, how am I going to deliver that quality of work? (BSN R3 Ware)*

Confidently stating one's position is important as you “move up the hierarchy.”



*And with the self-confidence and with my character I probably also was standing on my own two feet and let them know in an explicit way when they did a mistake and not to overstate the mistake, which created some tension, but I would call it in a positive way because at the end of the day it allowed me to move up the hierarchy. (BSN R1 Peter)*

### **Self Awareness and feedback**

Self awareness, often in combination with a degree of self confidence, enables individual to seek and receive feedback:

*Some people can perceive asking for feedback like that is a weakness because it is like saying ‘am you doing alright?’ I’m not frightened in doing that. So I try and solicit, seek out areas of potential weakness or areas for improvement and then (BSN R2 Lawrence)*

And:

*But if I’m wrong I say, ‘Well yes, I always have the option I’m wrong.’ Actually if somebody tells me you’re wrong, I’m always listening. I’m not deny them or ignoring them. (BSN R6 Peter)*

There are clear examples where self confidence and feedback go hand in hand whereby self confidence, usually developed through positive feedback over periods of time, enables an individual to be comfortable with and seek feedback:

*There’s probably times when I’m feeling the best that I’d sought feedback more – not best as in I’m doing a good job, but I’m just feeling strong and confident and ‘Help me out team, give me some feedback’ [...] Whatever you tell me can’t be worse than what I’ve had before; I’m strong now and I know it helps. So that’s a lot of conscious effort and some, I think, some degree of maturity as well. (BSN R4 Nicola)*

#### **6.2.1.2 Intrapersonal intelligence in execution**

An important element of transition expertise is the capacity to make appropriate decisions. There were clear examples where individuals were self reflective in

ways that had a direct impact on their decision to proceed with a transition (See Table 6.6).

*Table 6.6 Statements indicative of intrapersonal intelligence in execution*

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*"I wrote down 'This I can do, this I can't do' and wrote it out and you know - this is achievable, this isn't achievable. Eventually I decided, yeah, I could do enough here to change things."*

*"I never had any doubts that I could do this job. "*

*"This was definitely a lifestyle choice, I decided that I really would like to"*

*"But it's absolutely clear in my mind that what my passion was, what drove me"*

*"Right I'm literally going to be, in effect, master of my destiny here"*

*"I felt by that time 'Who was going to take that responsibility?' "*

*"It wasn't being out of my comfort zone ... I kind of thought I knew how to do that"*

*"I suddenly thought I can do that and I had visited here before so I could picture in mind"*

*"Do I really want to do this/ do I not want to do?"*

---

### **Decision making reflecting self awareness**

One recurring theme at the initiation of transitions involved deciding whether or not to make a transition. Participants talked about a certain degree of intrapersonal soul searching in which they examined their motivation and considered their future career directions:

*I had a personal fight inside, you know, I had to really, it was quite tough, I remember having this sort of conflict of "Do I really want to do this/ do I not want to do?" and so I kept putting myself in for these competitions, still keep playing, still keep doing and any time, I used to win them as well which was always good for the ego, so I suppose I kept believing in myself really even though there was this slight doubt that I wasn't going to be as good as other people. (MUS R1 Yvonne)*

And:

*I felt by that time "who was going to take that responsibility and as it were conduct this orchestra, as opposed to doing the front line of coaching." I decided to do that, my talents would be best spent doing that management conducting type of role, rather than being at the front goal posts with the sailors trying to improve their performance and that's what... that's what I decided to do. (SPT R2 George)*

## Decision making and self confidence

Being self aware and self confident in that awareness enables transition decisions to be made:

*It wasn't being out of my comfort zone when made the Programme Director... I kind of thought I knew how to do that... that I was right and others weren't! (BSN R3 Michael)*

A musician reflects on her decision to make a transition and arrives at a confirmation of her choice:

*I sat down on a train journey and I wrote down 'this I can do, this I can't do' and wrote it out and you know - this is achievable, this isn't achievable and looked at it all. Eventually I decided, yeah, I could do enough here to change things. (MUS R1 Vivian)*

Knowing one's experience and competency enables a transition:

*It was, it's funny, I never had any doubts that I could do this job. It was getting taken seriously that was the hard part because essentially the job that I did before was this job in a sort of microcosm and without the kudos. But I knew that the experiences that I had as a player, the experiences that I had as an outreach projects manager and effectively doing this job in {conservatoire} meant that I could do the job. (MUS R1 Stephen)*

And:

*I suddenly thought I can do that and I had visited here before so I could picture in min. (MUS R2 Richard)*

## Choice and motivation

Intrapersonal intelligence operates in conjunction with motivation when an individual is aware and clear as to why they are making a career transition. The choice is not just reactive and opportunistic but considered and reflective:

*This was definitely a lifestyle choice; I decided that I really would like to head a department. I'm basically a very bossy person and I like being in charge - it's horrible isn't it - a horrible thing to say, but I do like having, I enjoy the being able to have a team. (MUS R2 Yvonne)*

And:

*It was the first time I've actually said 'Right I'm literally going to be in effect master of my destiny here' (SPT R 4 Edward)*

One comment is particularly indicative of how intrapersonal intelligence operates when making a transition:

*I think whenever I've gone in a new role – as I think many people do – I've taken one step backwards before I've gone forwards so it's the old bath tub analogy. And I probably do – each time I've changed job, I go through a transitional phase where I do question 'am I doing the right things? Am I contributing as much as I was before?' (BSN R1 Lawrence)*

### **6.2.1.3 Intrapersonal intelligence and self regulation**

Self regulation and metacognition are special applications of intrapersonal intelligence used to organise behaviour through recursive patterns of planning, self monitoring and post event reflection for the purpose of refining future behaviour. Statements indicative of self regulation are shown in Table 6.7.

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*Table 6.7 Statements indicative of intrapersonal intelligence as self regulation*

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*"By analysing if you like, by setting up a series of races and then analysing each race and each condition"*

*"I've stepped back and said 'What was the goal? How do you do that? What could happen along the way?'"*

*"Then I worked a route, whereby I could"*

*"I remember coming out of that meeting and thinking 'That's why you are where you are doing that – Boy this Guy, this was wise"*

*"Yeah, the important work is conscious, right"*

*"So when I failed it was a conscious failure; therefore you're in a position to learn."*

*"I enjoyed entering competitions – I took the view that if I win some, lose some – didn't expect to do anything, but was pleased if I did"*

---

## **General self regulation**

Learning from failure through planning and post-event reflection indicates how some business people self regulate:

*Yeah, the important work is conscious right and not just get in, try it and then see what happens. There was a plan right, I mean the plan doesn't need to be sophisticated or thought through, but you know clearly understood; 'that's where we want to be and these are the four things we have to do to get from A to B. Over time it gets more balanced, rounded; soft factors, hard factors considered but it's not like 'Oh let's try this and let's try that and see how it goes'. So when I failed it was a conscious failure; therefore you're in a position to learn. (BSN R2 Peter)*

Self regulation can be a conscious process but need not be rigid:

*I was always doing concerts so it was always just another concert – I was always entering competitions. I enjoyed entering competitions – I took the view that if I win some, lose some – didn't expect to do anything, but was pleased if I did and you know... it's not so cut throat as it is now I suppose. (MUS R1 Vivian)*

## **Forethought**

Forethought is a process of setting goals and planning how to meet them:

*As with everything that I've ever done is, I've stepped back and said 'What was the goal? How do you do that? And what could happen along the way?' (SPT R2 Claire)*

And:

*Because I'd had a year where I've lost ....you have to have two years of points to qualify for an Olympics, so I had to sit down with a points scheme that July and work out if it was possible for me to qualify on half the number of competitions before I went for it and then I worked a route, whereby I could (SPT R4 Claire)*

## **Performance Review**

One sports individual mentioned using forethought and performance review as part of their strategy for preparing for competition:

*How did you self-learn or enhance your performance? By analysing if you like, by setting up a series of races and then analysing each race and each condition, working with the sail maker as well – and a mast maker and a boat builder – to develop all the equipment so you had better speed; which is what sailing is a lot about. (SPT R1 Alan)*

A business person used post-event self judgement to understand his situation:

*Then I went' to see my Chinese boss and did the same thing. And again I will never forget this; he said 'hang on a minute' - and I was convinced he was going to try to talk me out of it - and he said 'just think this through'. And I remember coming out of that meeting and thinking 'That's why you are where you are doing that – Boy this guy, this was wise in a Chinese way; this was all part of what Sun Yat Sun's art of war, this was-'. I just remember being massively impressed; that's what we did and the whole thing got nicked, so it was kinda this - I mean for me it was a very interesting lesson in how to do things, rather than just always naturally go at it kinda like a bull in a game. (BSN R2 John)*

### **6.2.1.4 Discussion: Intrapersonal intelligence in transitions**

#### **6.2.1.4.1 Discussion: Self Awareness and intrapersonal intelligence generally**

Is intrapersonal intelligence a contributor to transition expertise? Are individuals who are more self aware able to make better transitions, better transition choices and manage those choices better. There are clear indications from the analysis of

statements from the participants that they did use intrapersonal intelligence during transitions (See Table 6.8).

Table 6.8 Intrapersonal intelligence during transition

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
During Transition	8	21	2.63	7	39	5.57	7	56	8	22	116	5.27
Total		21			39			56			116	

Of the total 24 participants, 22 mentioned using intrapersonal intelligence during transitions with an average of 5.27 references per individual. Participants described how they were consciously aware of internal factors like their feelings, their strengths and weaknesses, motivation, how confident they were in their response to a situation, what impact decisions would have on them and their future, etc. This awareness reflects the first of Spearman's (1927) noegenic laws: "the apprehension of one's own experience." The individuals were not simply working through various information processing or analogic components of intelligence (Sternberg, 1977). They were actively involved in the "awareness and management of themselves" (Guilford, 1967). Intrapersonal intelligence informed and helped initiate and steer the utilisation of Sternberg type executive meta-components. Gardner's description of intrapersonal intelligence as the ability to access one's feelings and affect and draw upon them "as a means of understanding and guiding one's behaviour" (Gardner, 1983, p. 240) suggests that intrapersonal intelligence may be a predicate for mobilising executive cognitive processes like Sternberg's.

Business people mentioned intrapersonal intelligence more often than either sports people or musicians. One explanation is that the career paths of business people can often move rapidly away from performance into management of other

people. When business people become less able to rely on domain knowledge or domain expert processes as a basis for their performance as managers they might need to utilise intrapersonal intelligence more to understand themselves, their strengths and weaknesses with regards to their changing functions, and to develop new skills in response to the demands of transitions and new positions. Another possible reason is that many of the business people involved in this study attended various internal and external programmes which included training in intrapersonal intelligence. They would have been subject to and subsequently utilised personality measures like the MBTI, 16PF, EQ-Is, etc. all of which tend to develop intrapersonal awareness. They would use this knowledge to enhance their performance in their everyday work; their annual feedback will include performance on interpersonal skills; they will give similar feedback to their direct reports; they will organise their planning and frame annual performance and development goals based upon this information. These measures operate as a form 'institutional' metacognitive knowledge (Flavell, 1979). Furthermore, it is probable that, through this exposure, they would have developed a facility with this kind of self knowledge and language so that when discussing their transitions in the interview process their metacognitive knowledge would be explicit not implicit.

Sports people mentioned intrapersonal awareness more often than musicians. Sports, like business people, when making a transition to coaching positions are more likely to have gone through training programmes in which they may be the subject of personality tests and feedback. Most sports coaches were required to continue attending training programmes periodically throughout their career and many of these training programmes have borrowed heavily from business



personal development models. On the other hand, some of the sports individuals in this study were instrumental in setting up these programmes rather than taking part in them. This may reflect a high degree of existing intrapersonal intelligence in recognising the importance of training and development programmes for future coaches that they themselves never attended. For example 5 of the 8 sports participants mentioned using other fields of expertise (See Chapter 4) to enhance their own and their team's performance. Interpersonal intelligence enabled them to look beyond their own field and to recognise knowledge and expertise which would enhance performance in their domain experts.

Musicians made references to self awareness less than 3 times per individual. Yet their domain requires high levels of self awareness to excel. Perhaps this self-awareness is focussed on physiological and interpretive abilities rather than self concept or identity issues. However, where they did mention self-awareness it was usually acute and penetrating. Of the three domain populations in the study, only musicians are not generally required to undertake training in coaching or management skills. Rather these skills – and the accompanying development of intrapersonal intelligence – are acquired serendipitously or through vicariously modelling of mentors and other role models. Perhaps intrapersonal self awareness is more tacit and implicit and not normally accessed through verbal descriptions.

There were indications of using intrapersonal intelligence for being receptive to and adapting to feedback which suggests the operation of self regulation (Zimmerman, 2000) processes and metacognitive control (Nelson & Narens, 1990). But it is noteworthy most of the self awareness statements were made

about self identity, self confidence, and self acceptance: intrapersonal intelligence amongst the participants seemed to concern issues beyond the primarily performance focus of self regulation theory. This data provides fairly strong indications that uses of intrapersonal intelligence by the participants were often concerned with Gardner’s ‘project of the self’ (1983). Similarly, where self awareness contributed to decision-making processes, it often involved individuals confirming to themselves that their goals were line with personal aspirations and motivation.

**6.2.1.4.2 Discussion: Self regulation and metacognition**

There were some statements about the use of self regulation processes, but self regulation as delineated in the three stage process in particular was not nearly as evident in the data as had been anticipated (See Table 6.9).

*Table 6.9 Metacognition & self regulation during transitions*

	Music		Sport		Business		TOTAL	
	Cases	Ref	Cases	Ref	Cases	Ref	Cases	Ref
<b>SELF REGULATION</b>								
Forethought	3	6	2	3	6	13	11	22
Performance Control	1	2	1	2	1	1	3	5
Self Reflection	0	0	0	0	2	2	2	2
General Self Regulation	7	16	8	18	6	14	21	48
<b>META COGNITION</b>								
Controlling	2	2	1	1	4	6	7	9
Monitoring	1	1	1	1	4	6	6	8
General Metacognition	2	2	2	4	3	7	7	13
<b>Total</b>	29		29		49		107	

To the extent that different elements of self regulation were used by participants, forethought seemed to be used slightly more often amongst the participants, with 22 mentions amongst 11 participants. Such skills could be associated with the early steps in the stages of Sternberg’s meta-componential sub-theory (1988) or analytical intelligence (1996) such as “decision as to what the problem is” or

“selection of strategy for combining lower order components.” However, a closer scrutiny of the individual references indicated that the use of forethought processes such as planning, setting goals, etc. were mostly addressing performance issues related to career stages that impacted on transitions rather than explicitly during transitions. 21 of the participants did mention self regulation as a general process, but conflated two or three of the self regulation stages.

Perhaps most striking is how seldom meta-cognitive cognitive processes that take place simultaneously with performance such as performance control, metacognitive controlling and metacognitive monitoring were mentioned. Yet the literature in sport is full of research into self regulation techniques and in acquiring expertise (For a full review see Starks & Ericsson, 2003; Williams & Hodges, 2004). There was an average of less than one mention per individual (22 mentions across all three domains) and of these over half (13) were by business people. Amongst 16 sports people and musicians, there were only 9 mentions. This was surprising as almost certainly the demands of elite performance upon sports people and musicians would lead one to anticipate that they would rely on such processes. When pressed for more information about how they self-managed during transitions, participants often said that they just “got on with it” without describing any kind of structured self regulatory or metacognitive processes.

There could be several reasons for the lack of evidence of these processes in the data. Maybe the use of these processes can be viewed as metacognitive knowledge and Flavell’s (1979) assertion that metacognitive knowledge does not

necessarily enter into consciousness even when in operation may be operating here. Perhaps this kind of intrapersonal intelligence during transitions operates in ways similar to tacit knowledge (Sternberg & Horvath, 1999) and is not readily accessible to describe. Or perhaps domain specific self regulation processes are not easily generalised from personal performance to subsequent career stages. But even musicians, who talked about generalising other aspects of their performance career like organising chamber groups to organising faculties of music and many of whom continue to perform throughout their career, did not mention generalising self regulation. Alternatively, methodological issues might have contributed to this absence: the process of retrospective recall used in the interviews may not be an appropriate methodology for identifying metacognitive processes that take place simultaneously with performance. Think aloud protocols during performance, diary keeping, after event interviews might produce more data. Nonetheless, the paucity of mentions and the closer links in many of these mentions to managing performance or stabilising in a new positions rather than to transitions themselves would indicate that despite characterisations of self regulation as a process that produces change (Zimmerman, 2000; Shah & Kruglanski, 2000), it actually is a largely homeostatic process more closely associated with maintaining stable performance and hence not particularly amenable to managing transitions. Herminia Ibarra's (2004) proposition that transitions do not operate in the linear process of plan, test, study, act which is so favoured by business consultants and self regulation theorist would seem to be validated.

There were a few indications of emotional self regulatory processes such as persisting in the face of frustrations and regulating moods which are said by

Goleman (1995) to characterise emotional intelligence. But Bar-On's (1997) stress management was not mentioned as part of the participants' self regulation during transitions. On the few occasions where emotionally intelligence types of behaviour were mentioned, participants' reflections took the form of cognitions about their emotional/affective experiences in ways indicative of Mayer and Salovey's (1997) identifying, assimilating, understanding and reflecting on emotions. But generally it seems that emotional self regulatory processes were not central to managing career transitions.

## **6.2.2 Interpersonal intelligence**

Interpersonal intelligence, while paired developmentally with intrapersonal intelligence in Gardner's model, can be identified in ways that are operationally very different during transition. The analysis of the data has been divided into two categories.

- 1) *How interpersonal intelligence operate generally in transitions.*
- 2) *How interpersonal intelligence operates in three specific arenas to support transitions:*
  - (1) *understanding oneself and garnering feedback from other people;*
  - (2) *understanding others to influence them and help them develop;*
  - (3) *understanding one's environment in order to be most effective in one's organisational context.*

### **6.2.2.1 Interpersonal intelligence generally throughout a career**

Table 6.10 indicates how individuals identified interpersonal intelligence as an important contributor to their career successes and an enabler of transitions.

Table 6.10 Statements indicative of interpersonal intelligence

GENERALLY
<i>"I've always had pretty good relationships"</i>
<i>"I've always had an ability to put people together"</i>
<i>"Understanding where they are and being more in tune with them and understanding what it is that every person can give"</i>
<i>"I get and deliver confidence to those so they've got trust in me"</i>
<i>"Throughout careers it is about relationships and it's about building relationships"</i>
<i>"Reaching out to people"</i>
<i>"So work with those people to make sure it's non-threatening and invite them to participate"</i>
<i>"From quite a long way back I've viewed the job as managing people"</i>
<i>"Being the sort of force behind other people's progress"</i>
<i>"The interaction with the people was more appealing and more different and a bigger challenge"</i>
<i>"Reaching out to those people"</i>

Sometimes interpersonal intelligence was characterised as simply being able to "get on with most people:"

*And I would say one of my strengths all the way through my career has been my relationships; I've always had pretty good relationships with pretty much anybody – I mean probably not everybody but certainly on an 80 / 20 type of rule. You know I can get on with most people and I'm very straightforward by nature and therefore if there's an issue and people aren't happy with stuff then that's fine – okay, let's deal it; let's figure out what the issue is and figure out what we can do about it. (BSN R9 John)*

For one person it is retrospectively linked to their ability to manage transitions into positions requiring leadership, making decisions and managing people:

*When I was a young boy same age as my son; he's 12 as a child, I played loads of sport – absolutely loved, loved sport and I was quite ... never going to be a professional but I was always Captain; I've always been the Captain of the cricket team; from the age of 9 I was a Captain, and when I was 16, a Captain of first eleven for a few months so you know being adult twenties, thirties and probably in forties I was Captain and perhaps subconsciously I learnt a lot being a sports Captain back to making decisions to who goes to open to bowl and who's going to bat – telling people they've got to do things.. so it's nice to*

*learn without knowing you're learning and I think those early days of my sporting life, probably stood me in great stead for what I've subsequently done in my career because I think I've probably behaved the same. (BSN R4 Lawrence)*

A musician reflected on the importance of his ability to “put people together:”

*I've always had an ability to put people together I think, so in other words, the organising of ensembles eventually I remember I was the person who wrote the letters saying 'dear so and so, would you like the ensemble to come' ... I am still doing it actually and then that lead to in the 1980's, I was a founder partner of a music agency; we actually formally set up a music agency and we were managing 60/70 artists worldwide, so that entrepreneurial streak was always there and I think that took me away from being this narrow thing that I started with. (MUS R1 Richard)*

For a sports person interpersonal intelligence skills seem to develop over time whereas kinaesthetic skills had been developed at an early age:

*When I won my first medal, I wasn't really in touch with the guys I won it with. But I was so strong in certain areas that they still were able to kind of follow me and we kind of went in the same direction – energy has a lot to do with that I think. Now I'm probably better at understanding where they are and being more in tune with them and understanding what it is that every person can give. I'm definitely better at using people around me to achieve the same thing, so people in my staff. But I got there the other way as well, so I mean it's not like there is now all of a sudden I have this insight in leadership. (SPT R4 Frank)*

Participants repeatedly talk about “building relationships:”

*And really throughout careers and in particular the further you go up the tree it is about relationships and it's about building relationships and I think I do have a good ability to build relationships. I think I can see who to trust and not to trust; that's the trick isn't it? You can't believe everybody and hopefully I get and deliver confidence to those so they've got trust in me. (BSN R10 Lawrence)*

### 6.2.2.2 Interpersonal intelligence: self, others, context

Interpersonal intelligence was divided into three arenas of operation. The first arena involved people *using interpersonal intelligence to manage themselves*. They actively seek feedback and then respond to it and adapt their behaviour in accordance with what they have learned from the feedback. The second arena involved *understanding and developing others*. During transitions, individuals took time to understand people, their motivations and needs. They also took time to support and develop them. The third arena used interpersonal intelligence *to understand the environment and context within which they operate*. It involved influencing stakeholders and peers as well as understanding the organisational climate and seeing situational opportunities. Table 6.11 indicates statements indicative of interpersonal intelligence operating in each of these arenas.

*Table 6.11 Some statements indicative of the ways in which interpersonal intelligence operates in different levels*

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**PERSONAL: SEEKING FEEDBACK AND ADAPTING**

*"Where I've got a shortfall in my skill set then I'll listen to somebody who appears to have more knowledge"*

*"Try and interpret what they're telling"*

*"So you hold more communication sessions"*

*"You need to fit in with what people expect if you want to get very far"*

*"Seeing how am I doing, seeking feedback"*

**INTERPERSONAL: UNDERSTANDING AND DEVELOPING PEOPLE**

*"Instilling confidence in others and the performance kick you get out of them by boosting their confidence"*

*"Giving him the leadership that he needed"*

*"So if you see what they're wanting, what makes their career better"*

*"Making sure they understood exactly what the conductor was trying to achieve"*

*"The fact that I've got a good team round me is more by judgement than by luck"*

*"Talking to students as if their concerns are important"*

*"Being the sort of force behind other people's progress"*

**ORGANISATIONAL: ENVIRONMENTAL AWARENESS AND INFLUENCING**

*"You know where the people are and are very conscious about the interaction between those individuals"*

*"I will know about them through formal or those less formal ways"*

*"I think it goes back to the fact that I have a sensitive radar"*

*"You've got to persuade people actually"*

*"How do I achieve goals and everybody still has their original benefit"*

*"I went around and talked to people in other groups"*

*"Reaching out to those people"*

*"When you're interacting with people you're very conscious of style and evaluating staff"*

*"Find out where their interests are and make sure that their interests are represented"*

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## **Self: Seeking feedback and adapting behaviour**

The need to utilise interpersonal intelligence often grows from intrapersonal recognition of shortcomings. Where there is shortfall in one's skill set, interpersonally intelligence people seek out and listen to people:

*I think I've said to you that I have subconsciously been listening more than perhaps I thought I was and so back to - where I've got a shortfall in my skill set then I'll listen to somebody who appears to have more knowledge and then try and interpret what they're telling. (BSN R10 Lawrence)*

In moving into a management position an individual holds "more communication sessions [...] seeing how I am doing":

*So you hold more communication sessions or when you're interacting with people you're very conscious of style and evaluating staff, seeing how am I doing, seeking feedback [...] Whatever you tell me can't be worse than what I've had before; I'm strong now and I know it helps. So that a lot of conscious effort and some... I think some degree of maturity as well. I think you know ten years of working and observing others and understanding that making mistakes isn't going to end the world. (BSN R3 Nicola)*

Individuals acknowledge taking feedback, assessing it and then acting on it:

*I think I was the first person who had come along and actually wanted to run things and listen to people but at the end of the day had the confidence to put down to say 'well I've listened to everyone and this is what we are going to do.' (MUS R1 Robert)*

And adapting behaviour:

*I agree with this bit, I disagree with that bit, as opposed to being an enquiry and just kind of letting it be what it's going to be sort of thing and one of the things – again one of the things that I've kind of learnt in that sometimes I have to give up in order to get what I want is being right. (BSN R6 John)*

And getting support from a mentor and acting on it:

*{Colleague} also said “You must go for it. Don’t want to lose you but you must go. A) You’re an ex-student so it’s ideal ‘cos you’re going back to your roots in a way and B) I’ve got another five years” ‘cos he was sixty at the time “I’m still here for another five years maybe a little bit more and time’s rolling on for you” you know[...] So I suppose he saw that, he supported me, and he was very sweet, he took me to breakfast one morning, we went through all the stuff for the interview, very supportive and now of course, I’m his opposition, we’re in...but we’re also friendly so it’s very helpful. (MUS R5 Yvonne)*

And evolving in response to feedback:

*It had been almost an evolution from that point because [it] has changed over time to now I’m a filter on what’s coming down that translates it into what I think is relevant for the team (BSN R1 John)*

### **Others: Understanding and developing people**

Most business managers see the development of their people – an important interpersonal product - as a key function of their job in the same way that sports people coach their budding athletes and musicians develop their students. Involves “instilling confidence:”

*What took me a while to learn was instilling confidence in others and the performance kick you get out of them by boosting their confidence [...] And I think just on learning that concept and putting that into practice and seeing the impact of how your managers will step up a few steps when you do spend the time to boost their confidence. (BSN R6 Mark)*

And enabling an inexperienced team member by “giving him the leadership he needed:”

*I had one guy who was a new member of the team and didn’t know – he was very inexperienced and I was leading him in the same way I was leading the others and not getting results and I was getting increasingly frustrated [...] I got the guy and took him into a meeting room and I kind of apologised for the fact that I hadn’t been giving him the leadership that he needed, that it was now*

*much clearer I hadn't been doing it on purpose, and that I kinda now had a much clearer view in my mind of what leadership was. (BSN R7 (John))*

Building a good team – one of the clearest examples of interpersonal intelligence at work – “is more by judgement than by luck:”

*I haven't got the depth of knowledge but what I'll do is I'll listen to what people say to me and again throughout my career – without trying to exploit - I've tried to get the right people around me and not to the point of 'I must have the best guys'. It just 'he's got good expertise which compliments my skills'– I got thrown back at me a number of times 'You've got a better team than {company}'s got'... 'Your team is much stronger'. And I said 'The fact that I've got a good team round me is more by judgement than by luck'. (BSN R2 Lawrence)*

People establish programmes to develop people:

*So I wrote a proposal – 'Why don't we start a programme for women who have degrees in science but haven't been working and want to return and we convert them... you know in a year into scientists and engineers in a certain area.' We did that kind of thing. (BSN R1 Oliver)*

They listen to people:

*I've only ever simply worked with people in the way that you would naturally work with them... listen to them, try to be supportive, try to be able to intercept within something within them to make the dynamics of our conversation more than the two of us being isolated. (MUS R1 Susan)*

The use of interpersonal intelligence motivated leaders:

*What motivated me about and still motivates me about the coaching and management side and two melded into one whatever people say – there are elements of both in there... it's all about people you know and my job's still about that... it's all about attracting the right team, creating the right climate, to have commonly agreed goals. I know this is like truisms and they come from all sorts of places, but it's absolutely vital. (SPT R3 GEORGE)*

## **Context: Environmental sensitivity and stakeholder management**

Environmental and contextual sensitivity is something which takes time to develop and tends to be more operative at later career stages. One of the most common ways it operates is through sensitivity to people around you and being very “conscious about the interaction between those individuals:”

*There are some people they are on the same agenda, but they don't like the way it's being done because it can put them into an awkward situation. So work with those people to make sure it's non-threatening and invite them to participate. There is, clearly, if you look at this we have established a stakeholder map. You know where the people are there and be very conscious about the interaction between those individuals (BSN R4 Peter)*

It is used to gain information about the environment into which an individual is moving so that they can base their behaviour on correct assumptions and make appropriate decisions. For example when moving into a vice-chancellorship, interpersonal intelligence was used to gain information from the “intellectual leaders of the area regardless of their title, regardless of their rank”:

*A tremendous number of meetings which I conduct in situ, so I go to the area – I don't summon people here and I sit and I listen and it is pretty relaxed; it's pretty informal. What I am doing is collecting my information. [...] I'm also looking for the people who are the intellectual leaders of the area regardless of their title, regardless of their rank – it could be a junior Lecturer, it could be a senior Professor, it could be someone who works in the office – but the person who is seen to be the most reliable pair of hands and the one to whom people would turn if there was a fire, an earthquake or an academic disaster – they are often quite different and I quite consciously think of those in the crossed-meshed system then of me trying to establish the fact that, if things needed to be known, I will know about them through formal or those less formal ways. (MUS R5 Thomas)*

The other side of this sensitivity is knowing how to influence and shape people and situation without using force or power:

*In higher education there is a big gap between asking somebody to do something and giving them the sack. You've got to persuade people actually. (MUS R6 William)*

And:

*I wish to look and particularly to listen to the local environment so I can then think 'Well how do we actually tie up people's skills best and therefore what role do I play in this leader/manager role which gets the best out of that like the orchestra gets the best out of the ensemble'. (MUS R1 Thomas)*

Leaders reflected on how to get people to do what is required and communicated in ways that “will allow people to hear the message”:

*I mean from quite a long way back I've kind of viewed the job as managing people; now that doesn't mean you don't have to do strategy and stuff like that but by and large the day to day stuff gets done by other people – it never gets done by me and therefore you're kind of continually working on 'So how can I get from people what I want them to do?' basically and 'What do I do when it's not clear what I want them to do?' and 'What do I do if they clearly don't want to do what I want them to do?' [...] Actually getting more sophisticated at dealing with the areas where maybe I'm not that clear or they're not able to hear it if I say it that way – are there different ways that I can say it that will allow them to hear the message and not get lost in the delivery. (BSN R7 John)*

Dealing with “politics” – in this case people's differing expectations – reflects interpersonal intelligence:

*And here again I had then to learn how to deal with politics; it was no longer just a matter of facts it was really a matter of mobilising, you know, talking through. I had more senior management engagements and there was a certain effect of not the rationale of, 'let's find the quickest route to the problem', it was more about – it's like politics. How do I achieve goals and everybody still has their original benefit. Nobody wants to give up. Do we want to do this? (BSN R2 Peter)*

Interpersonal intelligence is required to be aware of the context into which one is moving:

*So it was the first time I had to understand the context, what people are doing, why they are doing stuff and how can I help them to provide the solution. And that very first experience really helps me still today, to learn and to adapt to a new situation. I think that was the very first one. (BSN R2 Peter)*

Being interpersonally aware of the impact one has on an organisation was expressed in what one individual called the “shadow of the leader”:

*I call it the ‘shadow of the leader’ – and the shadow that you cast as a leader. [...] And my first big job – I probably only learnt the first stage of it – the first one is finding out that you’ve got one, which is you find out that people come up to you and say ‘I hear you think X or I hear you think Y... or you don’t like this, or you don’t like that’ and you think ‘well why on earth would you think that?’ – ‘Well someone told me, and...’ (BSN R1 MARK)*

Or as a sports person puts it succinctly – having “a sensitive radar:”

*I think it goes back to the fact that I have a sensitive radar. (SPT R8 Frank)*

### 6.2.2.3 Discussion: Interpersonal intelligence

#### 6.2.2.3.1 Discussion: interpersonal intelligence generally

A number of participants mentioned using interpersonal intelligence frequently during transitions (See Table 6.12).

*Table 6.12 Interpersonal intelligence during transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
<b>EARLY</b>												
Interpersonal intelligence	3	4	1.33	3	4	1.33	5	9	1.8	11	17	1.56
<b>DURING TRANSITION</b>												
Interpersonal Intelligence	7	22	3.14	8	28	3.5	8	59	7.38	23	109	4.74
<b>POST TRANSITION</b>												
Interpersonal Intelligence	8	21	2.65	6	17	2.83	6	20	3.33	20	58	2.9
<b>TOTAL</b>	<b>8</b>	<b>47</b>	<b>5.88</b>	<b>8</b>	<b>49</b>	<b>6.13</b>	<b>8</b>	<b>88</b>	<b>11.0</b>	<b>24</b>	<b>184</b>	<b>7.67</b>

All 24 participants mentioned using interpersonal intelligence in transitions averaging 4.74 mentions per individual specifically during transitions and 7.67 mentions per individual if early and post transition mentions were included. On a basic level this is Gardner's "ability to notice and make distinctions among other individuals" (Gardner, 1983, p. 240). While a number of people mentioned that they always seemed to have had interpersonal intelligence and had relied upon it throughout their career, there were an equal number of cases where it only began to emerge in the transitions from performance to coaching or managing and then grew both in importance and in the development of skills associated with it. This is consistent with one of Gardner's (1983) criteria for an intelligence that it have a "distinctive developmental history along with a definable set of expert 'end set' performances." But this developmental history extends into careers often past the time when individuals are performing as a domain expert. This would tend to confirm neo-Piagetian thinking (Labouvie-Vief, 1992) and lifespan learning models (Laipple, 1992) in which interpersonal intelligence is more fully developed at later stages of a career.

As with intrapersonal intelligence, it is the business people who speak most often about interpersonal intelligence during transitions, averaging over 7 mentions per individual and more than twice as often as either sports people or musicians. They mention leading individuals, managing teams, and managing relationship amongst peers and stakeholders as central to their performance in their more senior positions.

Aside from the progressive development of interpersonal expertise throughout a career, there seems to be no predominant pattern or way in which it is developed.

Skills associated with interpersonal intelligence were developed through training, through association with others who demonstrate it, informally through finding oneself in a role requiring it, through mentoring, or through self reflection and constant personal review.

**6.2.2.3.2 Discussion: Interpersonal intelligence in specific arenas.**

When data for interpersonal intelligence were organised into categories of self, others and organisation some further subcategories emerged. (See Table 6.13)

*Table 6.13 Interpersonal intelligence during transitions in specific arenas*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
<b>SELF</b>												
Openness to Feedback	1	1	1	4	6	1.50	6	34	5.67	11	41	3.73
<b>OTHERS</b>												
Supporting Others	6	12	2.0	5	16	3.20	5	15	3.0	16	43	2.69
Motivating Others	6	7	1.17	3	7	2.33	5	12	2.40	14	26	1.86
Giving Autonomy	2	5	2.50	3	11	3.67	6	22	3.67	11	38	3.45
Subtotal	8	24		7	34		8	49		23	107	4.65
<b>CONTEXT</b>												
Corporate & Stakeholder	3	4	1.33	0	0	0	5	14	2.8	9	18	2.0
<b>TOTAL</b>	<b>8</b>	<b>29</b>	<b>3.63</b>	<b>8</b>	<b>40</b>	<b>5.0</b>	<b>8</b>	<b>97</b>	<b>12.13</b>	<b>24</b>	<b>166</b>	<b>6.92</b>

In the first arena of relationship to oneself, interpersonal intelligence mainly took the form of seeking out feedback. This is not surprising in itself, but it is noteworthy that 34 of the 41 references were by business people and there was only 1 reference by a musician and only 6 by sports people. This is a clear differentiation across domains. This may be attributable to the business culture



in which structured giving and receiving feedback are built into almost all aspects of performance and are considered crucial during transition periods.

In the second arena of others, one would expect to see interpersonal intelligence in most evidence. The data bear this out: 23 of the 24 participants mentioned using interpersonal intelligence in this way. This is consistent with most models of interpersonal intelligence. Guilford's behavioural/product category includes "responding flexibly in interpreting changes in social behaviour" (O'Sullivan, Guilford & deMille, 1965). Thorndike's (1920) third category encompassed behaviours for "understanding and managing people". One can also see elements of emotional intelligence as individuals deploy "interpersonal skills" and "handle relationships" (Barr-On, 1997; Goleman, 1995). Interestingly while supporting others through help, feedback, and advice was common (43 mentions), motivating others (26 mentions) and giving autonomy (38 mentions) also played important roles.

In the third, context/organisational arena participants drew upon interpersonal intelligence to mobilise support amongst key stakeholder, to shape the context in which decision were made or to support the implementation of their actions. This use of interpersonal intelligence was less frequent than the other arenas but was more in evidence during the later stages of career transitions when the roles and responsibilities of individuals often encompassed the development and direction of their institution rather than just their own career. Social cognitive theorists such as Cantor and Khilstrom (2000) maintain that social intelligence includes the social strategies people use to accomplish social tasks. Giddens' structuration process describes the embeddedness of individuals within their institutions as the

“specifically reflexive form of the knowledgeability of human agents that is most deeply involved in the recursive ordering of social practices” (Giddens, 1984, p. 3). Barley (1989) might say that individuals are “fashioned” by their social context but they can also modify the modalities of an organisation through “enacting” which in turn will “constitute” organisational structures and institutions.

In reviewing the overall patterns of the data, it seemed that interpersonal intelligence operated in what could broadly be described as either *receptive* ways in which people were open to information and feedback from their interpersonal environment, or in *responsive* ways in which they were also able to adapt or influence their interpersonal environment in ways which contributed to their ability to perform in general and during transitions. This differentiation is indicated in Table 6.14.

Table 6.14 How interpersonal intelligence is utilised during transitions		
	Receptive	Responsive
Personal Context	Gather information about oneself	Adapting one’s behaviour
Interpersonal Context	Gathering information about others	Developing others
Organisational Context	Sensitivity to Environment	Influencing/politics

Receptively, interpersonal intelligences was used to generate information about oneself, usually through soliciting feedback, to understand the interests and motivations of others or, in the broader organisational context, to gather information through awareness of others about the environment or context in which one is operating. Responsively, it was used to adapt and change one’s behaviour in accordance with feedback, to develop people through coaching, dialogue, etc. or to shape the environment in which they found themselves. The receptive/responsive dichotomy in this arena is similar to Kosmitzki and John’s

(1993) dichotomisation of social intelligence into cognitive (more receptive) and behavioural (more responsive) elements. For example their cognitive “perspective taking” vs. behavioural “social adaptability” would be illustrative of the receptive/responsive dichotomy at the personal level. Their cognitive “understanding people” vs. their behavioural “ability to deal with others” is illustrative of the receptive/responsive interpersonal level.

Finally it is important to mention that there were three cases where apparent lack of personal intelligence led to failed transitions. In the first case a sports person progressed to the level of a senior coach within his sport but never moved into a more senior management or leadership capacity. Over the course of the interview it became clear that he could not understand what was required of him to make this transition or indeed that he needed to be more socially astute. This lack of intrapersonal self awareness and inability to utilise negative feedback contributed to his career peaking at the level of senior coach. In the second case an individual became the performance director (CEO) for a national sporting association. But after a few years in this position, he realised that he did not have the interpersonal skills to manage the organisation nor in fact did he have the motivation to engage in the kinds of personal and ‘political’ processes required to lead his management team. He resigned his position to return to a more performance/research function which was his true passion. Lack of interpersonal intelligence in managing relationship with others contributed to this lateral move in his career. In a third case, an individual reached group vice-president level within an organisation but, when the organisational climate and leadership mood changed, he found himself wrong footed and eventually ushered out from senior management position within the company. While personally and interpersonally

aware, the individual did not sense the shifting winds of the corporate climate and ended up on the wrong side of a corporate reshuffle. All three individuals, one consciously, two unconsciously, were not able to use personal intelligences in a way that enabled them to manage a progressive career transition.

## 6.3 Concluding discussion

Personal intelligence seems to be a key contributor to transition expertise. It is the main intelligence for understanding how to contextualise ones performance in the changing environments into which individuals move as they make career transitions. While it may be possible to attain elite performance in one’s expert domain, it seems unlikely that individuals will progress beyond individual performance to coaching, managing and leading other unless they have developed their personal intelligences.

### 6.3.1 Intrapersonal intelligence

Intrapersonal intelligence was used by all of the participants at varying times in their career transitions. Mentions of intrapersonal intelligence, metacognition and self regulation combined to average almost 10 references per individual (See Table 6.15).

*Table 6.15 Intrapersonal intelligence, metacognition & self regulation during transitions*

	Music		Sport		Business		TOTAL	
	Cases	Ref	Cases	Ref	Cases	Ref	Cases	Ref
INTRAPERSONAL INTELLIGENCE	8	25	8	31	8	52	24	108
SELF REGULATION	7	24	8	23	8	30	23	77
META COGNITION	4	5	2	6	5	19	11	30
Total		54		60		101	24	215

Intrapersonal intelligence operated in an essentially twofold process. On the one hand, through *self awareness* people accessed self knowledge of their abilities, intelligences, emotions, previous experiences of personal intelligence, self

concept and cognitive states. They did this in order to understand themselves better, to know their motivations, to measure their strengths and weakness, to identify personal goals and objectives, to draw upon their accumulated knowledge of people and ultimately to determine the direction of their performance. On the other hand, individuals also used intrapersonal intelligence to *manage themselves*, to use feedback, build on their performance and continuously adapt their behaviours to emerging situations.

Business people made significantly more references to intrapersonal intelligence during transitions than sports people or musicians. This is attributable primarily to two factors. 1) There is a greater need for self awareness amongst business people during transitions because they tend to leave their primary domain at an earlier age and move further away from the explicit use of domain knowledge. 2) Business people are exposed to explicit training in intrapersonal awareness techniques to help compensate for less developed self-awareness in their domain whereas musicians and sports people need to be much more self aware and introspective in developing their expertise. For business people intrapersonal intelligence is explicit. For sports people and musicians in particular it may be much more tacit.

Surprisingly, self regulation, performance control and metacognitive monitoring were mentioned far less than had been hypothesised. And mentions of these processes taking place simultaneously with performance or transition situations were rare. Nor were there many generalisations of self-regulating cognitive processes from earlier performance stages. When self regulation processes were used in transitions, they involved planning beforehand and occasionally

reviewing activities. Self regulation during transitions might be viewed as a composite of intrapersonal intelligence and analytical cognitive processes as typified by Sternberg's meta-components. It is possible that self regulation is an inappropriately structured self management process for transitions because it is designed fundamentally to maintain homeostasis and stable states. There may be open-loop elements in the system which enable individuals to enhance performance, but it is essentially a linear, incremental change model which may not suit the nature of career transitions.

A number of individuals just "got on with it" and did not explicitly rely heavily on intrapersonal processes during transitions. This was particularly the case with musicians. In part this may be because these intrapersonal processes became tacit through years of training and self regulation during their earlier career. Or it might be due to their non-suitability for generalisation to subsequent career stage requirements: the kind of self regulation processes used to enhance performance may not be useful to apply during transitions or to subsequent career stages.

Emotional intelligence as a model for intrapersonal (and interpersonal) intelligence had limited usefulness. Because emotional intelligence models are formulated as composite concepts that incorporate a number of factors including motivation, self image, self beliefs, coping strategies, affective self regulation, etc. they are not synonymous with personal intelligence. Where they are formulated primarily as models for cognitive management of affective states it might have been useful. But emotional self management per-se was not widely mentioned by the participants in the study and to attempt to apply the disparate elements of most models in this study would have led to confusion.

### 6.3.2 Interpersonal intelligence

The data suggest that interpersonal intelligence is more evident and more relevant for transition expertise than intrapersonal intelligence. This is contrary to the initial hypotheses at the beginning of this study that intrapersonal intelligence would be more central to transitions expertise. There were more mentions of interpersonal intelligence (275) (Table 6.16) than intrapersonal intelligence (215) (Table 6.15) by participants and, while both were used for very different purposes, the use of interpersonal intelligence may be more explicitly at work in transitions.

Table 6.16 Interpersonal intelligence with self, others and stakeholders during transitions

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
GENERAL	7	22	3.14	8	28	3.5	8	59	7.38	23	109	4.74
SELF	1	1	1	4	6	1.5	7	34	4.86	12	41	3.42
OTHERS	7	24	3.43	6	34	5.67	8	49	6.13	21	107	5.10
STAKE-HOLDERS	3	4	1.33	0	0	0	5	14	2.8	9	18	2
TOTAL	8	51	6.35	8	68	8.50	8	156	19.5	24	275	11.46

Unlike primary domain expertise which is often highly developed by the early career stages, interpersonal expertise seems to develop over the years and decades of a professional career. Some participants demonstrated strong indications of interpersonal intelligence early on in their careers and for others it only emerged at later stages in response to job requirement. But almost all of the participants continued to develop the skills associated with interpersonal intelligence progressively throughout their career transitions as they took on higher degrees of responsibility in their field.

Interpersonal intelligence was generally used to be aware of and understand how best to act in relationship to others. In addition to the main focus for understanding and managing their relations with *others*, individuals used

interpersonal intelligence to refine *themselves* through use of feedback from interpersonal sources and to understand and respond to *organisational* dynamics and corporate climate issues.

The division of interpersonal intelligence into reflective processes which take information in from the outside and responsive processes which are directed externally towards execution proved useful for understanding how interpersonal intelligence operates in relationship to oneself, others and the environmental context.



# Chapter 7. Practical Intelligence in Transition Expertise

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## **Introduction**

Practical intelligence is another formulation of intelligence which may play an important role in successful career transitions. However, it is a composite model with a multitude of elements, some of which are clearly elements of intelligence and others which may not be. This chapter will first attempt to untangle the concept of practical intelligence through examining several of its most well known models in order to identify how the elements of it most associated with the application of intelligence might operate to enable individuals to make successful sanctions. The second part of the chapter will analyse and discuss the data as it is indicative of practical intelligence in operation during transitions. The third part will present a brief summary and conclusion.

## **7.1 The Practical Intelligences**

This first part of this chapter, the theoretical review, will consist of four sections: 1) a brief introduction to contextualist approaches to intelligence which underlie many of the practical intelligence models and which view intelligence as a social construct that is inextricable from the environment; 2) a review of the most useful and important practical intelligence models including those of Sternberg, Scribner, and Goodnow; 3) some key issue in practical intelligence, in particular testing, problem solving, tacit knowledge and common sense; and 4) some areas that the various models have in common which will be used as the basis for analysis of the data.

### 7.1.1 The contextualist context

To understand the role practical intelligence plays in transition expertise, it is necessary to appreciate contextualised approaches to theories of intelligence. Mercer and her colleagues distinguish between what they call *decontextualised trait models* that “lean heavily on the conceptual model developed to measure academic intelligence [...] which has dominated the thinking of measurement theorists” versus *contextualised behavioural models* that “do not postulate the existence of a construct or trait that is a general characteristic of the individual” (Mercer, Gomez-Palacio & Padilla, 1986, pp. 309- 310). Contextualism’s roots can be traced through various predecessors which include functionalism (William James, 1890), pragmatism (John Dewey, 1896; Charles Peirce, 1934), and symbolic interactionism (George Herbert Mead, 1984; Herbert Blumer, 1969).

Dixon and Baltes lucidly summarise the contextualist approaches to psychological development which are closely linked to models of social and practical intelligence:

Insofar as contextualism has been a tangible sponsor of an approach to psychology, that approach has portrayed psychological development as an active, continuing, adaptive lifelong process, related to other ‘internal’ or mental processes, and interacting with biological processes, external activities, and sociohistorical processes. In this way, a contextual psychology is related to (and occasionally identified with) psychologies derived from pragmatism, dialecticism, and functionalism, but it is not entirely disjunctive with psychologies derived from mechanism and organicism (Dixon & Baltes, 1986, pp. 207-206).

This paradigm shift away from trait and behaviourist models towards socially constructed models of intelligence amongst psychologists is also clearly evidenced in early cognitive approaches to human behaviour. In *A Study of Thinking* (1956), the seminal work of Bruner, Goodnow and Austin, subjects were viewed (and engaged) as proactive, constructive problem-solvers. Concurrently, the longstanding language/cognition debate had been further stimulated by the ‘Whorfian Hypothesis’ (Whorf, 1956) which proposed that not only was there *linguistic relativity* in which the world is experienced and conceived differently in different linguistic communities but that language actually causes these differences through *linguistic determinism*. Cole and Scribner (1974) and Charlesworth (1979) addressed how culture shapes thought and determines performance in a specific domain. Cross-cultural approaches (Goodnow, 1976) developed a socially defined notion of intelligence. Radical cultural relativists like John Berry (1974) insisted that only indigenous notions of intelligence were valid. The works of Neisser (1976) and Gibson (1986) developed an ecological conceptualisation of intelligence. “Adaptive behaviour” was widely researched using terms like “skills training”, “adaptability to the environment”, and “the power of fending for oneself in life” (Numara et al., 1969; Lambert et al., 1975; Mercer, 1978). These wide-ranging theories with varying elements of contextualism contributed to the development of a more-or-less socially constructed concept of intelligence (For a summary see Coulter & Morrow, 1978).

Ceci and Liker (1986b) suggested that intelligence generally – and practical intelligence in particular – may be better understood in terms of a hierarchy of cognitive skills from the simple to the complex in which complexity will reflect

the contextual aspects of intelligence. While this linear contextualist hierarchy has its limitations – performing a Beethoven sonata or judging market trends using mathematical modelling are very complex cognitive operations but they may have no more or less contextualist determinants than using a knife to eat peas at a dinner party – it is fair to say that contextual aspects add another dimension of complexity to cognitive skills.

In their highly regarded four-year study of race track handicappers, Ceci and Liker (1986b) studied individuals with relatively low scores on standard IQ tests who were able to perform complex, multilevel calculations to accurately predict the performance of race horses. Handicappers based their decisions on information in a pre-race programme which contained between twenty to thirty different categories of information about each horse ranging from track size of previous races which had four levels, to lifetime speed which had 29 levels, to performances in different track conditions, to previous performances of the jockey, etc. These were integrated through complex cognitive process in which the handicappers went “beyond the raw data in their racing program, assigning ‘weights’ to each variable, systematically combining the various variables in complex, non-additive ways, and computing a rough odds/probability equivalence for each horse” (Ceci & Liker, 1986a, p. 132).

The intersections between these kinds of contextualist concepts of practical intelligence and expertise theory are noteworthy. When compared to trait models, practical intelligence has some correlations with crystallised intelligence (*gc*) which can continue to develop as one increases in age while fluid intelligence's (*gf*) function declines (Dixon & Baltes, 1986; Baltes & Staudinger,

2000). The correlations are also reflected in Horn and Masunaga's (2006) subsequent redefining of crystallised intelligence (*gc*) as *Acculturation Knowledge (Gc)* because it includes culturally-tied knowledge, is considered to be more *educationally* derived and consists of abilities acquired (or at least optimised) throughout a lifetime: "Whereas *intelligence* sets the limit on *how much* can be acquired in a particular cognitive domain, the environmental challenges and opportunities that one faces during their development determines *what* shall be acquire" (Ceci & Liker, 1986a, p. 119).

### **7.1.2 Practical intelligence: 3 theories**

For Dixon and Baltes the study of practical intelligence – particularly from a functionalist perspective – portrays "(1) knowledge (or knowing) as practical, (2) intelligence as instrumental, (3) reason as efficacious, and (4) experience as being future oriented" (1986, p. 208). These are probably good criteria to bear in mind when reviewing the three theories of practical intelligence below.

#### **7.1.2.1 Sternberg's contextual subtheory**

Robert Sternberg proposes simply that practical intelligence "is needed to use ideas and their analysis in an effective way in one's everyday life" (Sternberg, 1996b, pp. 127-128). His *contextual intelligence* subtheory – which he calls mental self management – operates in ever day life as the "*purposive adaptation to, selection of, and shaping of real-world environments relevant to one's life and abilities*" (Sternberg, 1988, p. 65). In this subtheory an individual has three options for responding to experience in the world:

(1) one can *adapt* to one's environment though the skills that enable one to adapt may not be measured by standard intelligence tests;

(2) one can change the context in which one operates and *select* a more appropriate environment for one's skills and abilities; or

(3) one can *shape* or modify one's environment because it is not possible to select a different environment or one is unwilling to adapt to the environment in which one is operating (Sternberg, 1988, pp. 65-69).

Sternberg's contextual intelligence subtheory provides cognitive substance otherwise missing from many of the career transition models discussed in Chapter 1 because in it he identifies specific cognitive abilities in it, many of which are amenable to psychometric measures (Sternberg, 1985, 1988). While he might react unkindly to characterising his contextual subtheory as 'practical intelligence', Sternberg uses it himself as the basis of his operating definitions of practical intelligence: "Practical intelligence is a construct that is distinct from general intelligence [...] it is the ability to adapt to, shape and select everyday environments" (Sternberg et al., 2000, p. xi).

All three elements of Sternberg's contextual intelligence can be seen to operate at various times in a transition e.g., selecting a new position into which one moves, adapting during transitions to the new climate into which one has moved and shaping one's environment during later stages of the transition process. Adaptation in particular is commonly deployed in transitions: musicians adapt to new orchestras to which they move, engineers adapt to mergers and company take-overs, football players adapt to new clubs they join. However, while many

career adjustment models that explain how individuals adapt to the environment (e.g., Crites, 1976; Osipow, 1983), they most often do not explain how individuals shape their environment as addressed in Sternberg's contextual subtheory. This subtheory also provides cognitive mechanisms which might further explicate how Giddens' structuration (Giddens, 1984; Barley, 1989) operates in the individual. Adaptation (encoding and fashioning) would be more in evidence during early stages of a transition and shaping (enacting and constituting) would take place subsequently during the later stages of the transition process and stabilisation in the new career stages.

#### **7.1.2.2 Scribner's practical intelligence**

Sylvia Scribner's (1986) rigorous study of dairy workers – whose domain is admittedly distant from those under study in this project – provides a clear delineation of practical intelligence. According to her, there are five main characteristics of practical intelligence. Perhaps not surprisingly, each of these characteristics includes elements that involve issues of expertise and cognitive flexibility.

*1. Skilled problem formation is as important as problem solving abilities.* The ability to formulate or reformulate/redefine an initial problem is an important element of practical intelligence. While this might include elements of Sternberg's *Analytical Intelligence* (1996) – one of the three elements of his successful intelligence – it is perhaps more readily captured by his concept of encoding information through insightful learning (Sternberg, 1988) (See Chapter 5). This capacity to represent problems in a variety of ways (Woods et al., 1994)

is a characteristic of cognitive flexibility amongst experts (Feltovitch, Spiro, & Coulson, 1997).

2. *Flexibility in problem solving that solves the “same problem” in different ways fitted to changing circumstances.* Consistency across situations may in fact be maladaptive (Mischel, 1984) whereas ingenuity in devising shortcuts is also an element of practical intelligence (Schön, 1983). This flexibility in problem solving is similar to the avoidance of functional fixedness (Feltovitch, Spiro & Coulson, 1997) and the use of novelty to avoid automaticity (Sternberg, 1988). Almost certainly this kind of adaptability evidenced in practical intelligence would be indicative of schema restructuring (Rumelhart & Norman, 1978). It would benefit from an expert’s “extensive, rich, differentiated schematization” (Feltovitch et al., 1984).

3. *Practical intelligence incorporates features of the task environment such as people, things, information, etc.* into the problem solving system. Practical intelligence operates almost inextricably with the environment, using “social, symbolic and material resources outside the head of the individual” (Scribner, 1986, p. 25). These include colleagues, knowledge experts, data, etc. This is the most explicitly socially constructed (Lambert et al., 1975) aspect of Scribner’s practical intelligence model. The environment clearly shapes what will be acquired and used (Ceci & Liker, 1986a) and practical intelligence reflects acculturation knowledge (*Gc*) (Horn & Masunaga, 2006) on a mundane level. It might also use elements of Sternberg’s contextual subtheory to adapt to the environment.



4. *Practical intelligence involves searching for “least-effort” solutions that reflect the environment.* Practically intelligent people “fit means” to the situation (Welford, 1976). “If least-effort strategies represent conscious constructions, their investigation requires going beyond the formal requirement of problems and the objective conditions of the environment to the larger institutional and cultural context in which individual tasks and purposes take shape” (Scribner, 1986, p. 26). There is clear correspondence with both of Sternberg’s adapting and shaping processes. Templates which have “nodes in the discrimination net [that] may be accessed through several paths” (Gobet, 1998) would support the search for least-effort solutions. Mental models like MACR’s (Zeitz, 1997) might enable individuals to select and choose the most appropriate strategies. These kinds of fitting means to situation operations could readily be described by models of self-modifying production systems (Langley et al., 1981).

5. *Practical intelligence involves the acquisition and use of situation specific knowledge.* Scribner found that where “knowledge-strategy relationships are so complex [...] that generalisations are limited [and] functional requirements have an important role in structuring these relationships” (Scribner, 1986, p. 28). Individuals remained “extraordinarily selective” in areas of their working knowledge which suggests that practical intelligence – for all its flexibility and contextual sensitivity – might still be knowledge tied and domain specific. This fifth point of Scribner’s could have non-flexible implications for practical intelligence depending upon how domain specifically it is developed. One would expect that the high knowledge selectivity would use mental schemata like templates (Gobet, 1998) that can be tightly tied to domain knowledge. Generally

tight links to domain specific knowledge would reduce generalisability as many expert theorists would contend (e.g., Ericsson, 2006; Chi, 2006). Strong links to a domain might also be accompanied by development of role or function-specific cognitive processes (Salthouse, 1991; Ste Marie, 2003) which might not be applicable outside of the domain. Gardner's (1983) statement that critical thinking remains domain specific due to the domain's "own particular *logic of implications*" would suggest that practical intelligence can be very domain specific. One might conclude that the situation-specific knowledge which is an important aspect of practical intelligence could contribute to its non-generalisability.

### **7.1.2.3 Goodnow's organising and reorganising**

Goodnow chose the seeming simple phenomena of what she calls *organising and reorganising* to represent how practical intelligence might operate. Some people are better organisers and reorganisers than other people, which she calls "locating the moveable and squeezable pieces" (Goodnow & Burns, 1985). This includes "changing the order of various segments, cutting down the time for one and expanding the time for another, shifting a task from one person to another, re-ordering priorities, deferring or abandoning all but the essentials" (Goodnow, 1985, pp. 148-149). Goodnow cites Peter Berger's (1977) analysis of socialisation that includes learning which domains or arenas of behaviour will permit innovation or change and which domains tend to forbid or constrain innovation or change. Such socialised learning will help individuals in the organising and reorganising of the operational units of their life and by implication will contribute to practical intelligence. Though superficially simple,

Goodnow presents a powerful dissection of the main attributes of practical intelligence.

Firstly, practical intelligence involves *dealing with physical constraints*. Units with which one is dealing can be combinable or incompatible e.g., one can combine preparation for a meeting with organising work priorities for members of one's team but practicing cello and managing one's diary commitments are incompatible. Units of practical performance can be more or less malleable e.g., performing a piece of music by Mozart may not be very malleable whereas changing the focus of a meeting in order to get a fuller briefing on an issue would be. This has associations with the variety of ways in which production systems may or may not be modifiable through mechanisms such as discrimination or composition (Klahr, 1984). Constraints can also be managed by planning that is shaped by "world knowledge" and is subject to the "perception of segments as having particular features or qualities." For Goodnow, perception significantly influences whether or not plans are cognitively accessible, available for change, fixed, cognitively embedded, or unavailable for separation (Bruner, Goodnow & Austin, 1956).

Secondly, practical intelligence has *social aspects*. This is not so much social intelligence as the ability to manage and utilise the social environment for practical reasons. For example, other people provide you with different types of experiences which can be modelled; you can respond to ways that people point out for you to change; you may need other people to give you approval for what can be "moved or squeezed"; or you can alter someone else's pattern of work, change their schedule, delegate tasks to them, etc. (Oerter, 1981; Fikes 1982;

Goodnow & Burns, 1985; Goffman, 1974; Bandura, 1982). These social aspects of practical intelligence reflect Goodnow's (1976) early work on developing socially defined notions of intelligence and more general connections with social constructed concepts of intelligence (Lambert et al., 1975).

Thirdly, situations in which practical intelligence operates can have varying degrees of *facilitating conditions*. Goodnow suggests that three things influence how much a situation is "facilitative" to being reorganised: (1) there is a clear value to moving pieces; (2) there are relatively few social constraints; and (3) there are a variety of models for how something might be reorganised. Differences amongst situations are of importance because they "alter the likelihood of intelligent behaviour being displayed at a particular time, but also because they provide a way of breaking down those mysterious variables: 'experience' or 'social context'" (Goodnow, 1986, p. 157). This has parallels with Scribner's last practical intelligence attribute – "least effort solutions." One can see the "shaping" element Sternberg's contextual subtheory in the operation of Goodnow's model of practical intelligence.

### **7.1.3 Practical intelligence issues**

#### **7.1.3.1 Testing of intelligence vs. performance in real life**

The validity of measuring intelligence that has been removed from performance in real life has been repeatedly challenged. While correlations between intelligence tests e.g., Stanford Binet (Roid, 2003), Wechsler (1997) and Woodcock-Johnson (1989), can be quite high, correlations between performance on these intelligence tests and performance in real life situations can often be quite low. For example: correlation between occupational performance and

performance on IQ or employment tests fell to the .2 level in Ghiselli's comparative study (1966, 1973); expert psychologists' performance is reflective more of sophisticated cognitive process than high scores on IQ tests (Wagner & Sternberg, 1985); IQ scores of CEO's do not predict their real-world expertise and performance (Streufert & Streufert, 1978); specific job related knowledge has a higher correlation to performance on a job than does IQ, memory or speed of processing (Chi, Glaser & Rees, 1982; Wagner & Sternberg, 1985). Wagner and Sternberg (1990) have identified 'street smarts' amongst young leaders that do not conform to measures of intelligence. Dörner and colleagues have repeatedly found low correlations between an individual's performance on real world tasks and their IQ scores (Dörner & Kreuzig, 1983). They maintain that successful real-life performance – which they characterise as “complex systems” – is the result of paying “close attention to the relative configuration of the facts at a given time, aiming all the while at adapting current behaviour to the changing environment and constraints.” They call this “doing the right thing at the right time” or “*grandmother's know-how*” (Dörner & Schölkopf, 1991, pp. 219, 233). Cole and Scribner (1974) showed that even micro level cognitive processes such as memory strategies are influenced by contextual variables such as the nature of the task, sex role expectations, and setting (e.g., home versus laboratory). Children who appear deficient in micro level cognitive strategies in one context will demonstrate high levels of these cognitive abilities in another context or with a different task (Ceci & Bronfenbrenner, 1985). This is equally the case with adults as demonstrated in Ceci and Liker's (1986a) study of race track handicappers who scored low on IQ tests but could perform complex mathematical calculations.

Neisser (1976) critiqued the tasks of most intelligence tests as 1) being formulated by other people, 2) having little or no intrinsic interest to the person taking the test, 3) having all needed information available from the beginning, and 4) being disembedded from an individual's ordinary experience. Sternberg (1996), a prolific tester, maintains that most IQ tests are inadequate for predicting performance in life because they usually measure well-structured problems whereas practical intelligence is particularly suitable for working with poorly structured problems that are typical of life situations that require flexibility in response in the context in which one is working, performing, and living. Reviews of the literature consistently conclude that applied, practical intelligence cannot be measured by standard tests of intelligence (e.g., Scribner & Cole, 1981; Sternberg & Wagner, 1986; Voss, Perkins & Segal, 1991; Sternberg et al., 2000; and others).

Goodnow suggested that combining intelligence tests, problem solving in the laboratory and assessment of everyday behaviours might be a more integrated and useful approach to measuring intelligence. She maintains that such an approach would: 1) evoke individual differences and should be observable at several ages and several skill levels; 2) focus on intelligence which is observable in everyday life and in several types of everyday situation; 3) probably involve some aspects of social intelligence; and 4) ensure that the observable behaviours would also be amenable to some form of formal study so that naturalistic and experimental approaches can be brought together (Goodnow, 1986).

Where practical intelligence has been measured, the results generally suggest a contextualist basis. Howard Gardner developed a model with colleagues for

assessing practical intelligence in schools called *Practical Intelligence For Schools (PIFS)* (Krechevsky & Gardner, 1990). In spite of his strong links to both structuralist and trait schools of thought in the study of human intelligence and development (Gardner, 1973), Gardner's general conclusions were that:

- practical intelligence skills are most fruitfully nurtured in domain-specific contexts;
- concepts are most effectively implemented when used in the service of a particular purpose;
- individuals acquire knowledge best when it is related to their own sets of abilities and interests;
- practical intelligence skills are most powerfully integrated when presented in both scholastic and real-world contexts;
- individuals benefit from a focus on process as well as product;
- self-monitoring that takes responsibility for one's own learning helps develop practical intelligence (Gardner, et al., 1994).

#### **7.1.3.2 Problem solving**

A common theme amongst practical intelligence theorist is that people with practical intelligence are good, pragmatic problem solvers: they can take knowledge and experience and apply them in real life situations to arrive at good, viable solutions to problems. The study of problem solving has produced a multitude of approaches that includes economic models, utility models, bounded rationality, game theory models, means-ends analysis, root cause analysis, domain expertise, etc (Neumann & Morgenstern, 1944; Simon, 1957; Rapoport & Chamah, 1965; Kepner & Tregoe, 1965; Newell & Simon, 1972; Chi, Feltovich & Glaser, 1981; Axelrod, 1984; Frensch & Sternberg, 1991; etc). Most such models rely upon the human being to act more or less rationally. Early problem solving models discussed as prototypes for expertise are based upon rational models of problem solving. Newell, Shaw and Simon's GPS – General Problem Solver – (1959) is an early model of rational problem solving. Miller,

Galanter and Pribram's (1960) famous TOTE – Test, Operate, Test, Exit – problem solving stages seems to be the basis for Deming's analytical (1986) PDCA - Plan Do Check Act - process which is a commonly adopted form problem solving and process improvement in industry. Sternberg's analytical thinking “involves conscious direction of our mental processes to find a thoughtful solution to a problem” (Sternberg, 1996, p. 155) and has a series of sequential stages: 1) problem recognition, 2) problem definition, 3) formulating a strategy for problem solving, 4) representing information, 5) allocating resources, 6) monitoring, and 7) evaluation which are largely a reformulation of his metacomponent sub-theory.

However, problem solving theories and problem solving in real life are often quite far apart. This is due in large part to attempts by problem solving theorists to formulate problems solving into rational, linear models that make sense in theory but may not map how people actually solve problems. Even Sternberg (1996b) maintains that it is quite easy, even normal, for rational models of intelligence to be confounded with other issues such as needs, motivation, self belief, and personality traits. He proposes that use of analytical types of intelligence may enable people to manage these or other non-rational factors that might otherwise suborn their thought processes or lead them to faulty judgement. While these analytical factors are important in most theories of intelligence, human problem solving regularly diverges from rational and linear processes. In fact, human problem solving is often characterised by starts and stops, delays, interruptions, restarts, and recursive processes (deGroot, 1965; Mintzberg, Raisinhani & Theoret, 1976). Problem solving which takes place over significant lengths of time is characterised by “*convoluted action*” that is not



sequential or linear but turns back on itself and strikes out in many directions, particularly when the problems are important as would be the case with most career transitions (McCall & Kaplan, 1985). Edgar Schein (1992) distinguishes between “planned change” and “managed learning,” saying that the latter is what often occurs even when the former is what one aspires to. Herminia Ibarra talks about what she calls *testing and learning* during transitions, a circular and iterative process in which we “take action, one step at a time, and respond to the consequences of those actions such that an intelligence pattern eventually begins to form” (Ibarra, 2004, p. 32). Mintzberg distinguishes between “planning” and “crafting” strategies in which the latter “is not so much thinking and reason as involvement, a feeling of intimacy and harmony with the materials at hand, developed through long experience and commitment” (Mintzberg, 1987, p. 69).

Many of the foregoing examples of divergence from linear rational approaches to problem solving will be characteristic of the operation of practical intelligence in different circumstances. While one of the key components of practical intelligence is the ability for skilled problem formulation, much of the problem solving capabilities of practical intelligence – which can be formidable – are non-linear, iterative, associative and non-rational. The way in which race track handicappers arrived at their odds in Ceci and Liker’s (1986b) study or Scribner’s dairy workers (1986) decided what percentages of their products to stock in their delivery vans is not dissimilar to how energy futures traders make their calls about market trends or football managers select their teams. Is problem solving an important element of practical intelligence? Almost certainly. Are linear, analytical, rational processes the most common approach to problem solving in practical intelligence? The answer is much less definitive.

### **7.1.3.3 Tacit Knowledge**

Polyani initially developed a concept of *tacit knowledge* in which “we can know more than we can tell” (Polyani, 1966, p. 4). Wagner and Sternberg (Wagner & Sternberg, 1985; Wagner 1987; Wagner & Sternberg, 1990; Sternberg et al., 2000; Wagner, 2000) link practical intelligence to tacit knowledge – which they view as knowledge that is acquired through experience, observation, modelling, following examples, as well as practice. They cite high correlations between tacit knowledge and performance in organisations, for example between levels of tacit knowledge and salary (.48), personal management capability (.29), and ratings of ability to implement policy (.39) (Wagner & Sternberg, 1985). Tan and Libby (1997) found that amongst auditors tacit knowledge became more important for success as individuals moved away from technical job demands to developing more general skills and solving more complex practical problems such as career management. Like practical intelligence, tacit knowledge is positively correlated with performance in the real world, but does not necessarily have a high correlation with measures of traditional IQ tests (Wagner & Sternberg, 1985; Wagner, 1987). However, while practical intelligence may include tacit knowledge, they are not synonymous.

### **7.1.3.4 Common Sense**

“Practical intelligence is what most people call common sense” says Sternberg (Sternberg et al., 2000, p. xi). Howard Gardner identified *common sense* as “the ability to deal with problems in an intuitive, rapid, and perhaps unexpectedly accurate manner” (Gardner, 1983, pp. 288-289). Common sense is one of Gardner’s four higher order cognitive processes that is not tied to his seven specific intelligences. It includes the processes that enable an individual to plan

ahead, exploit opportunities, foresee consequences, plan multiple lines of activity and guide their and other's destinies in a "prudent way." Gardner suggests that using one's own life experience and knowing the impact that one's behaviour will have on others (which are indicative of personal intelligences) are also elements of common sense. Gardner also maintains that common sense includes elements of choice, intention and motivation. Common sense then is a composite construct – like practical intelligence. There are numerous overlaps with practical intelligence but again they are not synonymous.

#### **7.1.4 Practical intelligence and transition expertise**

The foregoing review reveals practical intelligence to be a rich but rather awkward mixture of intelligence, cognitive psychology, social learning, expertise and personality theories. Each of the models that have been discussed have different strengths and weaknesses for use in this study. Scribner's model at first seemed to be most useful, but its focus on a problem solving process largely shaped by domain expertise that was limited in scope and knowledge would not be comprehensive enough to use with the participants of the study. Sternberg's (1996b) over reliance on analytical rational processes with its close links to Gardner's logical/mathematical intelligence and elements of his own metacomponential subtheory (Sternberg, 1985) did not seem to capture either the pragmatics or the non-linear nature of practical intelligence. Wagner's (Wagner & Sternberg, 1985; Sternberg & Wagner, 1986) attempted synonymy of practical intelligence with tacit intelligence simply did not work and failed to encompass many of the conscious and explicit operations of practical intelligence. Gardner's model of common sense (1983), in contrast, covered a wide range of practical

intelligence operations but included too many non-intelligence factors like motivation and “guiding others’ destinies”. It was also too undeveloped to utilise effectively for analysing the data from the participants. Goodnow’s (1986) model of “movable squeezable” proved particularly useful in organising the pragmatics of practical intelligence into simple categories that actually had more subtle analytical depths than initially assumed. But it too, like Gardner’s model, had not been developed.

Fortunately, the different models overlapped in a number of areas and, if excluding personality factors and tacit processes, three common categories emerged which encompass most of the important facets of practical intelligence. These are: 1) Problem formulation and resolution; 2) Organising and administering; and 3) Managing social and organisational resources (Table 7.1).

*Table 7.1 Practical intelligence models compared*

	<b>1. Problem formulation and resolution</b>	<b>2. Administration and organisation</b>	<b>3. Managing social and organisational resources</b>
Sternberg (1985,1996) <i>Contextual/ Successful</i>	Analytical thinking (a,b,c)  Shaping	Analytical thinking (d,e,f,g)  Adapting	Shaping  Selection
Scribner (1986a, b) <i>Practical</i>	Skilled problem formulation  Flexibility in problem solving  Situation specific knowledge	Situation specific knowledge  Flexibility in problem solving  Searching for least effort solution	Incorporating features of the task environment  Searching for least effort solution
Goodnow (1986)  <i>Organising and reorganising</i>		Dealing with physical constraints	Social aspects  Facilitating conditions
Gardner (1983)  <i>Common Sense</i>	Use of logical process	Capacity to implement actions	Strategies and resources
Wagner (1985)  <i>Tacit Knowledge</i>	Use of experience	Ability to implement policy	Implications on others

These headings have the additional advantage of focussing on three progressively expansive levels at which practical intelligence operates. At the first level, *problem formulation and solution* is a largely subjective process in which individuals utilise their knowledge, experience and problem solving abilities to arrive at well-formed and practical solutions. At the second level, *organising and administrating* involve the ability to utilise and manipulate the immediate environment and implement short-term actions many of which may arise from the solutions derived from the first level. At the third level, *managing social and organisational resources* enables an individual to reach out beyond their immediate operating arena and utilise the extended resources of their environment to arrive at practical solutions for a broader context.

#### **7.1.4.1 Problem formulation and resolution**

Problem formulation and resolution is central to practical intelligence. Problem formulation is the first of Scribner (1986) five characteristics of practical intelligence and involves the ability to formulate, reformulate or redefine problems. This reformulation ability is followed by her second characteristic which is the capacity to be flexible and solving similar problems in different ways. Gardner's (1983) common sense includes exploiting opportunities and planning multiple lines of activity. Goodnow (1985) is very much concerned with a pragmatic approach to problem solving that involves changing order, cutting down time or expanding it, re-ordering priorities, and deferring or abandoning non-essentials. In her approach we see practical intelligence operating at a very different level than analytic approaches to problem solving. Practical intelligence is the third of Sternberg's (1996b) three successful intelligences – analytical, creative and practical – in which problem formulation

and redefinition fall under analytical and creative intelligences respectively. While Sternberg's approach offers a more granular understanding of what practical intelligence might be, it remains tied to its analytical structuring even when dealing with creativity. The earlier listing of human approaches to problem solving raises too many caveats against subsuming human problem solving under an analytical framework, though practical intelligence might use Sternberg's (1985) "insightful learning" to modify automatic processes. But what makes practical intelligence practical – rather than mathematical/logical (Gardner, 1983) or metacomponential (Sternberg, 1988) – is its non-linear approach to problems solving that has been described variously above as "turning back on itself", "striking out in many directions", "convoluted action", "crafting rather than planning" and "allowing an intelligent pattern to emerge" rather than forcing it through a structured process. Many of the researchers (e.g., Mintzberg, 1987; Schein, 1990; Ibarra, 2004) who propose these non-linear attributes of practical intelligence derive their data from studying how practical intelligence operates in the world, with managers and leaders rather than in controlled laboratory conditions. They have also relied on interviews and qualitative approaches to gather data. Problem formulation and resolution in practical intelligence, while including analytical elements primarily at the problem formulation stages, will follow non-linear, intuitive, flexible approaches to problem solving that are more concerned with getting to the right solution than following the right process.

#### **7.1.4.2 Administration and organisation**

*Administration and organisation* are important elements of practical intelligence. Scribner (1984) identifies how incorporating features of the environment such as people, things, and information into one's problem solving system are an important aspect of practical intelligence. Goodnow's (1986) manipulation of "moveable and squeezable" parts "within the constraints of existing structures and processes" is representative of the operational and administrative functions in any organisation. Gardner's (1983) common sense is focussed on successful implementation that is dependent upon "life experience." The domain specific knowledge associated with Wagner's (1987) tacit knowledge is typical of this kind of administrative practical intelligence that knows how to get day-to-day results in running any kind of operation. The latter part of Sternberg's (1988) analytical thinking/metacomponential processes i.e. strategy formulation, allocation of resources, and monitoring would all require administrative practical intelligence to implement potentially "good ideas" into successful actions. His metacomponents could be thought of as operating in support of practical intelligence rather than practical intelligence following submissively in their sequential footsteps. Gardner's study of practical intelligence in the classroom (Gardner et al., 1994) made it clear that "concepts are most effectively implemented when used in the service of a particular purpose." Reason is efficacious say Dixon and Baltes (1986) and in practical intelligence "intelligence is instrumental".

#### **7.1.4.3 Managing social and organisational resources**

Mobilising social and organisational resources is different than the administrative abilities that are associated with more pragmatic daily. Resource utilisation is the

ability to reach out beyond the daily operational constraints of a situation and mobilise more extensive resources and people in order to achieve success. Scribner says practical intelligence utilises “social, symbolic and material resources outside the head of the individual” (Scribner, 1986, p. 25). Her “least effort solutions” are closely tied to understanding and situating tasks in “the larger institutional and cultural context.” Gardner’s common sense includes the ability “to plan ahead, to exploit opportunities, to guide their destinies and those of others” (Gardner, 1983, p. 289). Goodnow (1986) stresses the importance of understanding the different situations in which one finds oneself. Tests of practical intelligence, she says, should focus on understanding how individuals deal with that “mysterious variable” social context. Sternberg says that practical intelligence includes the ability “to shape or modify one’s environment” (Sternberg et al., 2000). The success of individuals in implementing larger scale strategies will depend on how they mobilise resources.

## **7.2 Data Analysis**

The analysis of the data that corresponded to practical intelligence was challenging. Practical intelligence seemed to bleed over into a variety of contextual arenas e.g., practical use of education, practical use of team members, practical use of previous expertise in new domains, practical use of interpersonal skills to mobilise resources, etc. In the end four criteria were established for identifying a statement as indicative of practical intelligence. By definition they involved *praxis*, or activity in the world:

- Practical intelligence had to involve the application in the world of some kind of knowledge, intelligence or experience.



- Practical intelligence had to be applied to a real situation. Abstraction did not qualify, but application of abstract ideas in practice did.
- Practical intelligence had to involve some "movable/squeezable" component. It manipulates things, objects, people, structures, etc.
- Practical intelligence had to involve doing something or achieving something.

The data review is organised into three arenas as identified previously:

1. *Problem formulation and solution resolution*
2. *Administration and organisation*
3. *Managing social and organisational resources.*

### 7.2.1 Problem resolution

Problem solving in has been divided into two halves: problem formulation and solution resolution. Statements indicative of practical intelligence in the form of problem formulation and solution resolution are indicated in Table 7.2.

*Table 7.2 Some statements indicative of the ways in which practical intelligence operates in problem resolution*

<b>PRACTICAL INTELLIGENCE: PROBLEM FORMULATION</b>
<i>'I analysed it quickly: what goes wrong here'</i>
<i>'I just applied what I learned in theory into practice'</i>
<i>'It's about cutting to the quick of what it really is, rather than the whole peripheral stuff'</i>
<i>'Make analysis of who's strong, who isn't strong and what is strong and what's weak, what attributes need changing'</i>
<i>'You've sort of disestablished the whole skill set into various elements'</i>
<i>'What would that actually look like? What would the ingredients be?'</i>
<b>PRACTICAL INTELLIGENCE: SOLUTION RESOLUTION</b>
<i>'I was able to enable things myself in a much more proactive kind of way'</i>
<i>'Designing organisational structures'</i>
<i>'The architecture should look like this'</i>
<i>'So I wrote a proposal'</i>
<i>'I set up a research centre'</i>
<i>'I like to create something that is then able to run itself and doesn't need [...] me personally'</i>

### 7.2.1.1 Problem formulation

Practical intelligence is often in evidence in an individual's ability to formulate the nature of a situation, to identify crucial issues, to define a problem clearly, to follow a process to get to root causes, etc.

Moving from general or abstract concepts to practical applications of knowledge is indicative of practical intelligence:

*So basically when I saw the situation I analysed it quickly, what goes wrong here right? Where are all the process deficits, right? Where are the communication gaps? And where are personality issues? And I just applied what I learned in theory into practice, because it was kind of obvious, but it maybe was not very - so that was the learning how to apply it into practice. (BSN R6 Peter)*

One musician when moving into a management positions described it as clarifying the 'blindingly obvious':

*You're sitting round a meeting and you see something blindingly obvious and you say it and everybody says "I never thought of that before". (MUS R5 Stephen)*

Problem formulation during transitions often includes stepping back to observe:

*Well managerially what you do and I would advise anybody to do that, is let a year run so you watch how your horse performs before you start pulling the reins too hard and I think... so you consult widely with colleagues don't you? You observe the rhythm and pattern of an institution that's already under momentum and start to make analysis of who's strong, who isn't strong and what is strong and what's weak, what attributes need changing. (MUS R1 Richard)*

Analysis can also be applied to knowledge/skill situations through "disestablishing" skills as in this sporting example:

*We knew by then because we were starting to construct syllabi's and programmes by then and they all had to do that because you are going out to somebody and you're saying 'Well are you a coach?' 'Oh yeah' they say. 'Well why are you a coach? Just 'cause you put your hands up?' 'Well, yeah' 'Right what are you going to deliver to us?' So at the stage where you have that conversation you have to know and that means you've sort of disestablished the whole skill set into various elements that you think are important and then isolate those down and train typical things. (SPT R2 George)*

At a senior level problem formulation involves envisioning a future state and then figuring out how to actually realise its implementation:

*Once I'd made that statement, it becomes a lot easier to say, well you know: 'What would that actually look like? What would the ingredients be?' 'Well it's got to have a home; it's got to have a place. What would that place work like? Who's going to have to be there? What's the basic configuration of the working units within it and then 'okay who have I got to hire? And what is the job I'm giving them?' But it's no use if you can't crystallise that into something that's really quite visible in your mind's eye and then ultimately there is a whole series of steps you are prepared to take and obstacles that you know you've got to overcome [...] in a sense an awful of lot of what's happened at cycling since has been a whole set of experiments with some reasonable hypotheses to start with. (SPT R7 Edward)*

### **7.2.1.2 Solution resolution**

The other side of practical problem solving is resolving a solution through to implementation. While good solution resolution is dependent upon good problem formulation, this second phase of problem solving is indicative of practical intelligence in that the individual manipulates forms, structures, resources, assets, and people to implement a course of action.

Solution resolution can operate at a very basic level when setting up one's professional career:

*I mean just as a sort of indicator – instead of sitting by the phone hoping that the BBC would phone and offer me something which they did from time to time, I would start phoning producers, I would start thinking of programmes, having ideas and bouncing them off producers and they would say ‘Great, come in and do it.’ So I felt that I was in a much ... I was able to enable things myself in a much more proactive kind of way really. (MUS R4 Robert)*

Or reaching out to a larger arena and engaging in “politicking”:

*I set up a research centre which was subsequently very successful, began to publish lots and lots more papers, got more data, did a lot more politicking around the need for children protection and welfare in sport and all the time using research and politics together. (SPT R3 Diane)*

Practical intelligence often involves putting into place structures and processes (as distinguished from running them) which resolve organisational problems:

*It was like being given a green field when I got here. Nobody had any experience of running derivative operations which is what I had been doing – for some of the time – even when I wasn’t directly in that field, it’s related in finance. So there was a lot of, there was just total freedom for me really as far as designing organisational structures, designing technology concepts. I wasn’t doing the technology work but ‘the architecture should look like this’ (BSN R1 Nicola)*

Practical intelligence is also operational when the move to more senior management levels may involve setting up programmes and processes which bring visions or ideals into organisational reality:

*I did teaching like things so for example I wrote a proposal to do - the National Science Foundation was at that time moving to do something major for women in science and so I wrote a proposal: ‘Why don’t we start a programme for women who have degrees in science but haven’t been working and want to return and we convert them, you know, in a year into scientists and engineers in a certain area. (BSN R2 Oliver)*

And:

*I've sort of, put on a [...] a keyboard day where everybody plays in the concert hall and it lasts all day Sunday. They play a piece with a theme, last year it was Salon de Paris, hence this poster here. This year we're doing Songs Without Words where they play any of them and it includes, it's all inclusive, harpsichord, organist, keyboard, pianist and things and it's really exciting because last year we had fifteen hundred people through the door on a Sunday for that and the director said we've never had such an event which has attracted so many people from the street. So that's my mission here, to bring, to show our students to the outside world. (MUS R1 Yvonne)*

Ultimately practically intelligence people formulate and implement a strategy:

*It's what I set out to do - so I like to create something that is then able to run itself and doesn't need, either doesn't need me personally or doesn't need somebody doing my job at all and we're nearly there. (BSN R3 Nicola)*

### 7.2.1.3 Summary

While there were some clear examples of problem formulation and solution resolution amongst the participants in this study, they were not nearly as in evidence as one might have thought as is indicated in Table 7.3:

*Table 7.3 Practical intelligence and problem solving during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Problem formulation	2	2	1	6	13	2.17	4	12	3.0	12	27	2.25
Problem resolution	3	7	2.33	3	3	1	7	16	2.29	13	26	2
Total	4	9	2.25	6	16	2.67	8	28	3.5	18	53	2.94

Only half (12) of the participants mentioned using problem formulation, averaging only 2.25 references per individual. While 75% (6) of the sports people mentioned problem formulation as a contributor to managing their transitions, they only did so a little over an average of twice per person. Perhaps the analytical/logical process nature of problem solving might be more indicative of Gardner's (1983) logical/mathematical intelligence and might correspond

more to the business domain? But while there were slightly higher averages of references by business people (3.0), surprisingly only 50% (4) of the business people mentioned problem formulation as contributing to transitions even though their fields of engineering and finance require a higher degree of Gardner's logical/mathematical intelligence. There were almost no references to this kind of practical intelligence by musicians: only 25% (2) of the musicians mentioned it and then only on 1 occasion each.

While problem formulation when it was implemented was clear and contributed to transitions, as the examples from the data indicate, it did not seem to contribute extensively to transition expertise. The lack of analytical sequential problem formulation during the transition of most of the participants in the study would suggest that a different approach to problem formulation is operating in transition expertise which was not readily identified. Perhaps non-linear, approaches as characterised by McCall and Kaplan (1985), Mintzberg (1987), and Ibarra (2004) were used. Possibly it might operate as tacit knowledge?

Solution resolution would correspond to Scribner's (1986) "flexibility in problem solving." However, there were again relatively few mentions of solution resolution in transitions – roughly the same number of times (26) as problem formulation (27). However, the distribution amongst participants was slightly different. Roughly the same number of musicians (3 out of 8) mentioned it but with a higher average mention of 3 times per person. In the business domain, 7 out of 8 individuals mention generating solutions for problems averaging more than two times per person. However, sports people lagged in this measure with only 3 out of the 8 participants mentioning it, averaging only one time per

person. Again one is left with the conclusion that, while solution resolution as the explicit implementation of problem formulation outcomes may be effective when used, it does not seem to be a central element of transition expertise.

It is of some interest that on closer scrutiny, where participants took a structured approach that broke situations down into more manageable steps or pieces, this tended to be done by more senior individuals at later career stages and was applied to larger scale and longer term issues rather than at the day to day practical things. This suggests that these kinds of sequential linear process might contribute to issues involving more strategic thinking. However this kind of use of intelligence seems to be too 'large' and global to be reduced to practical intelligence as typified by Scribner's (1986) dairy workers or Ceci and Liker's (1986a) race track handicappers. Some of the illustrations used for practical intelligence may be compounded with strategic thinking skills. But practical intelligence at the senior organisational level seems to take the form of stepping back and looking at the bigger picture. This would suggest the use of inductive cognitive mechanisms in which practical intelligence is generalised from earlier specific experiences to broader strategic applications.

If one combines statements indicating both problem formulation and solution resolution kinds of behaviour, then 18 of the 24 participants averaged 3 mentions each. This suggests that some forms of problem solving and resolution are operative in career transitions. But the relatively modest amount of mentions would also seem to indicate that problem resolution *per se* is not the primary application of practical intelligence in transition expertise.

## 7.2.2 Administrative intelligence

Table 7.4 gives some indicative statements of administrative intelligence:

*Table 7.4 Some statements indicative of the ways in which practical intelligence operates in administrative intelligence*

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**PRACTICAL INTELLIGENCE: ADMINISTRATIVE**

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*'We laid in a structure that was an effective administrative structure.'*

*'Everybody understood what the objectives were and that wasn't going to be micro managed by anybody else.'*

*'The registrar said to me 'It's been marvellous having you as an administrator here.'*

*'I've always been quite well organised but I became even more sharply organised.'*

*'That's just the way that my brain works.'*

*'As a performing musician is actually really useful here, it's really useful in terms of actually applying it in other situations.'*

*'It's a bit like teaching really, I find organising departments the same kind of skill that you need.'*

*'It's just a thing, I'm quite a practical person, so, I'm quite well organised.'*

*'I just really tried hard to get then engaged as opposed to sitting on the side.'*

---

Administrative intelligence goes beyond setting up a structure to actually implementing and running that structure:

*Actually, mostly it was, in those days, of setting out a structure of competition and support – that was the first thing I did; I sorted out the politics, sorted out the structure of the competition so that we didn't waste time doing competitions either in the UK or abroad that weren't productive and thirdly a system of support to the things like moving their boats around – it sounds really simple, but sailing is not really simple – so the admin, all the admin side we laid in a structure that was an effective administrative structure, where everybody understood what the objectives were and that wasn't going to be micro managed by anybody else. (SPT R4 George)*

Musicians demonstrate a range of 'administrative' skills for management positions when they move to head of faculty, administering an orchestra, etc. :

*Unbelievable. I had no training whatsoever to be an administrator and I had never thought of myself particularly organised, but in fact I think I was quite a good administrator and when I left {institution}, the registrar said to me 'it's been marvellous having you as an administrator here'. Even if I hadn't done any administration, you know, but I think I was reasonably good at it – I was interested in it you know, so I wasn't sitting there thinking 'I should be playing the clarinet'. (MUS R2 Vivian)*



A sports person talks about how making a lateral transition from being national coach to setting up her own consulting business was supported by her being “quite well organised”:

*I've always been quite well organised but I became even more sharply organised; I wrote my own business plan, I had my own objectives, I started building my client base, I did everything you have to do to run a successful business and really I knew that eventually I would want to go back into a university and I saw this as a five year project probably being in the private sector. I made quite a healthy profit. (SPT R2 Diane)*

Amongst musicians, when they transitioned to career stages that involved managing musical faculties, several mentioned that they generalised practical intelligence capabilities developed in their performing career:

*When I got the job at {instiution}, I was presented with this sort of list of tasks and list of responsibilities and list of, if you like, my own list of possibilities and you sort of get on and do them really. And it's only afterwards when people say to you “You're very efficient at this” or “You're very good at this” it's then that you begin to think, actually, yes, the way that my brain works, because of the discipline that I had to go through to get to where I was as a performing musician is actually really useful here, it's really useful in terms of actually applying it in other situations. (MUS R5 Stephen)*

Another musician identified several situations such as teaching, running her career, and being a board examiner as examples of ‘training’ to administer a department:

*It's a bit like teaching really, I find organising departments the same kind of skill that you need. It's just a thing, I'm quite a practical person, so, I'm quite well organised although you'd never think so looking at my desk. No I just see that as another aspect of teaching in a way. I guess having to organise my own career from an early age and having to run, even be my own agent at one point, you know, I had to be organised at home with phoning people back or sending them CVs, in those days, nothing on the computer, sending it on paper, you know, so I had to be quite disciplined in that area so that was training for that.*

*But I think my Associated Board training was the best training I had. (MUS R8 Yvonne)*

A similar level of administrative practical intelligence emerged in sport when individuals talked about generalising from their experience acquired at a local coaching level during their transition to running a National Association:

*I'd managed budgets, not big budgets, but you had to be accountable, you had to work within your budget and so on – it was good training; I was relatively... I had lots of responsible in areas which, of course not big in themselves, were wide. So wide responsibilities for a number of small areas which was lucky. (SPT R1 George)*

Whereas musicians and sports people talk about using administrative intelligence during transitions generalised from self management in their performance career, business people seem to accrue administrative capabilities incrementally during the course of their management career:

*But I grew a lot as a manager as well in the time I was there – I learned a lot about how to deal with difficult situations, more process, more management process – we have, and not at the University – a more rigorous criteria for thinking about promotions and grades and appraisals and objective setting; all of those things which you don't do much up at the University. (BUS R2 Oliver)*

Finally, it is worth mentioning that administrative intelligence can operate in conjunction with other intelligences, particularly interpersonal intelligence:

*The first thing I had to do was go along to the head and say 'Would your school be interested in sailing?' and they'd say 'What?' 'You know, sailing.' 'Oh yeah – sailing.' 'Yes but' was their answer. 'Yes but transport.' 'Yes but time.' 'Yes but safety.' 'Yes but competence of our teachers to take it there.' There was always a whole load of 'Yes buts' and I just said, 'Well okay, if I got out of the yes buts what would you say?' 'Oh, yeah, okay'. And so we got a mini bus from the transport service, we got qualified instructors. 'It's only down the road – did you know there was a reservoir down the road?' 'Oh no.' 'Okay fine.' 'Well there is, and it's up to school or they can take it as an option instead of doing*

*cricket or soccer in their double period etc., etc.’ Okay so they came. And then we got a teacher and every teacher that came, I just really tried hard to get them engaged as opposed to sitting on the side and many of them did and then we ran free after-school training for teachers to try and build the instructor base, which we did. (SPT R2 George)*

### 7.2.2.1 Summary

Administration is indicative of Goodnow’s (1986) “moving and squeezing” in which people manipulate processes, procedures, and immediate resources to manage their daily work on an ongoing basis. Administration can also be seen as the operationalising of Scribner’s (1986a) “incorporating features of the task environment.” There are indications that administration is an element of practical intelligence used during transition in all of the domains in this study as indicated in Table 7.5.

Table 7.5 *Practical intelligence during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Administration Intelligence	7	18	2.57	5	20	4	4	9	2.25	16	47	2.94

Administrative intelligence was mentioned by 16 of the 24 (66%) participants with an average of almost 3 mentions per person. Surprisingly, business people were under represented with only 50% mentioning it and even then only averaging slightly over 2 mentions per individual, even though most business people are subject to quite intensive training in administrative skills. Furthermore upon reviewing the context of the references in the interviews for business people, administrative intelligence was most often mentioned during the latter stages of a transition and as leading to an incremental development of administrative intelligence in dealing with more and larger quantities of work.

Amongst musicians, on the other hand, 7 out of 8 (88%) participants mentioned administrative practical intelligence as contributing to successful transitions. Interestingly, they did not mention administrative intelligence during their transitions from performer to becoming a professor. Rather, it ‘resurfaced’ during their subsequent stage transition from professor to heading up a department or faculty within an institution when they generalised from their self management to managing a department. This is further evidence of practical intelligence being generalised inductively from their earlier good practice in successfully managing themselves e.g., planning, booking events, correspondence, invoicing, and so forth, to dealing with the wider arena of managing a department. The general lack of training in skills associated with practical administrative intelligence amongst musicians (unlike business people who are highly trained in these matters) suggests that the ability to generalise these skills from earlier to later career stages will be an indicator of transition expertise.

Sports people were not dissimilar to musicians: at a certain point their change in career levels required that they increasingly administer and run areas with greater responsibilities, such as a national association or a research department. Their practical intelligence in these transitions often seemed to involve getting around problems or what Goodnow (1986) calls “dealing with physical constraints” as indicated by the “Yes, but” litany of one participant. However sports people, unlike musicians, did not seem to express surprise at their development of administrative intelligence: it arose when they needed it to make transitions because the job required it. Also, administrative intelligence emerged earlier amongst sports people than musicians when they made transition from performer to coach.

## 7.2.4 Resource management

Resource management encompasses a variety of ways in which individuals mobilise resources and apply them pragmatically to achieve certain objectives.

*Table 7.6 Some statements indicative of the ways in which practical intelligence operates in resource management*

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### DRAWING ON KNOWLEDGE EXPERTS

*“I was lucky to meet one particular guy”*

*“Friends I knew who worked in business to read and give me critical feedback”*

*“I found somebody who [...] is absolutely fascinated by human dynamics”*

*“I was in a position to bring all of these people together”*

*“I’ve had the right people on the bus”*

*“So within the organisation, we’ve just got an enormous amount of intellectual knowledge and perspective”*

*“Learning opportunity from people who were really world leaders in their fields and gave me light understandings of issues”*

### DRAWING ON ENVIRONMENTAL SUPPORT

*“And again you know the head of the firm comes down and he said ‘We completely trust you; you’ve got to qualify’”*

*“There was a lot of opportunity and space to be entrepreneurial, to follow one’s ideas”*

*“It was deliberately an exercise to say how much can you learn and how can you start applying that”*

*“It was the environment...it was the culture, the challenge and the way people worked together”*

### APPLYING EDUCATION AND LEARNING

*“I had a very good private student who[...]put me through the ropes for the next time round”*

*“So when I got into the school, everything I learned I was able to apply the next day”*

*“But at the same time, I was doing my MBA dissertation and so I decided to do my dissertation in trading opportunities”*

*“After each week, I’d come in and try stuff out in the office and see how it worked”*

*“I did the theory and I did the practice and matched them together and wrote the programmes and all that stuff”*

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### 7.2.4.1 Drawing upon right network of knowledge experts

When making the transition into elite performance in sport, one individual first used problem formulation to identify the best route to qualify for the Olympics and then sought out expert knowledge to support her in achieving her objective:

*I had to sit down with a points scheme that July and work out if it was possible for me to qualify on half the number of competitions before I went for it and then I worked a route, whereby I could you know and I found a nutrients, I found a guy who did a sport degree where his thesis had on fencing in New Zealand and got him to all my physical training and I said ‘you have to fit this in and around my job’. And then I found a sports psychologist as well. And I went to my bank*

*manager and said 'I'm going to need an overdraft' and he said 'I've never had anybody come to me and said they wanted an overdraft for the Olympic Games and waived all the charges and gave me a really low interest rate. (MUS R1 Claire)*

One individual making a transition to running a sporting consulting/research business drew upon knowledge experts:

*Yeah. It's selling the deal, having to survive by learning all about tax – oh my God. Having a tax audit, VAT, dealing with accountants; I used to send my business plan out to colleagues, friends I knew who worked in business to read and give me critical feedback on whether I was going in the right direction. (SPT R3 Diane)*

Another individual, who didn't have management knowledge in an area himself, got knowledgeable people onto his team:

*It doesn't fascinate me as much as it fascinates the people who are very good at it, so I found in {person} somebody who I'd initially hired to do some deals for me basically to generate funding and partnership sport. I found somebody who over time it became clear to me is absolutely fascinated by human dynamics. (SPT R1 Edward)*

And:

*So clearly by the formula you know that I'm now starting to advocate to people in terms of my understanding of what seems to work in pursuing excellence; there's a very clear vision that evolved from a daydream of what I could contribute to and be a part of. I'm in the right place to be pursuing it; I'm lucky enough to have a whole team or people around me and with me who I think compliment and add to that which is nice. (SPT R2 Edward)*

And:

*I've had the right people on the bus. (BSN R2 Lawrence)*

And:

*There is another one in terms of the knowledge management to reach out to all these knowledge experts and acquire this knowledge by a need to use and make sure they are eager to participate as well. (BSN R4 Peter)*

And:

*I've got a damn good Director of Finance now, that's the difference. (MUS R4 William)*

#### **7.2.4.2 Drawing on environmental support**

Knowledge experts are a particular kind of environmental resource which practical intelligence can draw upon.

This 'resourcefulness' is in evidence in the way one individual uses her business environment to enable her to transition from student to elite performer:

*I'm sneaking out every lunchtime with my fencing school to have lessons and one of the partners stopped me and said 'Claire, I notice you're going off for your fencing lessons and what are you trying to do?' And I said 'I'm trying to make the Olympics team' and we sort of sat down and discussed and he said 'What do you need?' I said 'I just need a bit of flexibility on time'. And again you know the head of the firm comes down, you know, later that week and he said 'We completely trust you; you've got to qualify'. (SPT R2 Claire)*

'Entrepreneurial' use of the environment is an indication of practical intelligence that enables an individual to make the transition from student to performer:

*There was a lot of opportunity and space to be entrepreneurial, to follow one's ideas, to put on concerts. (MUS R2 Robert)*

One individual decided to make a transition to a different academic institution for the precise purpose of discovering and learning cutting edge practices that he could apply back in his 'home' environment.

*It allowed me to look at activities that went on in a great American University – compare it with what I knew from my British training and my Australian career and so it was deliberately an exercise to say how much can you learn and how*

*can you start applying that to the real benefit of my employer. (MUS R3 Thomas)*

This is an example of a conscious application of practical intelligence at a ‘meta-level’ to plan for and acquire the skills necessary to make transitions.

#### **7.2.4.3 Applying learning and education**

Education and learning can be consciously mobilised by practical intelligence to draw upon knowledge which is then brought back to the workplace for pragmatic testing and application.

Some educational applications are more immediate and involve short-term training that is work targeted:

*So that when I got into the school, everything I learned I was able to apply the next day and I think one of my natural strengths is to recognise opportunities all the time. I see 2 points and I can connect them, where maybe others have a bigger struggle (BSN R3 Peter)*

One individual consciously trained for the next career position having failed initially to land a similar job:

*After that my husband said ‘Right next time a job comes up, we’re going to make sure that’ – he’s a businessman – ‘We’ll make sure you get yourself practised at interview techniques’. So I had a very good private student who was a head of personnel for {business}, HR person, and she put me through the ropes for the next time round because {person} only lasted two years in that job and gave up, so that job was advertised again. (MUS R1 Yvonne)*

Practical intelligence enables an individual to choose the most expeditious educational process to acquire skills and knowledge for their transition:

*I ticked the place where they were known to get really good exam results, where they basically spoon fed you for the exam, so again there were lots of different*



*courses but you know it was like 'How am I going to get through this exam in a year?' (SPT R2 Claire)*

And:

*After each week, I'd come in and try stuff out in the office and see how it worked and of course sometimes it went cataclysmically wrong and it was fine and sometimes it was a serious improvement on what I'd done before. (BSN R7 John)*

Sometimes higher levels of education can be the position into which one is transitioning and work applications are brought into the study:

*I did the theory and I did the practice and matched them together and wrote the programmes and all that stuff, and so in that sense it was a good way to do a PhD. (BSN R1 Michael)*

And:

*But at the same time, I was doing my MBA dissertation and so I decided to do my dissertation in trading opportunities. I'd just moved into my next job which was business development or origination we would now call it, so basically trying to do trading business. So trying to deal with Eastern Europe as that was opening up and North Africa – that was kinda my patch. So then for my MBA dissertation I did trading opportunities within Turkey. (BSN R3 John)*

One individual used the reverse process, taking experience and translating it into academic qualifications in preparation for subsequent transitions:

*And while I was there I suddenly got wind of the fact that the M.MUS regulations were going to change and it was going to get more difficult to get one and I had put all my life work into one which was quite a lot by that time into disks and books and got it done and I got a DMus while I was a member of London University and that turned out to be very useful. (MUS R1 William)*

#### 7.2.4.4 Summary of resource management

Practical intelligence during transitions is evident in the way that participants in the study mobilised resources (Table 7.7).

*Table 7.7 Practical intelligence and resource management during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Knowledge expertise	3	8	2.57	7	17	2.43	5	10	2	15	35	2.33
Environment Support	7	14	2	7	14	2	5	10	2	19	38	2
Education and training	3	3	1	7	15	2.14	4	18	4.5	14	36	2.57
Total	7	25	3.57	8	44	5.5	8	38	4.75	23	107	4.65

23 out of the 24 participants mentioned using practical intelligence for an average of 4.65 times per person to mobilise resources external to themselves. These uses of the environment in one form or another are indicative of Scribner's (1984) "social, symbolic and material resources" and what Goodnow (1986) calls the 'facilitating conditions' of practical intelligence. While taking part in an educational programme to raise one's own knowledge base is different than calling on external resources to deploy their knowledge for you, they are not so very different in terms of practical intelligence. In the educational case, an individual decides to internalise knowledge from the environment. In the use of knowledge experts, individuals decide to leave the knowledge stored in the environment in the form of knowledge experts just as one might use a computer server or 'cloud storage'.

Educational training e.g., short term leadership courses to enhance leadership capabilities, MA's to enhance expert knowledge in international economic trends or PhD's in engineering design or baroque instruments, was pursued in direct response to transitions in which the individual needed to acquire new knowledge

or expertise. But they could also be developed in anticipation of a career transition, enabling the individual to become competent before undertaking the next phase of their career. However, it is noteworthy that amongst musicians education was an underutilised transition resource: only 3 musicians mentioned it on 1 occasion each. This may be due to the ‘culture’ of music academies and conservatoires which doesn’t often foster continuing education in leadership and management skills: this is something that is more often acquired through experience and apprenticeship in ways not dissimilar to more traditional models of musical education. Surprisingly, only 50% of the business participants mentioned education in conjunction with transitions even though training in the business community can be “up to the gills” to quote one participant.

Most formal education such as post graduate research, MA’s and PhDs was undertaken at earlier stages (other than studentship) in a career and contributed to transitions in management positions e.g., to heading up music facility, leading an engineering team or heading up a performance programme in sport. After individuals reached higher-level management positions, it was more common for them to simply draw upon knowledge experts to complement lack of knowledge e.g., hiring the services of a financial officer, a psychologist/consultant, an exercise physiologist, etc. Knowing how to choose between these alternative routes to the acquisition of expert knowledge may also be indicative of practical intelligence i.e., knowing when you need to know something yourself and when you need to utilise external resources to complement your own knowledge.

## 7.3 Concluding discussion

Table 7.8 summarises the main statements from the participants in the study concerning practical intelligence.

*Table 7.8 Practical intelligence during transition: Conclusions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
General Practical Intelligence	7	20	3.14	8	23	3.13	8	29	4.38	23	72	3.13
Problem Formulation	2	2	1	6	13	2.17	4	12	3	12	27	2.25
Problem resolution	3	7	2.33	3	3	1	7	16	2.29	13	26	2
Administrative Intelligence	7	18	2.57	5	20	4	4	9	2.25	21	47	2.24
Knowledge expertise	3	8	2.57	7	17	2.43	5	10	2	15	35	2.33
Environment Support	7	14	2	7	14	2	5	10	2	19	38	2
Education and training	3	3	1	7	15	2.14	4	18	4.5	14	36	2.57
Total	8	74	9.25	8	107	13.34	8	110	13.75	24	281	11.71

Based upon the data, generally, it is possible to conclude that practical intelligence supports transitions. All 24 participants mentioned using practical intelligence during transitions, with an average of nearly 11.71 references per individual. The variations in the types of practical intelligence used have

implications for the both the differences amongst the domains and the nature of their transitions. Where problem solving and solution resolution were used they seemed to operate in the early part of a transition as an inquiry or experiment which was subsequently tested and then implemented into structures and strategies. This supports Ibarra's (2004) "testing and learning" process during transitions. For business people practical intelligence during transitions can take the form of initiating processes and procedures during the early stages of a transition following up by "crafting strategies" (Mintzberg, 1985) and steering a team or project into implementing them.

But there were significantly fewer illustrations of analytical processes used in practical intelligence during transitions than would have been predicted by some intelligence theorist, most notably Sternberg (1985, 1988, 1996b), and some career transition theorists (Bridge, 1991; Elsner & Farrands, 2006). Yet this is consistent with the discussion in Chapter 5 of the importance of the operation of inferential intelligence during transitions in which inductive, inferential and analogy mechanisms (e.g., Guilford, 1967; Sternberg, 1977; Carroll, 1993) were found to be more important for generalising experience during transitions than factors associated with planning and problem solving. Nor is it likely that analytical thinking might fall under tacit knowledge and simply not be mentioned in the interviews. Business people with regular explicit training in analytical problem solving techniques didn't mention analytical thinking as contributing significantly to their transition expertise. One can conclude that, while problem formulation and solution resolution may play a supporting role, they are not the main practical intelligence functions which participants use to manage their transitions.

Musicians and sports people regularly mentioned using the administrative kinds of practical intelligence that they developed in their performance stages to support their transitions into managing a team or to heading up a faculty. This practical intelligence had become almost tacit during their coaching/professorship career stages only to re-emerge and be generalised consciously at a higher level of complexity when it was needed during their transition to managing a larger operation. Business people seemed to develop this type of practical intelligence through incremental exposure to and acquisition of its associated skills, though it was more often mentioned in association with performing in a position rather than managing a transition.

While strategic planning might not be classified as practical intelligence, some of the divergent/convergent cognitive processes used to solve smaller problems were also used to generate strategic plans and then implement them. A pattern emerged in the data which suggested that practical intelligence, like expert knowledge and processes, can be generalised during transitions through induction from performance specific applications to increasingly broader management and strategic planning applications. At the very least, maintaining a practical intelligence 'mind set' when determining plans for longer-term strategies is important for the ultimate success of those strategies. In transitions to more senior careers career positions some sort of combination of visioning and pragmatics seemed to be in evidence in all three domains.

Career transitions involve moving into new or unfamiliar contexts that require individuals to apply their previous knowledge and expertise in new ways. This includes how they generalise their ability to use real world environmental

resources. The data clearly indicates that during transitions individuals do “adapt to and shape” their environment, they do “squeeze it and move it” around, they do draw upon “facilitating conditions”, they do identify “least-effort” solutions, they do “fit means” to situations. Where additional expert knowledge is required this can involve internalising knowledge through training or accessing it externally through knowledge experts. Because practical intelligence is concerned with the manipulation of the environment, it operates contextually (Sternberg, 1988) and is amenable to both ecological (Gibson, 1986; Neisser, 1976) and social cognitive (Cantor & Kihlstrom, 1987) explication.

Practical intelligence is a complex, composite structure encompassing a range of intelligence components, expert knowledge and learned abilities which are variously inherent within an individual and developed and refined through their repeated use in the environmental contexts. At the same time, practical intelligence requires good domain knowledge in order to operate effectively. It is a key enabler of the generalisation of most domain specific expert knowledge and processes to broader contexts during transitions. It is itself also readily generalised through inductive cognitive mechanisms from early career management skills to broader strategic applications during career transitions.

# Chapter 8. Transition Expertise Development Over the Career

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During the analysis of the data it became clear that transition expertise developed and evolved over the course of a career. These changes occurred in conjunction with a variety of external factors like changing characteristics of careers stages, different environments and new role requirements. They may also reflect emergent properties of intelligence and expertise over the life span in response to transitions. This chapter will first revisit some of the theories of career, expertise and intelligence to review how they address issues of lifetime development and specifically over the course of a career. It will then review the data to see how intelligence and expertise and their use were developed and adapted in response to the major career stage transitions. It will conclude with an overview of some of these major developmental patterns and how the different elements of transition expertise evolve over the course of the career cycle.

## **8.1 Self concept, expertise and intelligence over time**

### **8.1.1 Development of self concept over time**

#### **8.1.1.1 An evolving self concept**

A number of the career development theories discussed in Chapter 1 incorporate the idea of a *self concept* that develops over the course of a career. While these ideas go by various names such self identity, self concept, project of the self, working identity and life structure, I will use the term self concept as a general



title for these often similar conceptualisations. Erikson's (1959, 1985) epigenic cycle clearly involves an evolution of self identify over the course of the lifetime. Super's *self concept* model (1957, 1963) is predicated on the regular revisions of self concept over the course of a career. Torbert's (2004) leadership development framework can be viewed as an evolving model of leadership abilities and issues. Ibarra's (2004) working identity theory addresses identity change through the choosing from multiple selves over time. Gardner's (1983) project of the self is an evolving and developing process. Levinson's life stage model incorporates a life structure concept that evolves over one's career in which "the primary tasks of every transition period are to question and reappraise the existing structure, to explore various possibilities for change in self and world, and to move toward commitment to the crucial choices that form the basis for a new life structure in the ensuing stable period" (Levinson, et.al., 1978, p. 49).

Models of an emerging and evolving sense of self have long been supported by the *symbolic interactionism* school (e.g., Mead, 1964; Blumer 1969) in which the self is defined as a process rather than an object and the study of self is merged with the study of social interaction: humans create the worlds in which they live, meaning is arrived at within a social context and the self is developed through a reflexive and recursive process of interpretations and ascribed meanings based upon an individual's experience (Denzin, 1992).

Super's model is illustrative of how identity might evolve as individuals progress through their career stages, revising their self concept based upon their success in making transitions at the major stages of their career (See Table 8.1).

1. Growth stage	to approximately age 14	in which self concept develops through identification processes with family and school
2. Exploratory stage	up to about age 25	where through reality testing an individual keeps the appropriate and modifies the non-appropriate elements of self concept
3. Establishment stage	to about age 45	in which, having found the right field and career direction, the individual fashions a permanent place in it and a relatively stable self concept
4. Maintenance stage	up to retirement	in which an individual holds onto what they have achieved with fewer changes to self concept
5. Decline stage	from retirement to death	in which an individual balances work and leisure and seeks final self realisation

Hall (1976) maintained that successful transitions enhance self esteem and produce a more competent self identity as individuals progress repeatedly through a virtuous circle from psychological success to increased self esteem to more competent identity (Figure 8.1).

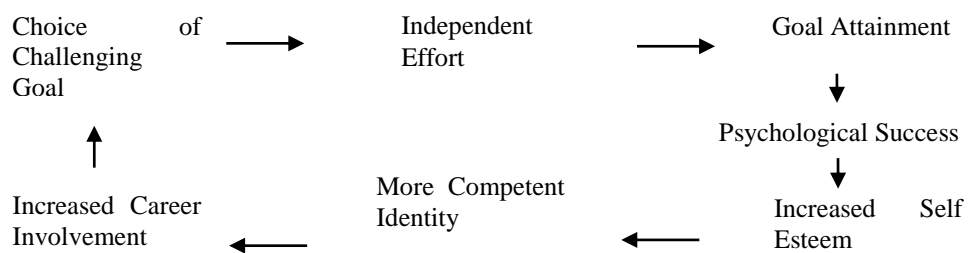


Figure 8.1 The transition process and self esteem from Hall, 1976, p. 31

One could conclude that self concept, life structure and working identity do evolve over time and that they will shape and be shaped during career transitions.

### 8.1.1.2 Constraints on evolving self concept and their mitigation

It is also the case that the underdevelopment of self awareness and cognitive flexibility can lead to a narrow or overly constrained identity which may make transitioning difficult. *Identity foreclosure* has been described as a state in which individuals arrive at an identity and commitments to roles without engaging in

substantive exploration of their identity or the possibility of different self concepts (Petitpas, 1978). Linville (1985, 1987) describes how individuals who organise their information about themselves in ways that are non-diversified are more likely to suffer from dysphoria, depression or disease when faced with stressful situations. Limited self-schemata or social-cognitive self images have been shown to contribute to depression and inefficacy during transitions (Dance & Kuiper, 1987; Oatley & Bolton, 1985). Studies of collegiate athletes (Werthner & Orlick, 1986; Kleiber et al., 1987) show that individuals who have been developing parallel identities through coursework, social activities and other fields of study during their academic career are more successful in making career transitions after their university sporting career than those students whose primary focus and identity has been on sport to the exclusion of other activities. (For a full review of theories associated with transitions in sporting careers, see Lavalley & Wylleman, 2000).

*Coping strategies* describe how individuals deal with the situations over which they have relatively little control. Coping strategies for dealing with changing environments and stages of career (Taylor & Olgilvie, 1994) have been seen to be effective when they include adaptability. However, Lazarus and Folkman (1984) have demonstrated that individuals with more limited identities have more difficulties in coping with the unknown. Defensiveness and lack of adaptation can lead to reification of ego structure and identity (Block & Block, 1980) and can contribute to difficulty in adapting to changing circumstances that arise during career transitions in the same way that cognitive inflexibility might contribute to the lack of generalisability of expertise. In contrast, Super's (1980) self concept theory includes career adaptability which is the capacity to deal with

changing work and life conditions. Ibarra (2004) emphasises the importance of trial activities, relationships and narratives while “trying out” a new or different identity. Coping strategies have been mentioned in a number of transition models (Bridges, 1991; Elsner & Farrands, 2006) as one of the mechanisms for dealing with uncertainty and anxiety during transitions. It seems likely that coping strategies may be helpful during transitions when they are used to mitigate abrupt surprise or shock rather than if they are used as the main, and largely defensive, reactions to the unknown or unpredicted.

## **8.1.2 Expertise and intelligence over time**

### **8.1.2.1 Expertise over time**

Considerable research has been dedicated to the acquisition and use of expertise as discussed in Chapter 4. But there is also considerable research dedicated to the study of how expert performance is maintained over time. Expert performance can be maintained well into adulthood and late adulthood through a range of cognitive mechanisms: expert musicians retain high levels of performance well into their 50's and 60's through continuing to selectively train existing skills (Krampe & Ericsson, 1996); chess players continue to perform at championship levels into their middle age through engaging in less extensive searches than younger players and through move selection based on more refined knowledge-based processes than the more rapid but ‘wasteful’ search processes of younger players (Charness, 1981); typists compensate for age related declines through longer eye-hand spans (Salthouse 1991); master athletes tend to selectively sustain those proportions of training and routines that they utilised more

effectively as younger players to achieve elite performance levels (Starkes, Weir & Young, 2003; Starkes, Cullen & MacMahon, 2004).

Some of these kinds of mechanisms that can extend the performing life of experts can be relatively 'free' from domain-specific bindings even when developed to enhance domain expertise. They might: (a) incorporate general meta-cognitive processes not tied to the original processes for acquisition of expertise (Flavell, 1979; Sternberg, 1985); (b) include discrimination nets or retrieval structures which have become 'broader based' than the domain in which they were originally applied (Gobet, 1998); (c) be more associated with the overall self-management rather than skill or content acquisition and as such avoid domain specificity (Sternberg, 1996); and (d) operate with higher level cognitive processes not tied to sensory input or content (Fodor, 1983; Gardner, 1983). These and other processes and structures would not only contribute to expert performance but may operate as elements of transition expertise itself.

#### **8.1.2.2 Intelligence over time**

Crystallised intelligence (*gc*) can continue to develop as one increases in age while fluid intelligence's (*gf*) functions begin to decline as early as the 30's (Dixon & Baltes, 1986; Baltes, 1987; Baltes & Staudinger, 2000). For example, performance on traditional problem solving tasks measured by cognitively based tests may begin to decline in terms of both accuracy and speed whereas performance on practical problems solving tasks tends to increase to peaks around 40-50 years and then only begin to decline gradually around age 70 (Berg & Klaczynski, 1996). When comparing extensive research in the area of cognitive development over time, Baltes and Staudinger (2000) concluded that,

while the *cognitive mechanics* that are associated with normal tests of academic intelligence do show a gradual decline starting in early adulthood, *cognitive pragmatics* do not show such signs of deterioration. Practical intelligence theories, such as those of Scribner (1986) and Goodnow (1986), incorporate many of these cognitive pragmatics.

Studies in *lifespan learning* suggest that personal intelligences continue to develop over time or at least are more operative as life progresses. Older adults are more likely to consider the social and interpersonal aspects of a problem when defining the problem itself (Laipple, 1992). They will be more interpersonally sensitive to the actual nature of the problem compared to young adults who will more likely use a logical problem solving orientation (Sinnott, 1989). Middle-aged adults tend to set more interpersonal and affective goals than pre-adolescents (Strough, Berg & Sansone, 1996). Labouvie-Vief (1990) proposed that, over time, metacognitive abilities are developed that help an individual to integrate their cognitive capacities and emotional experiences into interpersonal intelligences so that one has a more synthetic understanding of oneself, one's experience in the world and one's relationship with others. This neo-Piagetian approach proposes that a fifth *post-formal operational stage* emerges by middle adulthood in which the formal-operational reasoning associated with late adolescence is transformed or augmented by more sophisticated – or at least more life-experience based – mental structures that are more relativistic in their logic/reasoning. Such adult cognitive processes allow the individual to synthesise and incorporate personal, emotional and non-rational experience into their mental structures (Blanchard-Fields, 1994). Howard Gardner (1983) states that ultimately the key role of the personal intelligences is

“the project of the self.” This project is not a static thing; the self grows and evolves throughout a career.

### **8.1.3 Wisdom over time**

The developmental process of transition expertise may mirror that of wisdom. Wisdom is Gardner’s fourth non-domain specific higher level cognitive ability which he calls a “general synthesizing power” (Gardner, 1983, p. 295) that is not parochial or domain specific: it transcends intelligence, domain and expert boundaries. Wisdom develops over time. It is not implicit in the potential of a child and, like other higher level abilities of Gardner such as common sense or creativity, it is a composite ability. Wisdom has been studied extensively. It is viewed as a type of life span learning expertise with specific knowledge and processes, acquisition and retrieval techniques, and representational systems that are developed over time (Kunzmann & Baltes, 2005). Studies of life cycles (Erikson, 1985; Levinson et al., 1978; Levinson & Levinson, 1996) and work and career cycles (Dawis & Lofquist, 1984; Super, 1980) as discussed in the introductory chapter have incorporated the development of wisdom in their models. Robert Sternberg also developed a *Wisdom, Intelligence, and Creativity Synthesised (WICS)* model (Sternberg, 2003, 2005) that incorporates elements of his triarchic intelligence (Sternberg, 1985), successful intelligence (Sternberg, 1997) and creativity (Sternberg & Lubart, 1996, 1999).

Baltes and Staudinger have defined wisdom as “an expert system dealing with the meaning and conduct of life” (Staudinger & Baltes, 1994, p.144). They maintain that wisdom cannot be explained solely by the emergence of a constellation of personality dispositions (e.g., Erikson, 1959) in later life nor by a

neo-Piagetian developmental conceptualisations of post-formal thought (e.g., Labouvie-Vief, 1990). Their *Berlin wisdom paradigm* (Baltes & Staudinger, 2000; Baltes, 2004) identifies two general wisdom criteria: 1) *rich factual (declarative) knowledge* which concerns “interpersonal relations, social norms, critical events in life and their possible constellations, as well as knowledge about the coordination of the well-being of oneself and that of others” and 2) *rich procedural knowledge* which involves “strategies and heuristics for dealing with the meaning and conduct of life” (Baltes & Staudinger, 2000, p. 125). These are similar to the knowledge and process distinction in most expertise theories. Baltes and colleagues further identified three meta-heuristics that are derived substantively from life-span psychology (Alexander & Langer, 1990; Baltes, 1997): (a) lifespan contextualisation that includes contextual, cultural and temporal perspectives; (b) relativism of values and priorities that includes tolerance for differences; and (c) recognition and management of uncertainty that acknowledges the limitations of human processing ability and the inability to know fully the future in advance (Staudinger & Baltes, 1996; Baltes & Staudinger, 2000). They also found that there was no significant age gradient in measures of wisdom in adulthood from 25 to 75 years of age, disconfirming the idea that higher-level performance in wisdom related tasks only emerges from midlife onwards (Lindenberger & Baltes, 1997; Baltes & Staudinger, 2000).

#### **8.1.4 The Career Cycle over time revisited**

Though the original focus of this dissertation did not include a developmental conceptualisation of transition expertise, several patterns emerged in both the theories and data which required that this issue be addressed if the operation of



transition expertise were to be understood properly. Table 8.2 revisits the major career cycle models first presented in Chapter 1 and includes for comparison – eponymously and immodestly – the *Connolly Career Transition Cycle*.

Table 8.2 Composite career stage and transition cycle

<b>Connolly Career Transition Cycle</b>	<b>Levinson Seasons of a Man's Life</b>	<b>Torbert Leadership Development Framework</b>	<b>Schein Career Cycle</b>	<b>Super Self-Concept Adjustment</b>
Stage 1: Studentship Age 5-24	Pre-adulthood Age 8-22		Growth, fantasy exploration Age 0-21	Growth Stage
First Stage Transition: Student to professional	Early adult transition Age 17-22		Entry into world of work Age 16-25	
Stage 2: Professionalism Age 16-30	Entry Life Structure for early adulthood Age 22-28	Action Logic 1: Opportunist	Basic training Age 16-25	Exploratory Stage
Second Stage Transition: Professional to manager/coach	Age 30 transition Age 28-33	Action Logic 2: Diplomat	Full Membership in early career Age 17-30	
Stage 3: Manager/Coach Age 26-35	Culminating Life structure for early adulthood Age 33-40	Action Logic 3: Expert	Full membership, mid-career Age 25 +	
Third Stage Transition: Manager coach to Department Head	Mid life transition Age 40-45		Mid Career Crisis Age 35-45	
Stage 4: Head of Department Age 35-45	Entry Life structure for middle adulthood Age 45-50	Action Logic 4: Achiever	Late career in leadership or non-leadership role Age 40 - retirement	Maintenance Stage
Fourth Stage Transition: Department Head to Divisional leader	Age 50 Transition Age 50-55			
Stage 5: Divisional Lead Age 45-55	Culminating life structure for middle adulthood Age 55-60	Action Logic 5: Individualist	Decline and disengagement Age 40 until retirement	Decline Stage
Fifth Stage Transition: Divisional Leader to Organisational Leader		Action Logic 6: Strategist		
Stage 6: Organisation Leader Age 50-70		Late adult Transition Age 60-65		
	Late adulthood Age 65		Retirement	

*Super's self concept* model (1957, 1963) is an early development of the idea that identity evolves over the course of a career, and as such was quite pioneering. However, it is less useful for the purposes of this project because the participants in this study were selected because they continued to develop and evolve late into their career rather than settle into a mid-career stability that leads to maintenance and retirement as proposed in Super's model. It is also perhaps less useful when discussing the evolution of identity and transition expertise over the course of a career as it happens in contemporary 21st century society.

*Levinson's life eras* (1986) deal with broader life issues, but include both steady-state stages and transition stages. While there are significant parallels between his transitions and those that emerged in this study, a major difference is that Levinson's transition stages reflect general life/work changes that take place over a period of years whereas the model developed in this study attempts to identify more specific transition events in careers that will reflect the operation of transition expertise. Another difference is that Levinson doesn't really describe in any depth the later transitions in his model that would correspond to transitions to Career Stages 5 Divisional Leader and 6 Organisational Leader in the Connolly model, though these are important career stages and transitions amongst the participants in the study. Also, some participants in this study reached stages in Levinson's model earlier than he would have predicted. Again this discrepancy may reflect general changes in career patterns that have emerged of the last 30 to 40 years since the publication of Levinson's work.

*Schein's career stages* (1978) also have correspondences with the development stages that emerged amongst the participants in this study. But, like Levinson, Schein offers little explanations for career stages after the age of 40 even though these later stages are crucial for understanding the whole adult career cycle and the nature of transition expertise. While some of the issues and tasks associated with Schein's career stages such as "accepting higher levels of responsibility" or "working through one's relationship with mentors and preparing to become a mentor" are relevant, their generalness makes them less useful for understanding transition expertise. However, Schein's differentiation of *inclusion* transitions which involve moving closer to the centre of an operation to understand and deal with strategic issues and *functional* transitions which involve moving to areas outside of an individual's primary domain expertise to acquire wider organisational knowledge, have helped explain career moves that take place at Career Stages four and five amongst participants in the study. These 'lateral' transitions can be as demanding and radical as hierarchical transitions.

*Torbert's LDF model* (2004) also has correspondences with the Connolly Career Transition Cycle presented above. There are clear parallels, for example, between the Career Stage four Head of Department and Torbert's Diplomat action-logic and between the Career Stage six Organisational Leader and Torbert's Strategist and Alchemist action-logics. In addition, Torbert's Expert action-logic refers to a combination of primary domain expertise that has been generalised and the development of secondary expertise in management which would be characteristic of transitions to Career Stage three Manager/Coach/Professor or Career Stage four Head of Department.

## **8.2 Transition expertise over time**

While the foregoing summaries do not do justice to the depth of research in lifespan learning in the fields of expertise and intelligence, they further confirm the generally agreed propositions across many fields of study that individuals develop a range of cognitive processes and mechanisms for maintaining and enhancing performance levels over the course of their lifetime even while some functions may be declining in their efficacy. If expertise and intelligence do evolve and adapt over time – whether initiated by an individual or in response to changing environments or both – then transition expertise could and would also develop over time. Therefore, while many illustrations from the data were given in the previous chapters on the operation of the various components of transition expertise, it is also possible to summarise the different ways in which transition expertise operates at different transition stages.

### **8.2.0 Before transitions: Career Stage 1 Studentship**

Before any of the individuals in this study embarked upon a career or made career transitions, they first engaged in the study and acquisition of the expert skills that they would use in their subsequent professional career. Sports and music students engaged in intensive training early in their lives which resulted in attainment of very high levels of expertise by the time they had finished their ‘studentship’ at ages as early as 16-18. Business people remained professionally more open and uncommitted during their studentship, some still not knowing their eventual career field and area of expertise when they left university at ages 22-24 or even after postgraduate studies. As discussed in Chapter 4, expertise was often developed in more than one domain during this period by most

participants in all the fields under study. Cognitive flexibility was also developed during this period

## **8.2.1 Stage Transition One**

### **8.2.1.1 The new career stage: Performer**

In this first career stage all of the participants begin their professional careers, develop domain expertise further and also manage their professional life. Musicians usually organise their own career which required self-discipline and solitary endeavour. Sports people begin to perform and compete at quite young ages and continued to follow a highly structured regime combining personal commitment to training with an external discipline imposed by their sporting institution. They tend to have less autonomy than musicians. Business people move into organisations where they learn to meet performance goals in a structured environment. Their socialisation process into their expert domain culture begins at this stage, later than that of musicians and sports people.

### **8.2.1.2 The transition**

Van Mannen (1973, 1977) described this transition as a “breaking in phenomenon.” Schein (1978) described it as “negotiating a viable psychological contract” with tasks like “learning the ropes” and getting along.” Becker and Strauss (1956) talked about a portion of a person’s life space being blank before they join an organisation for the first time. It is probably one of the most highly studied transitions because of the access by researchers to university students who are making such professional transitions.

### 8.2.1.3 The transition expertise

In table 8.3 there are some representative statements made by the participants that are indicative of different aspects of transition expertise in this transition.

Table 8.3 Some statements indicative of transition expertise from studentship to professional

<b>Cognitive flexibility</b>
<ul style="list-style-type: none"><li>- So I went out there and I was prepared to <u>do anything, absolutely anything.</u></li><li>- This was a way of <u>broadening out.</u></li><li>- So that <u>entrepreneurial streak</u> was always there.</li><li>- I think that took me <u>away from being this narrow thing that I started with.</u></li></ul>
<b>Domain expertise generalizability</b>
<ul style="list-style-type: none"><li>- <u>I used the work that was being done</u> and researched there as part of my PhD.</li><li>- A perfect <u>amalgamation of three tendrils</u> that were hanging; one from each of those fields.</li></ul>
<b>Induction, inference and analogical processes</b>
<ul style="list-style-type: none"><li>- <u>I can abstract things</u></li><li>- <u>There must be generic dynamics</u></li><li>- I used the <u>same skills</u> and [...] it was very magic for these people.</li></ul>
<b>Intrapersonal self awareness</b>
<ul style="list-style-type: none"><li>- <u>You think, 'this is too stupid' it cannot fulfil me.</u></li><li>- <u>It did take quite a lot of self-belief</u></li><li>- <u>I knew what I had was valuable,</u></li><li>- <u>So my view was I suppose a very conscious one</u></li><li>- <u>Do I really want to do this? Do I not want to do?</u></li><li>- It was <u>quite conscious to find the things you do least well and remedy them</u></li><li>- <u>I didn't find it stressful. I enjoyed the adrenalin</u></li></ul>
<b>Intrapersonal self regulation</b>
<ul style="list-style-type: none"><li>- But that's <u>time management.</u></li><li>- It had just come to me innately to <u>rehearse all possibilities,</u></li><li>- <u>I had to sit down with a points scheme that July and work out.</u></li><li>- <u>I've also been very good at working out what it is I have to do to make the teams.</u></li><li>- I was really <u>managing myself.</u></li></ul>
<b>Interpersonal intelligence</b>
<ul style="list-style-type: none"><li>- I was <u>learning leadership skills.</u></li><li>- <u>Got lots of people involved in fencing, we had a lot of fun.</u></li><li>- This is starting to get interesting because <u>this was real customers.</u></li><li>- I've <u>always had an ability to put people together.</u></li></ul>
<b>Practical intelligence</b>
<ul style="list-style-type: none"><li>- I had to <u>understand the context,</u> what people are doing, why they are doing stuff and how can I help them to provide the solution.</li><li>- I just did it on my own. <u>I just solved them.</u></li><li>- You learn to set and <u>you read the rules and work it out in finite detail, plot the path and then do it.</u></li><li>- <u>I experimented,</u> right. So basically when I saw the situation I analysed it quickly, what goes wrong here right?</li></ul>

This transition involves little generalisation from primary domain expertise which is not surprising in that the transition is primarily more about applying learned expertise in performance contexts that require expert knowledge and processes. It usually involves a further development of the self management skills which might have been initiated during studentship. Cognitive flexibility is

seen to operate in the individual's willingness to do whatever is required of them in order to perform. Interestingly, analogy operates through bringing experience acquired in different or parallel domains to bear on performing in the primary domain. Intrapersonal intelligence seems more important than interpersonal intelligence as individuals seek to understand themselves better and learn from the feedback they are receiving. Practical intelligence operates pragmatically to solve problems and take advantage of opportunities. In both this transition and the following one, it is too early to look for life-span or wisdom related development of transition expertise. Rather, we see the continued development of all the aspects of transition expertise though still mostly in their application to continuing high performance. The operation of cognitive generalisability and inferential mechanisms broaden the application of both domain and transition expertise – not from any need to compensate for age related decline or otherwise – but simply because their application of expertise is continuing to develop and expand.

## **8.2.2 Stage Transition Two**

### **8.2.2.1 The new career stage: Manager/Coach/Professor**

The transition to this stage takes place at varying ages and is characterised by a move into managing and directing the performance of others, running operations within an organisation, and becoming a promulgator of institutional norms. The ability to generalise previous performance-linked knowledge and processes to coaching and managing people is central to this stage. At the same time this stage requires the development of a new range of skills even while the individual might continue to perform as a domain expert. The management/coaching

functions associated with this career stage assume different levels of priorities amongst the three domains. It becomes co-equal with performing in the case of musicians whose performing career might actually be peaking at this stage. It replaces the performing career of sports people, sometimes over a few years, sometimes almost overnight e.g., at the end of an Olympics or due to an injury. Business people move away from hands on performance and a promotion might change their function abruptly from a performing/delivery role to a managing/organising role.

### **8.2.2.2 The transition**

This transition requires that individuals apply their primary domain expertise beyond personal performance e.g., in their capacity to teach or coach others in the acquisition of domain expertise or to implement a course of action based upon situational knowledge they have acquired. Having learned how to perform, they begin to exteriorise that knowledge for others; having managed themselves, they begin to provide structure and organisation in which others can manage themselves; having developed the intrapersonal knowledge necessary to become expert, they begin to develop interpersonal skills to convey that knowledge to others.

### **8.2.2.3 The transition expertise**

In table 8.4 there are some representative statements made by the participants that are indicative of different aspects of transition expertise in this transition.



Table 8.4 Some statements indicative of transition expertise from Professional to Coach/Manager/Professor

<b>Cognitive Flexibility</b>
<ul style="list-style-type: none"> <li>- A very good job as regards having to <u>be flexible</u>, the difficulties that you face, <u>working around</u> them.</li> <li>- <u>I adapted</u></li> <li>- It's <u>not pre-planned</u> so you had to think fast.</li> <li>- I think one of my natural strengths is to <u>recognise opportunities</u> all the time.</li> <li>- That means you've got sort of <u>disestablished the whole skill</u> set into various elements.</li> </ul>
<b>Domain expertise generalisability</b>
<ul style="list-style-type: none"> <li>- They <u>took me on board there on the basis of my, if you like, practitioner's experience</u>.</li> <li>- I knew that the <u>experiences that I had as a player</u>, as an outreach projects manager meant that I could do the job.</li> <li>- It's all very well having the skill but, you know, <u>it's actually being able to transfer it</u>.</li> <li>- And also <u>broadening my musical horizons</u></li> </ul>
<b>Inferential, inductive and analogical intelligence</b>
<ul style="list-style-type: none"> <li>- <u>Music notation. I developed sport notation</u> in the '80's.</li> <li>- I had <u>never been coached in sailing</u>, but I'd been coached in rugby.</li> <li>- Taking from one field and applying to another.</li> </ul>
<b>Intrapersonal self awareness</b>
<ul style="list-style-type: none"> <li>- <u>I remember thinking 'No, actually, I think I could learn a lot doing that</u>.</li> <li>- <u>I found this leadership stuff fascinating and then I kinda wanted to be different</u>.</li> <li>- <u>When the 360 feedback started to come it was very awakening for me</u></li> <li>- <u>I was never sort of terrified of failure</u></li> <li>- But it's <u>absolutely clear in my mind that what my passion was</u>,</li> <li>- I just remember thinking <u>'Right this is what I've wanted to do</u></li> <li>- <u>I try to search and look down inside: "Where does the motivation come from?"</u></li> </ul>
<b>Intrapersonal self regulation</b>
<ul style="list-style-type: none"> <li>- Yeah and that's <u>all about those milestones</u> – the sense that I'm growing – I'm getting there.</li> <li>- <u>A lot of goal setting milestone thinking is most effective</u> when you realise that ultimately it is just about ticking off the journey.</li> <li>- <u>I think that sense of being able to work progressively and logically</u></li> <li>- <u>I think a lot of it comes down to being organised</u></li> </ul>
<b>Interpersonal intelligence</b>
<ul style="list-style-type: none"> <li>- Eventually became the leader, <u>you realised just how important it was for you to be directing</u> what the section would do.</li> <li>- <u>Have to be seen to be able to communicate</u> and get on with people and do the things that get them on in life</li> <li>- And you were <u>able to mobilise people</u>.</li> <li>- For me to you know develop a coaching career at that stage – <u>to want to help the younger players a little bit more</u>.</li> <li>- The <u>interaction with the people was kinda more appealing</u></li> <li>- And actually <u>using your contacts, being able to thread them all together</u>.</li> <li>- I was <u>learning leadership skills</u> and think that's some of the common threads that I look back</li> </ul>
<b>Practical intelligence</b>
<ul style="list-style-type: none"> <li>- <u>Everything I learned I was able to apply</u> the other day.</li> <li>- There was <u>administration</u></li> <li>- So fundamentally you have to underpin any coaching with <u>good basis of organisation</u></li> <li>- <u>Becoming a jack-of-all-trades master of none</u>. The diversity of knowledge</li> <li>- <u>Situational Leadership</u> and the way you needed to be relative to the experience of the people you were leading.</li> <li>- I'd come in and <u>try stuff out in the office and see how it worked</u>.</li> <li>- And I just <u>applied what I learned in theory into practice</u>, because it was kind of obvious.</li> </ul>

In this transition individuals become more *conscious* in their use of cognitive flexibility to experiment and continuously try things out. They continue to use inference and analogy to generalise from other domains to their primary domain – if anything more often than previously – by drawing eclectically from previous experience. But the main focus is on generalising performing skills from primary domain expertise to showing others how to perform. Interpersonal intelligence develops rapidly in this context as individuals learn to understand and respond to the needs of those who they are coaching or managing. Self regulation can continue to contribute to performance though less directly. Practical intelligence generalises from personal organisation to organising others. Super's (1963) 'exploratory stage' involves "reality testing" which includes modifying "non-appropriate elements of self concept." It is possible to see this modification taking place as individuals generalise from performance to coaching and developing others. In this transition the self-reflexive nature of intrapersonal intelligence becomes much more conscious. Awareness of motivating factors becomes more explicit: the individual begins to search inside to identify what drives them and determines their career choices and direction. In some ways this transition parallels Levinson's 'age thirty' transition period (Levinson et al., 1974) in which individuals begin to question their early vision of their career and push out from their original life structure. This transition is the first transition that requires moving beyond primary domain identification.

## **8.2.3 Stage Transition Three**

### **8.2.3.1 The new career stage: Head of department**

In this career stage individuals assume major organisational roles in their field. The many aspects of running a department or functional area such as planning, resource utilisation and people development come under their purview. This stage transition almost uniformly requires a movement away from a hands-on operation to leading and managing colleagues who manage others. In the case of business there is almost no direct involvement in performance delivery i.e. engineers no longer designed, traders no longer traded. Most sports people move out of performing in their domain though some continued to compete in senior leagues. Musicians, however, continued to perform though they may have reached the peak of their career progression in their domain i.e. ensemble players were unlikely to launch solo careers and soloists who had not attained star status are unlikely to do so.

### **8.2.3.1 The transition**

Third stage transitions require significantly different applications of transition expertise because individuals often move into roles with fundamentally different requirements than the previous career stage. On a simple level the transition requires the rapid acquisition of new skills and knowledge to perform in the new role. Simple generalisations from performance expertise or from teaching, managing or coaching would be insufficient because this transition often requires an individual to move tangentially from their main expert knowledge base: a musician may move from a performance department into heading up an academic department; a sports person may move from coaching to running a

political pressure group; a business person may move out of running a centralised trading function into leading a small regional operation. They will need to become knowledgeable – if not expert – across a wider range of domains than their own e.g., a musician will have to develop mathematical skills to plan and budget or a business manager will have to develop interpersonal stakeholder management skills. Transitions at this stage may also require that individuals create a ‘culture’ of expertise and expert systems for the people who work for or with them.

### 8.2.3.3 The transition expertise

In table 8.5 there are some representative statements made by the participants that are indicative of different aspects of transition expertise in this transition.

Table 8.5 Some statements indicative of transitions from Coach/Manager/Professor to Department Head

Cognitive flexibility
<ul style="list-style-type: none"> <li>- <u>Trying some different ways</u></li> <li>- <u>Some of the things</u> I realised I <u>may have to give up in order to achieve</u> what I want,</li> <li>- If there is something in the way I like to <u>find my way around it</u>.</li> <li>- <u>Not fighting battles that you can't</u></li> <li>- The ability to be <u>relatively quick on the uptake</u>.</li> <li>- <u>Whatever it is, there'll be a solution</u>.</li> <li>- <u>The challenge was adapting and doing a job that was totally unfamiliar very quickly</u></li> </ul>
Domain expertise generalizability
<ul style="list-style-type: none"> <li>- So I was <u>able to bridge</u> and I knew how these guys were thinking.</li> <li>- <u>A parallel that ran with my academy growing and my playing growing</u>.</li> <li>- <u>You learn from managing traders is that you get great confidence that any people management issue you [encounter] is easy</u>.</li> <li>- <u>Like teaching really, I find organising departments the same kind of skill that you need</u>.</li> <li>- <u>Developed physical and then cultural capital and I converted it into professional capital</u>.</li> <li>- <u>Wrote stuff that could be used in management which is now being used in the schools</u>.</li> <li>- <u>And it was really on the back of that that it gave me the ability to move into a whole sort of different area of the music industry</u></li> </ul>
Inferential, inductive and analogical intelligence
<ul style="list-style-type: none"> <li>- You'd hear somebody else was doing this and <u>you'd think oh bloody hell that might work for us as well</u>.</li> <li>- <u>So that was ten years of operations experience, into running a group of accountants in finance</u>.</li> <li>- I wasn't doing the technology work but <u>'The architecture should look like this.'</u></li> <li>- <u>Benchmarking manufacturing processes</u> in world class manufacturing companies</li> <li>- I'd <u>brought those two interests together</u>.</li> <li>- <u>I realised quite quickly on – a bit like the swimming – 'I have a natural feel for this.'</u></li> <li>- 'We don't do NIH here, we do the SBID: <u>'You swipe the best ideas and do it</u>.</li> </ul>
Intrapersonal self awareness
<ul style="list-style-type: none"> <li>- And so <u>there were various phases of self-recognition</u></li> </ul>

- It's funny; I never had any doubts that I could do this job.
- A sense of what's appropriate to say and what's not appropriate to say
- 'Right I'm literally going to be in effect master of my destiny here.'
- Where I failed in not dissimilar situations is that I've not consciously built in and then protected – very disciplined fashioned – what I think I've now called reflective time.
- Starting to think I've really got to find something that I'm happier in.
- Realising that you weren't an all-powerful machine that could carry on at higher revs.

#### Intrapersonal self regulation

- So when I failed it was a conscious failure; therefore you're in a position to learn.
- Constantly trying to learn from incrementally moving on,
- It's based on to do lists and long term goals and evaluation of those goals over time
- I made sure my diary had free space to plan the day, think about what's ahead,
- Putting some sign posts in to make sure that I don't waste time
- I know the way I work – if I don't put some milestones in the diary, then I'll drift,

#### Interpersonal intelligence

- See what they're wanting, what makes their career better
- Had to manage these two teams that had become one
- I solve problems by talking to people
- Actually you have to go and get on with people.
- A point where you don't know how to do it and you've got to manage people who do.
- Thinking a lot about where do I want to take these guys?
- Deal with people, how you use people, how you get them to work for you

#### Practical intelligence

- More process, more management processes.
- So I did enjoy all that very much and organising
- I wrote down 'This I can do... this I can't do'. Eventually I decided, yeah, I could do enough here to change things.
- I'm quite a practical person, so, I'm quite well organised.
- I've always been quite well organised but I became even more sharply organised
- So wide responsibilities for a number of small areas.
- I sorted out the politics, sorted out the structure
- 'Well, you know, what would that actually look like? What would the ingredients be?'
- Organisational skills. For the Board, you need to be incredibly well organised
- I have clearly become more political.

This transition requires that individuals break from their reliance on the expert knowledge and processes of their primary domain. They begin to give up their old self conception and old ways of performing in order to allow new kinds of expert skills to be developed and fitted into their growing constellation of abilities. The use of inference has changed. In the first transitions it involved the use of analogy to infer from earlier experience to current situations e.g., from childhood sporting performance to musical performance. In this transition it is now likely to take the form of using analogies to apply experience across departments or from their previous working situation to another. These analogies are also more inductive as they move from specific applications to more general

conceptualisations like “the architecture” of an organisation. Intrapersonal awareness increasingly becomes a steering and guiding process rather than a controlling and managing process and individuals now self-direct through making more time to reflect and consider. Interpersonally, individuals seem to spend more time listening and seeking feedback: this transition marks a move to thinking about people in the larger picture rather than simply managing teams and relationships. Problem solving strategies previously used for resolving conflict amongst teammates may need to be generalised to conflict resolution across departments. When individuals define a problem itself, they begin to consider what Laipple (1992) identified in older adults as the “social and interpersonal aspects of a problem.” Goals and objectives become more strategic. Individuals develop more sophisticated strategic and administrative abilities which utilise broader generalisations from previous problem solving, analysis, and communication strategies. One can clearly see elements of Torbert’s (2004) 'Individualist' action logic which “creates unique structures” and “resolves gaps between strategy and performance.” It is at this stage that one can also see elements of Levinson’s (Levinson et al., 1974) midlife transition in which individuals “modify life structures.” However, for Levinson this is more about family, values and social outlooks whereas, in terms of transition expertise, it involves moving beyond narrow self definitions. It is at this stage that most work adjustment models (e.g., Holland, 1973; Crites, 1976; Osipow, 1983) begin to fail as explicators of transition expertise because they are so focused on adjustment and congruence rather than change and development.

## **8.2.4 Transition Stage Four**

### **8.2.4.1 The new career stage: Divisional or strategic leader**

This transition requires a further shift in skills and cognitive processes away from day to day operational issues towards strategic planning, stakeholder management and operational oversight. Individuals often have to oversee a wide range of operations with which they may have had no previous performance or operational experience. They spend increasing time interfacing with peers within or outside their organisation. They need to be able to move beyond their identity as a domain expert or manager of an area of domain expertise. Both this stage and the previous stage are the periods in an individual's career where Schein's (1978) non-hierarchical career progressions are most likely to take place. These could occur through changing a *function* e.g., from national coach in a sport to performance management in the national sporting governing body, from running a large trading operation to running a small business unit in another country, or from heading up a music faculty in a music college to running a performing arts department at a university. It could also occur through making an *inclusive* move towards the strategic centre of an operation, e.g. consulting all sporting bodies on funding bids, heading up the performance function for all instruments in a music college, or overseeing all research areas in a business.

### **8.2.4.2 The Transition**

This fourth stage transition often involves adapting to a radical shift in the arena in which one is operating. It comes primarily in two forms. It could involve a shift in *scope* e.g., a regional sports coach will move to become national director or a music professor who had been a head of faculty will move to becoming a

dean of studies. Or it could involve a shift in the operating *arena* as when a head of an academic research department moves to head up a research division in a business or a head of a trading department moves to lead a logistic division. Sometimes this transition requires both a scope and arena change e.g., when a head of a woodwind music faculty moves to head up a faculty of multimedia creative performance. Sometimes individuals move to an arena where they have more operational scope though the overall operation is itself smaller e.g., a football coach will become an assistant manager at a lower division football club to acquire management skills, a musician will become the dean of academic studies at a less prestigious college of music, or a business person will agree to run a daughter company overseas in order to gain wider operational expertise.

### 8.2.4.3 The transition expertise

In table 8.6 there are some representative statements made by the participants that are indicative of different aspects of transition expertise in this transition.

Table 8.6 Some statements indicative of transitions from Department Head to Division Leader

Cognitive flexibility
<ul style="list-style-type: none"> <li>- <u>Suddenly see all these various options that exist.</u></li> <li>- <u>Modify my mind-set</u></li> <li>- <u>You can't just do the same</u> as you have done for the last 10 years.</li> <li>- <u>Actually getting more sophisticated</u></li> <li>- <u>Seeing how different countries did business</u> in different ways.</li> <li>- I've always been better at <u>standing back</u> and looking at the bigger</li> <li>- <u>You've come without the baggage.</u></li> <li>- I've been <u>letting some things go</u></li> </ul>
Domain expertise generalizability
<ul style="list-style-type: none"> <li>- At the same time, <u>I did a lot of internal strategy stuff</u></li> <li>- <u>On the UK Sports board with a specific remit to be somebody with performance experience.</u></li> <li>- <u>I was the person who could do it both technically and managerially.</u></li> <li>- <u>So it was the whole thing – legal, membership, marketing, publishing.</u></li> <li>- <u>I was able to provide scientific leadership to the group.</u></li> <li>- <u>It was a very different domain within the same field</u></li> </ul>
Inferential, inductive and analogical intelligence
<ul style="list-style-type: none"> <li>- <u>Skills that I would never have learnt as even a Dean of a faculty of arts,</u></li> <li>- <u>Deliberately seeking the series of external roles</u></li> <li>- I would <u>probably gain most of my important professional development outside the context of music or the arts</u></li> <li>- <u>It was deliberately an exercise to say how much can you learn and how can you start applying that to the real benefit of my employer.</u></li> </ul>



- I'd gone from sport and administration to now knowing all about anaerobic digestion and green policies.

#### Intrapersonal self awareness

- Going through this process of take myself back and always consider, consider, consider.
- What do I want to do? What do I want to be? What impact do I want to have?
- The shadow that you cast as a leader. I'm very aware of my shadow now as never before.
- I think that's half the battle knowing what I ought to be doing.
- I think that's because I recognise my faults and that's the way to mitigate them.
- I ask myself questions of 'What should I have been doing differently all this time?'
- There was a degree of a very self conscious sort of revolt really
- As with everything that I've ever done is I've stepped back and said 'What was the goal?'
- And so there were various phases of self-recognition
- Each time I've changed job, I go through a transitional phase where I do question 'Am I doing the right things?'

#### Intrapersonal self regulation

- I think when you become a General Manager you need some sort of discipline to make sure that the generalities are all covered,
- What I call managing self and the need to manage self.
- You need to learn to delegate more, you need to actually clear your brain and make sure that you're looking after yourself.
- Methodically analysing your diary in peace and quiet and saying 'over the next month is this covering the agenda that I wanted to cover
- Am I in charge or am I reacting?' and just making sure you've got the time diarised

#### Interpersonal intelligence

- Reaching out to those people who are maybe less willing to participate.
- Find out where their interests are and make sure that their interests are represented.
- Fascinating to work with different cultures
- So it's a different style how you reach out, how you connect.
- I think what I've always analysed is what affect do I have on people?
- I then listened and learnt and picked up enough knowledge to improve my performance
- There's a point where you can get them close to where you want and you'll say 'Well I wouldn't have made that decision but it's your decision.'

#### Practical intelligence

- The day-to-day stuff gets done by other people – it never gets done by me.
- Just not taking it all back when I come back – constantly trying to free up my time
- I had then to learn how to deal with politics;
- We have established a stakeholder map
- That job which was a smaller people management job, but a very complex in terms of the interface between the business and
- Structuring the research programme of this business.
- What would be the right way to organise a group like we already had
- Designing organisational structures [...] 'The architecture should look like this.'
- I like to create something that is then able to run itself
- I'm realising the context

In this transition the use of intelligence and expertise move quite dramatically from applied actions to consideration of general principles. Experts who began to let go of previous self concepts and ways of thinking in the previous transition stage now step even further back from their previous performer identity as they generalise expert process and knowledge from content to principles, from specific to general applications. If cognitive flexibility has been sufficiently

developed, it now enables them to make these conceptual shifts. Their use of analogy and inference changes. In transitions 1 and 2 they used analogies to build bridges from other domains to their primary expert domain. In transition 3 it was used to make comparisons across similar department or between self-management and management of a large department. Now in transition 4 individuals build bridges outward from their primary domain expertise to apply it to new domains, external roles and strategic performance. Intrapersonal intelligence also steps back from application to a more pure and unvarnished self reflection and search for insight in which self regulation is used to free up time. Interpersonal intelligence on the other hand reaches out beyond one's immediate context to stakeholders, building bridges across departments and understanding the cultural context in which they are working. Life span psychologists (e.g., Alexander & Langer, 1990; Baltes, 1997) call this a meta-heuristic that includes contextual, cultural and temporal perspectives in cognition and decisions. Similarly, Schein's (1978) 'late career in leadership role' involves becoming both a "senior partner" and "an internal entrepreneur." It focuses significantly on how individuals begin to change the actual organisational structures in which they operate. Practical intelligence moves from pragmatically applying knowledge to considering 'the architecture' of an operation, designing interfaces across departments and dealing with higher-level politics. Individuals use induction to generalise from their self regulatory experiences to considering how a department might be self regulating. Much of this is consistent with Torbert's (2004) 'Strategist' who "weaves short term goal orientedness with longer term developmental process orientedness."

## **8.2.5 Stage Transition Five**

### **8.2.5.1 The new career stage: *CEO***

This final Career Stage involves leading an organisation within the individual's field of expertise and sometimes beyond it. This could be as a group vice president or CEO of a business, a vice chancellor or principal of a college, a manager of a premiership team or head of a national sporting governing body. The individual can be leading the total organisation or institution which includes direction over most areas of the operation as well as accountability to external stakeholders, boards of directors, trustees, governmental and regulatory bodies.

### **8.2.5.2 The transition**

In this transition core identity and self concept which have been evolving during transitions 3 and 4 become more constant and consistent even while skills, abilities and – indeed – intelligences continue to be modified and adapted. In order to make this transition an individual will have needed to have been exposed to a wide range of performance positions which will enable them to apply expert knowledge and processes across multiple domains. Even though their previous roles may all have been within the same field e.g., sport or banking, the development of their abilities and cognitive processes will have been subject to widely divergent requirements. This wide range of applications of their domain expert knowledge in conjunction with the acquisition of different types of expertise in their various positions will have enabled them to move from their domain constraints and ties to expert knowledge to understanding processes and principles in the abstract.

### 8.2.5.3 The transition expertise

In table 8.7 there are some representative statements made by the participants that are indicative of different aspects of transition expertise in this transition.<sup>7</sup>

Table 8.7 Some statements indicative of transitions from Divisional Leader to Organisational CEO

<b>Cognitive Flexibility</b>
<ul style="list-style-type: none"> <li>- I would <u>probably gain most of my important professional development outside the context of music or the arts.</u></li> <li>- You <u>can have an eight carriage motorway and you can run all sorts of things in your life and the art is how you sneak in and out of your carriageways and achieve what you want to do and get out of life.</u></li> <li>- The history of my life, instinct. I think I've got <u>fantastic instinct.</u></li> <li>- I've lived abroad and have had to lead a <u>high performance environment in a completely foreign set up</u> has helped me tremendously.</li> <li>- Ultimately these really senior positions like the conductor or the Vice Chancellor <u>demand both leadership and management.</u></li> </ul>
<b>Domain expertise generalisability</b>
<ul style="list-style-type: none"> <li>- <u>I found lots of other things to do. And I continue to evolve.</u></li> <li>- <u>We will end up in larger structures where the arts will then collaborate</u></li> <li>- <u>Even when you're running a company you still sit down with people and decide what you're going to do and it happens at every level and you're just dealing with more money and bigger decisions.</u></li> <li>- <u>One of the skills I think I have is taking something that's not so good and polishing it and making it better.</u></li> </ul>
<b>Inferential, inductive and analogical intelligence</b>
<ul style="list-style-type: none"> <li>- <u>What role do I play in this leader/manager role which gets the best out of that like the orchestra gets the best out of the ensemble'?</u></li> <li>- <u>An orchestra tells you about that. A training in a Government department may not</u></li> <li>- <u>Above all, it colours the way I see the world. I often do use music in artistic analogies as a way to confronting an issue. I'm not coming in from textbook management 101.</u></li> <li>- <u>Now you learn that through being part of any musical texture; you don't learn that in management school.</u></li> <li>- <u>Understandings of issues in medical sciences and technology and natural sciences which often then became role models for things you could take back to areas of humanities and social sciences</u></li> </ul>
<b>Intrapersonal self awareness</b>
<ul style="list-style-type: none"> <li>- <u>Whenever I've gone in a new role I've taken one step backwards before I've gone forwards.</u></li> <li>- <u>I go through a transitional phase where I do question 'Am I doing the right things? Am I contributing as much as I was before?'</u></li> <li>- <u>I try and solicit, seek out areas of potential weakness or areas for improvement.</u></li> <li>- <u>If you haven't reinvented yourself it's a recipe for bitterness.</u></li> </ul>

<sup>7</sup> Of the individuals who took part in this study, 50% from each domain made this stage transitions. Three of the four musicians who made this fifth stage transition took significant (usually fourth stage) tangential transitions into a different field e.g. business, media studies, academic studies before making their fifth stage transition. Only one business individuals made a tangential fourth stage transition into another field and from academia into business. Only one sports person took a significant tangential transition out of sport (to become a lawyer): they progressed very much within their field and stayed in the same arena, only increasing scope during previous transitions to broader or more global responsibilities. Two sports people made these transitions after they had taken part in the interview - one to being manager of a premiership football club and another to the Chef d'Equipe of their country's Olympic team. One musician transitioned to the presidency of a college after her interview.

- I think I am pretty laid back and I don't think it is such bad thing

#### Intrapersonal self regulation

- In terms of prioritisation and organisation you heavily lean on an administration that can make you function, but going back I think I had to be pretty organised anyway.
- I do make up a list and I still do it now.
- I like to be organised and ahead of the game, rather than running alongside or even worse running behind
- I do work to get myself organised, to feel confident that when I go back, I'll be in control.

#### Interpersonal intelligence

- Even when you're running a company you still sit down with people
- I knew a huge number of the people already, I made my business to know the rest
- What you do in the end is the same: I mean you listen to people.
- I don't summon people here and I sit and I listen and it is pretty relaxed; it's pretty informal. What I am doing is collecting my information.
- The further you go up the tree it is about relationships and it's about building relationships and I think I do have a good ability to build relationships.
- Now I'm probably better at understanding where they are and being more in tune with them and understanding what it is that every person can give.
- I think it goes back to the fact that I have a sensitive radar.

#### Practical intelligence

- You're just dealing with more money and bigger decisions.
- You observe the rhythm and pattern of an Institution that's already under momentum and start to make analysis of what is strong and what's weak, what attributes need changing?
- I'm always looking for the formal representation and I'm looking for the informal representation
- I've tried to get the right people around me.
- I'm definitely better at using people around me to achieve the same thing
- Where I've got a shortfall in my skill set then I'll listen to somebody who appears to have more knowledge and then try and interpret what they're telling me.

Transition expertise at this stage presents a dual aspect in which individuals use their expertise and intelligence to address broad issues while simultaneously maintaining a simple almost intimate perspective on their immediate context. On the one hand there is continued generalisation of expertise to wider arenas and the use of inductive processes to expand across fields and develop a unified philosophy or approach. They focus on global issues, institutional regulation, and the search for deeper patterns and rhythms which operate within an organisation. The shaping of culture, philosophy, direction and vision operates as a 'higher order' kind of practical intelligence. On the other hand, individuals apply their refined transition expertise – particularly their personal intelligences – to their immediate context. Interpersonal intelligence is focussed on one's immediate vicinity: talking, speaking, listening, and managing a small circle of intimate

team members. This is particularly reflective of Torbert’s (2004) ‘Strategist’ action logic which he describes as “self awareness in action” and which encompasses both the ability to see the bigger picture and to relate to the personal needs and individual differences of the people around oneself. Intrapersonal intelligence conducts an ongoing self-dialogue, an internal question-and-answer process, designed to continually steer a course of action in line with one’s values and motivation. This combination of broad vision and personal awareness which continually influence each other is probably characteristic of a leader who creates corporate culture (Schein, 1992). In Eriksson’s epigenic cycle it is called “integrity”. Baltes and Staudinger (2004) refer to it in as “the strategies and heuristics for dealing with the meaning and conduct of life.”

### 8.2.6 Summary of development of transition expertise

Perhaps the best way to summarise the development of transition expertise throughout the course of career is to view each of the main areas of transition expertise as they develop over time through the five stage transitions. This developmental process is presented in Table 8.8.

Table 8.8 Development of transition expertise over the course of a career

1. Development of cognitive flexibility over the course of career transitions	
Transition 1: From Studentship to Performer	The individual is flexible to doing anything required to perform. They avoid narrowness and seek to broaden out at an early age.
Transition 2: From Performer to Coach, Professor, Manager	Individuals continued to develop and use cognitive flexibility. But it is now a more conscious approach. They continue to try things out but now there is more selective experimentation and choices. Cognitive flexibility is more directed at the acquisition of skills for their new position.
Transition 3: From Coach, Professor, Manager to Head of Department	Individuals begin to let go of attachments generally and often specifically to their identity as a performer. They find ways around obstacles, are quick at adapting, and continues to develop new repertoire of activities appropriate for their
Transition 4: From Head of Department to Lead of	Cognitive flexibility enables individuals to see things in different ways. They step back to see the big picture. This transition sustains

Division	a shift in mind-sets which avoid preconceptions and attachments.
Transition 5: From Lead of Division to CEO	Perspective and vision are further expanded This is enhanced through balancing managing and leading functions and through the pursuit of multiplex knowledge and performance.
<b>2. Development of expertise generalisability over the course of career transitions</b>	
Transition 1: From Studentship to Performer	There is little generalisation. Rather this transition is largely focused on application of expertise acquired in studentship.
Transition 2: From Performer to Coach, Professor, Manager	As would be expected the main expertise generalisation is from performing to showing other how to perform.
Transition 3: From Coach, Professor, Manager to Head of Department	The individual continues to generalise existing knowledge with clear links back to previous expertise but now to broader arenas. In addition this transition also begins to move beyond applications of existing expertise: generalisation of domain expertise is necessary but insufficient.
Transition 4: From Head of Department to Lead of Division	There is a conceptual shift as expert knowledge is generalised beyond operational issues to principles and abstract ideas. Individuals now advise, consult, and provide strategic leadership.
Transition 5: From Lead of Division to CEO	This transition generalises expertise on two levels. Expertise evolves into still broader applications in a wider arena. But individuals also revert to using the fundamental skills developed during the first transitions to coach, develop and lead individuals.
<b>3. Development of inferential intelligence over the course of career transitions</b>	
Transition 1: From Studentship to Performer	There is already a significant use of analogy. However, most analogy is applied from other domains to the primary domain to enhance their performance in their primary domain expertise.
Transition 2: From Performer to Coach, Professor, Manager	Inference is now almost transparently used as the basis for applying primary domain expertise to the instruction and development of others.
Transition 3: From Coach, Professor, Manager to Head of Department	There is continued use of inference only now it is more from one department to another, applying operational experience from one position to another. However there is still inference from how one has managed oneself in performing to managing a department.
Transition 4: From Head of Department to Lead of Division	Induction operates on a large scale to support analogy in the use of primary domain expertise. There is less like-for-like use of analogy and more building upon general rules and principles as the basis for building bridges outward to new domains, external roles or operating at strategic level.
Transition 5: From Lead of Division to CEO	Inference operates in a dual capacity in this transition. There is a continued expansion in one's field through the inductive development of a vision and philosophy. There is also a continued analogous usage of primary domain expertise in meeting the more personal role requirement of new positions.
<b>4. Development of intrapersonal self awareness over the course of career transitions</b>	
Transition 1: From Studentship to Performer	Intrapersonal intelligence is a significant contributor to transition expertise at this early stage. Self awareness is used to enhance self confidence, self belief and ability to learn. But it is reactive to the environment into which the individual moves and is often still

	engaged in an ‘awakening’ of self awareness.
Transition 2: From Performer to Coach, Professor, Manager	Self awareness continues to be developed and used as a basis for actions and decisions in this transition. Motivation enters as an emergent factor that impinges on self awareness: individuals are now more aware of their motivation for making career transition choices.
Transition 3: From Coach, Professor, Manager to Head of Department	Self awareness is no longer focused on identity issues but rather operates to support self development. Individuals think harder, listen more, and reflect more deeply on their personal development. Furthermore motivation now operates through self awareness, not simply as an emergent process, but as a conscious part of self-reflection on what is the right career choice.
Transition 4: From Head of Department to Lead of Division	Self awareness is almost pure and unvarnished now. Individuals self consciously consider, step back, and reflect about what they are doing. Self awareness is used to develop self recognition, and understand why they are motivated.
Transition 5: From Lead of Division to CEO	Self awareness operates as an intrapersonal dialogue involving self questioning and reflecting. Motivation begins to use self awareness as it becomes almost aspirational and self actualising. Together self awareness and aspiration operate as steering mechanisms for behaviour and choices.
<b>5. Development of intrapersonal self regulation over the course of career transitions</b>	
Transition 1: From Studentship to Performer	Self regulation operates as expected: time management, analysing, and self management all focus on enhancing performance during transitions.
Transition 2: From Performer to Coach, Professor, Manager	More setting of goals and milestones, working logically and progressively. Self regulation at this stage involves more logical, sequential planning.
Transition 3: From Coach, Professor, Manager to Head of Department	Self regulation is still focused on goals and planning, but it is more sophisticated, with more conscious learning elements built in. The management of time and diaries becomes more important.
Transition 4: From Head of Department to Lead of Division	Self regulation is focused on freeing space and organising self reflection time in which to think. This transition also sees a movement towards an abstracting process in which personal self regulation experience is generalised to department regulation processes.
Transition 5: From Lead of Division to CEO	Self regulation processes are generalised to regulation of an institution and involve controlling and managing information, environment and context. Strategy and vision are important.
<b>6. Development of interpersonal intelligence over the course of career transitions</b>	
Transition 1: From Studentship to Performer	This transition uses elements of the interpersonal context in which individuals operate e.g., relationships with a friend or colleague, to operate more effectively and to enhance performing opportunities.
Transition 2: From Performer to Coach, Professor, Manager	Interpersonal intelligence is now used to focus on developing other people, directing, coordinating and mobilising them.
Transition 3: From Coach, Professor,	Interpersonal intelligence moves beyond simply managing of teams to considering how to utilise team members to compensate for gaps



Manager to Head of Department	in one's own abilities or knowledge. There is a focus on developing the expertise of people who are operating as part of a management team. Managing of large groups becomes important.
Transition 4: From Head of Department to Lead of Division	Interpersonal intelligence is actively used to reach out beyond one's immediate context or team to stakeholders and to build bridges across institutional divides. Understanding of cultural contexts is now a major focus.
Transition 5: From Lead of Division to CEO	Interpersonal intelligence is refocused on basic, simple abilities: sitting down with people, talking with them and understanding them. The individuals rely on a small circle of intimate team members with whom they build understanding and rapport.
<b>7. Development of practical intelligence over the course of career transitions</b>	
Transition 1: From Studentship to Performer	The individual works within the context in which they find themselves. But they also are independent, solution oriented, and pragmatic in their analysis. They simply get things done.
Transition 2: From Performer to Coach, Professor, Manager	Organising and administrative abilities emerge. They may have been generalised from managing oneself but they also include applying theory, trying things out and optimising efficiency.
Transition 3: From Coach, Professor, Manager to Head of Department	Efficiency and being organised continue to be present in this transition but there is the beginning of a movement toward abstraction: individuals set out structures, deal with management processes and generally organise the context in which they operate.
Transition 4: From Head of Department to Lead of Division	Practical intelligence is applied to structural and infrastructural issues. Designing of operations involves a higher level operation of practical intelligence which now includes designing interfaces with other divisions and dealing with high level politics. Inference, induction and analogy are clear enablers of this process.
Transition 5: From Lead of Division to CEO	Practical intelligence now addresses global issues. Individuals look for deeper levels of patterns and stretch their knowledge across disparate arenas of performance. They are concerned with building cultures and organisational contexts. Still this is accomplished through getting the right resources and the right people on board.

## 8.4 Concluding discussion

Careers progress through stages. These stages and the transitions between them are more malleable and nonlinear than most models suggest including those developed in this dissertation. However, most of the participants in this study moved through most of the stages and transitions that have been used for this dissertation. There are clear connections between a number of the career stage models and the elements of transition expertise as individuals work through

repeated, progressive career stages. Some models such as Levinson's (Levinson et al., 1978) and Schein's (1978) present clear parallels at the beginning to middle stages of a career but don't describe the later transitions very effectively. Adjustment models ( e.g., Holland, 1973; Crites, 1976; Osipow, 1983) tend to identify skills and behaviours closely associated with attaining stability rather than managing change and don't seem to describe the transition process that took place amongst most of the participants in this study. Torbert's (2004) action logic, on the other hand, builds a developmental model of leaders that includes a range of skills and mental mind-sets that may apply to transitions as well as his leadership positions. However, in some ways, the closest parallels to the progressive development of transition expertise over the course of a career seem to lie in wisdom models of learning and development (e.g., Baltes & Staudinger, 2000; Sternberg, 2003).

Transition expertise develops and evolves over the course of a career. Individuals were able to generalise their expert knowledge and processes, interpersonal and intrapersonal intelligences and practical intelligence – which had all been utilised in their early transitions from student to performer – to increasing broader and larger arenas. This development was fostered by cognitive flexibility which used induction, inference and analogy as the main mechanisms for generalising expert knowledge and processes. During earlier transitions (1 & 2) there was little generalisation from domain expertise. Rather, inferential processes built bridges from other domain experience back to the primary domain which were used in conjunction with personal and practical intelligence to enhance performance. In mid-career transitions (2 & 3) expert knowledge was generalised between

different arenas of operations within a field or organisation. In later career transitions (4 & 5), having made a number of transitions within their field, individuals then began to infer their domain expertise outward to larger arenas of application. Inferential processes not only generalised expert domain knowledge and processes: personal and practical intelligences that had been developed in the earlier career transitions were also generalised inductively and inferentially from specific applications to general principles.

Of particular interest in later career transitions was the variety of ways in which inductive expansion of expert knowledge from specific applications of intelligence or expertise to more abstract principles and philosophy enabled individuals to develop a greater understanding of the context in which they had transitioned and to build the structures, processes, operations and organisational culture they needed to make successful transitions. Of equal and contrasting interest is the re-emergence of the use of the personal intelligences during the later transitions in very intimate and personal applications for building rapport and understanding team members, colleagues and stakeholders. This dual operation of using inductive expansion of expertise and experience from earlier specific applications to general principles and philosophies for running an operation while simultaneously returning from the generalised principles of personal intelligences back to using intrapersonal and interpersonal intelligence for managing oneself and one's intimate working relations is one of the more striking characteristics of late carer transitions.

# Chapter 9. The Transition Process: Stability versus Change

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This chapter will review the transition process itself and in particular the movement from a stable career stage or position through an unstable transition process to a stable new position. I will then discuss the two main types of transitions encountered in the data: 1) completed transitions which has two main subcategories in the form of reactive versus initiated transitions and 2) non-transitions which also has two main subcategories in the form of failures versus choosing not to transition. This will be followed by some conclusion about the operation of transition expertise during these different types of transitions.

## 9.1 The transition process reviewed

In the literature on the transition process a variety of models have emphasised different perspectives, included different numbers of transition stages and different stage names. For the purpose of this study, a simple three-stage model had been used initially: 1) leaving a position, 2) making a transition and 3) integrating into the new position. Based on the analysis of the data, this model was changed: the second stage of ‘making a transition’ was divided into two stages – investigation and integration and the stages were renamed to clarify their operation. This resulted in a four-stage model: *Inception, Investigation, Integration and Stabilisation* which is presented in Figure 9.1 in contrast to some of the models reviewed in Chapter 1.

Table 9.1 Comparison of some transition cycles with the patterns in the data

<b>v Gennep</b>	Separation	Initiation			Reintegration
<b>Crites</b>	Career motives	Tasks and problems	Career adjustment	Anxiety reduction	Satisfaction and success
<b>Nicholson</b>	Preparation	Affect and Sense making	Adjustment		Stabilisation and preparation
<b>Elsner &amp; Farrands</b>	Leaving	Arriving	Surviving –reflecting, reframing, reshaping–		Thriving
<b>Bridge</b>	Endings	Neutral zone		New beginnings	
<b>Ibarra</b>	Exploring possible selves	Lingering between identities –crafting, shifting, making sense–			Grounding deep change
<b>Connolly</b>	Inception	Investigation	Integration		Stabilisation

- 1) *Inception*. This stage was originally called ‘leaving.’ But amongst the participants in the study it was more of a forward-looking process of searching for or deciding about the right next position. The process of transitioning out of a position is more usefully understood in terms of examining the future, identifying opportunities and recognising the ‘pull’ of the next step or position. These and similar factors will shape the thinking and behaviour of an individual before they move as well as their preliminary responses when they actually take up a new position.
  
- 2) *Investigation*. When an individual enters into a new environment and takes up their new position they begin an active process, a period of exploration and interrogation of the system during which they seek to understand what is expected of them, how their abilities match the requirements of the position and how the environment will support or constrain their performance. The individual questions the new system of which they have become a part while the system is simultaneously interrogating them in terms of their capabilities and performance.

- 3) *Integration*. In this third phase the individual is beginning to perform in their new context. They have settled into their position, understood their roles and responsibilities and are beginning to proactively initiate work, pursue their own agenda, make decisions and implement decisions. Their environment and organisational context also begin to increase performance demands upon them as the preliminary ‘grace period’ ends.
- 4) *Stabilisation*. The fourth phase returns to a more stable situation in which the individual is more fully integrated and they complete the transition process. They are no longer viewed – by themselves or their organisation – as being in transition but rather as a fully operational member.

The career transition process seems to operate as a mutual inquiry and exploration between the individual and the environment into which they move. Below are a few illustrations from the data indicative of the stages of the transition process.

### **9.1.1 Inception**

A transition is initiated by a business person at Stage Transition 3:

*So {company} said ‘What do you want to do now?’ and I so I said ‘I want to come back to London’. So rather than ‘I want this job’ or ‘you can send me where you like’, I was suddenly thinking I want to take control over where I go, having been sort of shuffled {city a}, {city b}, {city c} at the sort of company’s whim – I wanted to be back in London, so I said ‘I want to be back in London’. And I was sort of happy to see what came up job-wise and you know [...] So they offered me a job of running logistics in Europe which was sort of completely not what I had experience of (BSN R2 Karl)*

A transition produces a career transformation in a sports person:

*The next passion, the next dream I suppose is, well “How can I help some cyclists be the best in the world” which at the right time I would have spent time dreaming about and visualising what does that actually look like? And that timed very nicely with the phone going from {colleague} for (national sporting body) as it would have been at the time saying that ‘Will you come to the Olympic games as a support member of staff’ in 1988. That was massive for me because that I hadn’t seen coming. He could probably take another mechanic, another masseur or whatever, but he wanted to take me. I’ve never really talked to him about it, but I mean for me, it was an inspired decision looking back because to be placed in that environment, to see the enormity of what an Olympic games is - it’s a completely different vision of success. (SPT R3 Edward)*

### **9.1.2 Investigation**

Some transitions give opportunity for investigation:

*There was a very wise guy who was senior vice president responsible for the research centre and he said ‘Look you know when a person of your seniority... we don’t want you to make a mistake coming here and we don’t want to make a mistake in hiring you if you aren’t going to be right for this[...]. What we should do is get used to each other; if you think this might be interesting and we think it might be interesting, why don’t you – we’ll sign you on as a consultant and we’ll, you know you come out once a month, we’ll pay you for it and we’ll start sending you reports and stuff of what we do and nobody here need to know what you’re doing – you’re just one of our senior consultants and you go around and you’ll meet people and you’ll... and then you’ll come to me and {person} and ask us challenging questions like, what is this / why are you doing this / what about the level science here etc, etc. and we’ll see whether it works. ‘And that’s what I did. (BSN R4Oliver)*

Others require that the individual engage in a self-initiated inquiry process:

*It gave me absolutely the shock of my life really. I mean it was very good for me and I started talking to photographers and I mean the multi-media aspect was fantastic and we were opposite {media company} so we had a relationship with them. And you know digital animation and all this kind of stuff. The degree*

*shows were amazing actually lots of very talented kids but not sort of academic.  
(MUS R3 William)*

Some investigations are well structured by the organisation:

*And then I came into 'functional management' which was much more open. And then I wanted to do a degree in Business Administration and Economics, which was again a 3½ year thing which was kind of you really had to prepare yourself and it was also quite selective in the {country} environment. That opened my horizon. I also had assignments around 'exposure management', 'credit exposure management' for the bank and I learned stuff; first I was working with consultants – a big consultants firm and they introduced me to simple stuff. Programme Management; Presentations; Articulation of Thoughts, Business English and I really sucked the whole stuff in. (BUS R2 Peter)*

Other investigations are “sink or swim” processes:

*It was one of “sink or swim.” Something you either make it or you don't, it's quite hard-nosed in that way, a much less supportive environment in that sense. It's sort of 'go out and prove yourself and we'll tell you if you've made it or not'. And I think my early development was, it was helped and hindered by that. It was helped in that my natural inclination is of hard work, excellence etc.; that was a value that I held already, so that worked well. (BUS R2 Nicola)*

### **9.1.3 Integration**

Musicians often take up a teaching position at an academy or college while they are still in the midst of their playing career which results in a gradual integration process:

*I became very interested in words with doing classics and writing good English and that sort of stuff and instead after {university} instead of going to a place like this and doing some more {instrument} learning, I went to {university} and wrote a thesis on the eighteenth century {instrument}. Over the course of a very nice year I drifted along for another two terms and saw an advert for temporary job in academe, in the Music Department, met my wife who was a student and I'm still married to her. And, wrote a PhD on an aspect of the very early history of the {instrument}. (MUS R1 William)*



For some, integration into their professional career is quite rapid and total:

*Yeah. I left {university} in 1976, so I was about, I was 25 I guess and then I went to London and then I hit the playing scene in a big way: I played in the {orchestra} and at the {orchestra} so there was a lot of playing went on. If you look back in my old diaries, I was all over the country, night after night playing, broadcasts, you name it. (MUS R5 Richard)*

A businesswoman took six months to make a transition into her new role in which the end of the integration process resulted in a change to her function:

*I took the decision quite early on then not to pursue the hotel career path. And to carry on within that investment banking framework, so quite after I think it was six months of being there, I changed roles from being a secretarial support to performing a clerical role within the operation there. (BUS R1 Nicola)*

#### **9.1.4 Stabilisation**

The stabilisation stage of the transition process is not the main focus of this dissertation *per se* because when individuals reach this stage they have moved out of the transition process and back into the stable performance environment.

However some illustrations are useful:

*It's what I set out to do - so I like to create something that is then able to run itself and doesn't need, either doesn't need me personally or doesn't need somebody doing my job at all and we're nearly there. (BSN R3 Nicola)*

And:

*And it's only afterwards when people say to you "You're very efficient at this" or "You're very good at this" it's then that you begin to think, actually, yes, the way that my brain works. (MUS R5 Stephen)*

And:

*I learned a lot about how to deal with difficult situations, more process, more management process [...] a more rigorous criteria for thinking about promotions and grades and appraisals and objective setting. (BUS R2 Oliver)*

### 9.1.5 The Transition process and stability or homeostasis

Figure 9.1 illustrates the transition process. The dotted line represents the relative stability – high or low homeostasis – of an individual’s situation during the transition process.

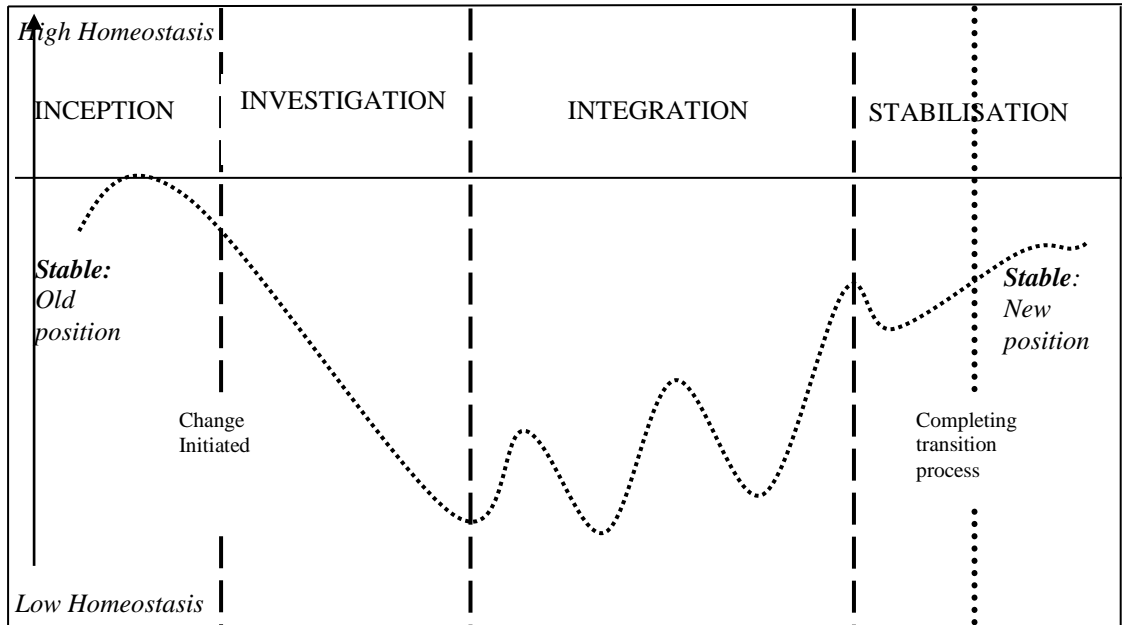


Figure 9.1 The Transition Process

The individual starts out from a position of relatively high stability but as they enter into a transition they rapidly move into a situation with lower stability and less homeostasis. Stability is further decreased after they begin their investigation into the new situation when they begin to understand what they do and don't know and the position begins to make demands upon them to evolve and grow into it. Through a series of first reactive and then initiated actions they go through periods of relatively lower and higher homeostasis before returning, through the integration process, to increasingly higher degrees of stabilisation.

## 9.2 Initiated and reactive transitions

One of the distinctions that emerged in the course of the interviews with participants in the study was that transitions could be initiated or reactive.

*Initiated transitions* are transitions that were identified in advance, chosen and often planned for over time e.g., when a football player chooses to train as a coach or a musician seeks out a head of faculty position. *Reactive transitions* are unanticipated, often unplanned and sometimes take place very rapidly e.g., when a business manager is headhunted to lead up a division of a different company or a football player jumps from the reserves to the first team because of an injury to another player. There are a large number of statements by the participants in the study illustrating both initiated and reactive transitions at all of the stage transitions. I will present a few examples from each stage transition to demonstrate the general characteristics of initiated vs. reactive transitions.

## **9.2.1 Initiated transitions**

### ***1 From Student to Performer***

At the end of a four year academic programme a business person choose to end an apprenticeship with an engineering company:

*So straight after university I should have done another year with {company a} but bearing in mind I had a job with {company b} I then resigned from {company a} and actually took a cut in pay to come down south, kind of with a view that this was a) more interesting and b) better long term prospects. (BSN R2 John)*

Transitions for musicians often required that they choose between a career as an academic and a career as a performer:

*Having finished my degree and finished my course here, I then really I suppose was confronted by the same choice that I had avoided making before going into higher education and then I felt, 'Right I've done what my parents wanted to do, I've got my Degree, now I am going to go for performing.' (MUS R1 Robert)*

### ***2 From Professional to Coach, Professor or Manager***

Sports people often made the decision to coach while they were still in their performing career, even though the transition took place over time:

*But at that time I had decided that I wanted to do my coaching badges, wanted to get involved in coaching sessions, coaching some kids and as I say heightened my knowledge of the game. So by that stage I knew I wanted to stay in the game and then it was really just about getting the opportunities. (SPT R4 Brian)*

Musicians build up the components required for the next career stage at an early age before actually making the transition to becoming a professor:

*On leaving [university] I then went to London, I took pupils in and started to teach instrumentally and that went on to the point where I was appointed with my own Institution of {conservatoire} as Professor of {instrument} so that was also another strand in my parallel development. (MUS R4 Richard)*

### **3 From Coach, Manager Professor to Department Head**

At this stage transition, individuals will often have been looking for an opportunity such as Head of Faculty, even though the actual position may emerge suddenly:

*This job came out of the blue. I got very excited about it 'cos I thought I really want to come here, and work, and head a department. {Colleague} also said "You must go for it. Don't want to lose you but you must go. a) You're an ex-student so it's ideal 'cos you're going back to your roots in a way and b) I'm still here for another five years maybe a little bit more and time's rolling on for you" you know. (MUS R1 Yvonne)*

Business individuals frequently initiated or sought out stage transitions to head up a department:

*Anyway I was beginning to think 'What am I going to do now?' I saw an advert in the paper for a Chief Engineer at {company} and I applied and got it and I'd always liked cars and {company} was an independent PLC at that stage and I thought to go and be a Chief Engineer at {company} was rather a good move*

*and I liked the glamour of the company, I liked the cars, it was a promotion, so I liked that. (BSN R6 Michael)*

#### **4 From Department Head to Division Lead**

In the fourth stage transition, an individual moved to a different country to become a national director of performance in a sport:

*And I would say that that was a normal thing, was bound to happen, but at the same time there was {country b} who was stuck and weren't getting anywhere and they were just looking for this guy to please bring in somebody that is going to rock our foundation and take us on again. So yeah, I mean you might say that's a coincidence; I don't believe in that. I think that you create those opportunities – I mean the opportunity with {country b} was there because of what I did with {country a} before; otherwise I would not have had opportunity so you create those. (SPT R7 Frank)*

The stage transition may require moving to a parallel expert arena or to a different institution:

*I mean what happened I suppose the third term at {university a} there was an advert, a {university b} advert in the Times Higher for the Dean, for Pro-Vice Chancellor of the Faculty and Dean of the Arts which was Music, Art and Design and Media. Well suddenly I got this phone call from this head-hunter and I'd never been headhunted or anything like that. This woman rang up and said you know we'd very much like to speak to you further about this, you know and this that and the other. (MUS R2 William)*

#### **5 From Division Head to Organisation Leader**

Often, having progressed in both their field and the organisation in which they have been involved, this transition can coincide with an individual's aspiration:

*Okay, so they needed a new CEO now, because it was only a temporary step up and advertised the normal way. I thought about it a long, long time whether I was going to do another round, another Games leading to 2004, but by then I'd been in Olympic {sport} since '83 – you know – close on 20 years and I'd been to '84, '88, '92, '96... we'd been to five Olympics in a performance role and*

*achieved as much as I could achieve – you know three Gold's and two Silver was a good score. So I thought this opportunity won't come up again in my lifetime... in my working lifetime, so I went for it. (SPT R4 George)*

Stage transitions are usually entered into with eyes wide open. They can often be, even at this final stage, part of a long-term career path envisioned by the individual:

*It was a challenge and its focus is something different. This is a University for business and the professions; it's not a University with strong liberal and fundamental scholarship yet curiously it has a five star rated music department amongst the top, it was rated for its music department which is a thoroughly musicological department, so in personal terms there is a department here very close to my own interests. (MUS R6 Thomas)*

As with other transitions these fifth stage transitions are usually accompanied by awareness of how one's strengths and limitations match the requirements to perform at this level:

*I suddenly thought I can do that and I had visited here before so I could picture in mind – there were all sorts of things and I knew it to be a struggling Institution and one of the skills I think I have is taking something that's not so good and polishing it and making it better, so I know I am a kind of turnaround person and I've got the doggedness to stay within something and really do my best by it. It was the most phenomenal moment. (MUS R 6Richard)*

## **9.2.2 Reactive transitions**

### ***1 From Student to Performer***

Sports people seem to have a fair share of reactive first stage transition, for example when an unexpected performing opportunity emerged:

*We got to a semi-final of a cup competition and I don't think I was going to play, but what happened [was] the left back got injured so the decision from the coach at the time was either for me not to play or to play me in a different*

*position. And that was it: they played me in a different position at left back and that was it. (SPT R1 Brian)*

## **2 From Performer to Coach, Professor or Manager**

Stage transitions into a management role in business can come when an individual has to deputise for someone who subsequently moves on and they find themselves suddenly promoted to the role:

*My boss resigned and the big boss decided that he wasn't going to replace him; he was actually going to move the other boss out and he was going to effectively take a layer out of the organisation so suddenly I became one of a team of about eight that was the leadership team. (BUS R2 John)*

Sometimes, a transition to coaching is a reaction to decline in performance or the immediate consequences of having failed to succeed at the highest levels:

*I tried to do the Olympics in '84 and then in '88 I tried to do it and, I didn't win the trials but the guy who won the trials, I went to the Olympics with him in '88 as his coach and he won a gold medal then, so that's the start of that. So that's the start of that? Coaching, yeah. (SPT R5 Alan)*

## **3 From Coach, Manager Professor to Department Head**

Being headhunted by a different organisation for a more senior post is a common example of a reactive stage transition in business:

*I was approached - I didn't do anything about my concerns at {company a}. It didn't last very long either; it was only a couple of months until this role was presented to me. Had it have been longer, I might have looked for a job but I didn't think it was worth doing that. So the attraction of the job at {company b} - there was a big transition at that point because the job was far more senior. (BUS R2 Nicola)*

And sport:

*Then I get a phone call from {university}: 'We're thinking of starting a new research centre around youth sport. Would you be interested?' I mean terribly lucky because they've let me come here and set up a research centre which is all*

*around my own research interests. It's just like, again I'm like a pig in muck, it's fantastic. (SPT R2 Diane)*

#### **4 From Department Head to Division Lead**

As stage transitions progress hierarchically, they become less reactive. But reactive transitions can still occur:

*And then suddenly he sort of said 'I'd like you to create and run this new function called corporate communications'. [...] So you knew you had the potential for a very big step and so this came along and he said 'it's a Group Vice President' ... and suddenly you're moving into the top 40 of the company and certainly in remuneration terms, this is a sort of material leap really and so of course you sort of think 'Yeah sounds great.' (BUS R10 Karl)*

#### **5 From Division Head to Organisation Leader.**

Very occasionally fifth stage transitions can be reactive:

*And then one day I'm trying to get back into having a legal career and an envelope falls through the door saying 'You might be interested in this application to the Chair of {national organisation}?' And I thought that sounds interesting and it's like it's the next stage in the Administration career [...] and next thing I know, I'm Chair of {national organisation} (SPT R4 Claire)*

### **9.2.3 Discussion: Initiated and reactive transitions.**

In all of the domains statements made by the participants at various times could be coded as indicative of reactive or initiated transitions (See Table 9.2).

*Table 9.2 Statements indicative of initiated vs. reactive transitions*

	Music		Sport		Business		Total	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Reactive	59	.22	110	.37	163	.51	332	.375
Initiated	208	.78	187	.63	157	.49	552	.625
Total	267		297		320		884	

Of all the 884 statements coded as reactive or initiated, 332 or .375 per cent were made about reactive transitions and 552 or .625 per cent were indicative of initiated transitions. However, musicians were far more likely to initiate



transitions than react to a transition situation: they mentioned initiating a transition 3.5 times as often as reacting to a transition. Sports people were also more likely to initiate than react to transitions, initiating 1.7 times as often as reacting. However, business people spoke about reacting to a transition situation almost the same amount as they did initiating a transition: their proportion of reactive transitions was higher than the overall average of the participants. The difference is large enough to suggest that transition choices in the career paths of musicians and sports people are different than those of business people. Business people, on the one hand, enter into a professional environment where many of their career development decisions are organised and planned for them: they follow the relatively predicted career paths charted for them by their organisation in which career choices are made for them as frequently as they seek them out. The careers of musicians, on the other hand, involve a large amount of freelance work and self organised progressions during their early stages. If a musician does not initiate change, self-start and proactively manage their career, it is highly unlikely that they will achieve their optimal career success or attain their full performing potential. Sports people, who fall somewhere in between, pursue career paths which may be tightly controlled and less initiated during their performing years and their early development as a coach. But often, having achieved a coaching position, their careers then become much more self directed and initiated.

Not all statements that had been coded as a particular type of transition expertise were also coded as a statement about a reactive or initiated transition. For example, an individual might have made a statement about cognitive flexibility which was not linked to a specific initiated or reactive transition e.g., “A life-

long quest to touch as much as possible.” Conversely, an individual may have made a statement about a reactive transition, without it necessarily being coded as a particular type of transition expertise e.g., “My boss resigned and the big boss decided that he wasn’t going to replace him.”

### **9.2.3.1 Relationships between reactive/initiated transitions and elements of transition expertise**

In the following discussion, data will be presented which illustrate the relationship between the various elements of transition expertise and reactive and initiated transitions. It will show the number of mentions of a particular transition expertise and its relative percentages made in association with reactive and initiated transitions and then compare it against the number of times it would have been mentioned if it had conformed to the same percentages of times reactive and initiated transitions were mentioned in total (See Table 9.2 above). For example (See table 9.3 below), there were 28 statements associated with both intrapersonal intelligence and reactive transitions. These constitute .24 per cent of total (117) intrapersonal statements associated with either reactive or initiated transitions. The 89 statements of intrapersonal intelligence associated with initiated transitions constitute .76 per cent of the total intrapersonal statements. As a comparator, figures are shown which represent the number of statements about intrapersonal intelligence that would have been made (e.g., 44 and 73) if they had been in the same proportion as all statements associated with reactive (332) vs. initiated (552) transitions, that is .375 vs. .625 respectively.

### 9.2.3.2 Personal intelligences and reactive/initiated transitions

Table 9.3 show how the personal intelligences were used during reactive and initiated transitions.

*Table 9.3 Use of personal intelligences during transitions*

	Reactive		Initiated		Total
	Actual number (percentage)	Projected to match total statements	Actual number (percentage)	Projected to match total statements	
Interpersonal Intelligence	52 (.35)	56 (.375)	97 (.65)	93 (.625)	149
Intrapersonal Intelligence	28 (.24)	44 (.375)	89 (.76)	73 (.625)	117
Total	80 (.30)	100 (.375)	186 (.70)	166 (.625)	266

The use of interpersonal intelligence during transitions corresponded closely to the number of overall mentions of reactive and initiated transitions, suggesting that there was little difference in its use during different type of transitions (See Table 9.3). One explanation for this could be that interpersonal intelligence will still be accessible and used during reactive and initiated transitions because understanding the context into which one moves is unavoidably important (Kihlstrom & Cantor, 2000). However, intrapersonal intelligence was used more often during initiated transitions (.76) than during reactive transitions (.24) when compared with the overall mentions of initiated transitions (.625) and reactive transitions (.375). This would be consistent with the operation of self-regulatory conceptions of personal intelligence (Schunk & Zimmerman, 1998; Kuhl, 2000) that focus on planned and organised self-management processes and that might operate more during initiated transitions where there is time and psychological space to plan and organise.

Emotional intelligence models (Goleman, 1995; Bar-On, 1997) propose that individuals who score “high” on emotional intelligence scales would be more

effective in “management of emotions” and “stress management.” However there was very little mention amongst participants of using affect management in particular to support their transitions. It may be the case that, when responding to a sudden change as often encountered in reactive transition, an individual may not necessarily have the time or ‘psychological space’ to reflect or self manage which a more controlled, initiated transition might afford. They might react without as much intrapersonal reflection.

### 9.2.3.3 Practical Intelligence and initiated/reactive transitions

Table 9.4 shows how practical intelligence was used during transitions.

*Table 9.4 Practical intelligence in reactive and initiated transitions*

	Reactive		Initiated		Total
	Actual number (percentage)	Projected to match total statements	Actual number (percentage)	Projected to match total statements	
Administration	10 (.24)	15 (.375)	31 (.76)	26 (.625)	41
Problem resolution	5 (.12)	16 (.375)	37 (.88)	26 (.625)	42
Resource utilisation	28 (.36)	29 (.375)	49 (.64)	48 (.625)	77
Total	43 (.27)	60 (.375)	117 (.73)	100 (.625)	160

Problem resolution is used even more frequently in initiated transitions relative to reactive transitions i.e. 88% of problem resolution statements were associated with initiated transitions as opposed to only 12% during reactive transitions. Administration is also used more often in initiated (.76 vs. .625) than reactive (.24 vs. .375) transitions when compared to proportions of overall initiated and reactive transitions. The most straightforward interpretation of this difference is that initiated transitions will be more amenable to management and control during the transition process. Administrative processes would be more accessible and usable under controlled transitions, since these skills are largely regulatory

and managing processes associated with control. Similarly, the analytical, sequential processes associated with problem resolution techniques would be used more readily when a change is anticipated, for example when planning to make a transition and mapping out how the transition process will take place. Resource utilisation, however, is used in relatively the same proportions as statements about reactive vs. initiated transitions (.36/.375 and 64/.625). It is probable that resource utilisation is less directly related to controlling the unstable elements of a transition process and becomes more evident when delivering performance during transitions once the way in which the resources can be utilised is understood, planned for and brought under control.

The operation and role of practical intelligence in transitions does seem to overlap with other elements of intelligence. Social intelligence models that are associated with personal intelligence are also concerned with strategies for planning, monitoring progress and outcomes of plans (Kihlstrom & Cantor, 2000). This is also reflected in the interpretation of the data mentioned earlier that intrapersonal self regulatory processes might be more accessible during initiated transitions (Schunk & Zimmerman, 1998). This would reflect the clear overlaps between practical intelligences and more specific cognitive process such as Guilford's convergent and evaluation operations (1967), Sternberg's meta-components (Sternberg, 1985), and factors in Carroll's (1993) lexicon like quantitative reasoning and general sequential reasoning.

### 9.2.3.4 Expertise generalisability and reactive/initiated transitions

Expertise generalisability was operative during both reactive and initiated transitions (See Table 9.5).

*Table 9.5 Expertise generalisability in reactive and initiated transitions*

		Reactive		Initiated		Total
		Actual number (percentage)	Projected to match total statements	Actual number (percentage)	Projected to match total statements	
Early Generalisability	Expertise	6 (.19)	12 (.375)	25 (.81)	19 (.625)	31
General Flexibility	Cognitive	12 (.21)	22 (.375)	46 (.79)	36 (.625)	58
Domain Generalisability	Knowledge	5 (.14)	14 (.375)	32 (.86)	23 (.625)	37
Domain Generalisability	Process	11 (.37)	11 (.375)	19 (.63)	19 (.625)	30
General Processes	Transition	21 (.36)	21 (.375)	38 (.64)	38 (.625)	59
Total		55 (.26)	81 (.375)	160 (.74)	134 (.625)	215

Statements that were indicative of general transition processes corresponded with the pattern of general statements about reactive and initiated transitions (.36 vs. .375 and .66 vs. .625). There were also similar proportion of domain (specific) process generalisability in reactive (.37) and initiated (.63) transitions. Of interest is the low proportion of mentions of domain knowledge generalisability (.14) in reactive transitions. This would suggest that specific domain knowledge becomes less generalisable as ambiguity increases in emerging transition situations. While it is difficult to draw clear causal relationships in this data, it is likely that semantic memory retrieval (Tulving & Thomson, 1973), long term working memory (Ericsson & Kintch, 1995), schemata (Hoffman, 1977; Woods, et. al., 1994), templates (Gobet & Simon, 1996b), and similar models do in fact describe the limited generalisability of expertise when it is tied to specific knowledge

rather than process. But constraints on the use of expert knowledge in transitions may also be influenced by factors which are outside of the scope of this project such as attributions of stability and control (Heider, 1958; Weiner, 1980) and self belief (Bandura, 1997) which influence perceptions of one's ability to perform and the ensuing behaviour.

The relatively low mention of early generalisability of expertise (.19) during reactive transitions can be accounted for because these statements were usually limited to the early stages of a career where initiated transitions are usually more common. Reactive transitions were mentioned more often during mid-career but at this point instances of early generalisability of expertise no longer apply. However, one would have expected to see general cognitive flexibility present in similar proportions during reactive transitions. But it wasn't (.21) and there is no obvious accounting for the reasons for this.

### 9.2.3.5 Inferential Intelligence and reactive/initiated transitions

Table 9.6 presents the use of inferential intelligence during reactive and initiated transitions.

*Table 9.6 Inferential intelligence in reactive and initiated transitions*

	Reactive		Initiated		Total
	Actual number and (percentage)	Projected to match total statements	Actual number and (percentage)	Projected to match total statements	
Induction/Analogy	1 (.10)	4 (.375)	9 (.90)	6 (.625)	10
Intelligence generalised	12 (.34)	13 (.375)	23 (.66)	23 (.625)	35
Primary domain intelligence generalised	15 (.37)	15 (.375)	25 (.63)	25 (.625)	40
Total	28 (.33)	32 (.375)	57 (.67)	53 (.625)	85

The use of intelligence generalised (.34) and primary domain intelligence generalised (.37) parallel the mentions of reactive and initiated transitions. This

is as would be expected, as this category of coding identifies the inferential cognitive mechanisms that are used to apply processes beyond primary domain applications and corresponds with the use of general transition processes and domain process generalisability as described earlier. While the wide divergence of the use of analogy between reactive (.10) and initiated (.90) transitions might imply that this specific process operates better when parameters of the home domain from which the analogy is drawn and those of the new application to which it is applied are both clearly defined, the small number of mentions of the use of analogy in relation to these transitions makes it difficult to draw conclusions.

#### **9.2.3.6 Summary: Reactive vs. initiated transitions**

The relative frequency of mentions of initiated vs. reactive transitions was different in each of the three fields under study. Business people mentioned relatively similar numbers of initiated (.51) and reactive (.49) transition situations. Sports people went through almost 1.7 as many initiated (.63) as reactive (.37) transitions. And musicians discussed 3.5 times as many situations involving initiated (.78) transitions relative to reactive transitions (.22). The most obvious conclusion to draw from this divergence of the populations in the different domains in this study is that career progressions within these different fields are subject to very different field and contextual influences. Musicians would need to be more self-initiating in terms of their career development. Business people will tend to be more reactive. Sports people match the overall average. This almost certainly reflects the different characteristic of the fields in which the expert domains operate. It may also reflect the nature of the domain expertise itself. Different motivational and personality factors which may be



characteristic of the different domains may also influence predispositions towards initiated versus reactive transitions.

When mentioned in conjunction with transitions it was the case that domain processes generalised (.37/.63), general transitions processes (.36/.64), generalised intelligence (.34/.66) and generalised primary intelligence .37/.63) were all used in nearly equal proportions to reactive vs. initiated transitions. One could conclude that the cognitive processes that are used to generalise experience from one domain of operation to another are used in any type of transition.

However, more content specific applications of cognitive process such as administration (.76), problem resolution (.88) and domain specific knowledge (.86) would pertain more during initiated transitions. Anticipation, which would be more present during initiated transitions, might enable these aspects of transition expertise to operate more effectively. Problem solving and administrative abilities which bring control and stability to situations might be applied more effectively in initiated transitions. Domain knowledge is generalised more frequently in anticipated transitions suggesting that familiarity with the content of the new position may make it easier to generalise that knowledge. General cognitive flexibility (.79) and possibly analogy (.90) may operate more effectively when transitions are anticipated. This could be because the cognitive stretch required to generalise from past experience to new situations may be more achievable if other conditions are more stable.

At the risk of oversimplification, the distinctions discussed above do seem congruent with accepted conceptions of convergent and divergent cognitive processes and the mechanisms of intelligence which have been delineated most

clearly in Guilford's divergent and convergent productions (See Figure 5.1 in Chapter 5). It is useful to quote Guilford at some length:

[In divergent production] the problem itself may be loose and broad in its requirements for solutions; or the problem, if properly structured, may call for a unique solution, but the individual may have an incomplete grasp of it; or he may comprehend the problem fully, but he is unable to find the unique answer immediately, resorting to trial-and-error behaviour, which means divergent production alternated with evaluation. [In convergent production] the problem can be rigorously structured and is so structured, and an answer is forthcoming without much hesitation. In the former case, restrictions are few; in the latter there are many. In the former, the search is broad; in the latter it is narrow. In the former, output is in quantity; in the latter it is limited (Guilford, 1967, pp. 214-215).

Guilford goes on to qualify that "in everyday life, of course, the middle ground between these two kinds of functions is not excluded, and the individual very frequently engages in much divergent production on the way to a convergent answer" (ibid., 215).

The operation of various elements of transition expertise in reactive and initiated transitions as discussed above can also be seen to operate in corresponding ways in a number of the career transition models reviewed in Chapter 1. Adjustment theories include elements like "preparation" (Nicholson, 1984), "task and problem solving" (Crites, 1976) and "dissipation of doubts" (Tiedeman & O'Hara, 1963) in which individuals seek to minimise ambiguity and subject transitions to more structured and controllable processes. Bridges' (1991) transition process suggests that individuals confront fears and self doubt through structured processes, clear goals, and small wins which are followed by planning the future and identifying the role one has to play. Elsner and Farrands (2006) identify a number of issues in their arriving stage which deal with getting a

situation under control, identifying competence, and building trust, while their subsequent surviving stage actually contains a number of intrapersonal processes like “self reflecting” and finding ones “internal compass.” This suggests that, for them, stabilising and controlling are prerequisites to self awareness. Ibarra’s (2004) model incorporates planning and controlling processes into the first stage of her transition process during which an individual is “experimenting with possible selves.” In addition the first part of her recursive “identity in practice cycle” has individuals engaging in “crafting experiments” on a small scale and testing them before implementing. This is consistent with the conclusions drawn in the foregoing discussion that in an initiated and more controllable transition, intrapersonal intelligence might be have more cognitive space in which to operate.

Figure 9.2 indicates that stability during initiated transitions starts out high and remains relatively high during the transition process, only dropping when the individual begins to move from the initial exploration period into integration by which time the position and environment into which they have moved will have revealed its real demands and constraints upon their performance.

Figure 9.3 indicates how, during reactive transitions, it is likely that stability will drop much more rapidly as individuals enter into a situation over which they do not feel that they have control. Such transitions will present fewer opportunities to plan and direct their responses and may also result in a longer period of relative instability before the individual begins to re-establish their control over their working situation.

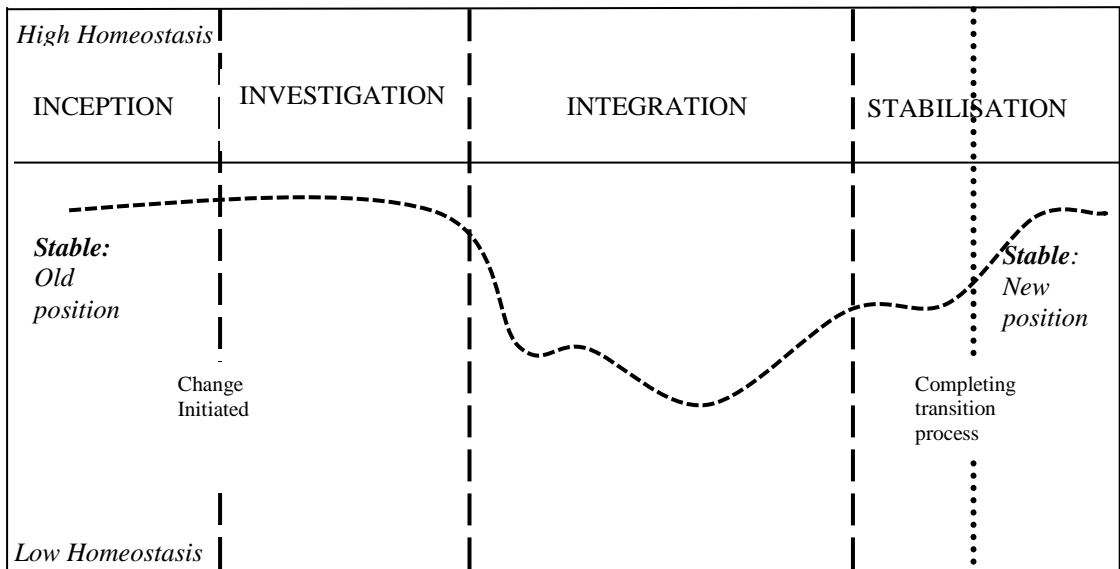


Figure 9.2 Stability in the Transition Process during initiated transitions

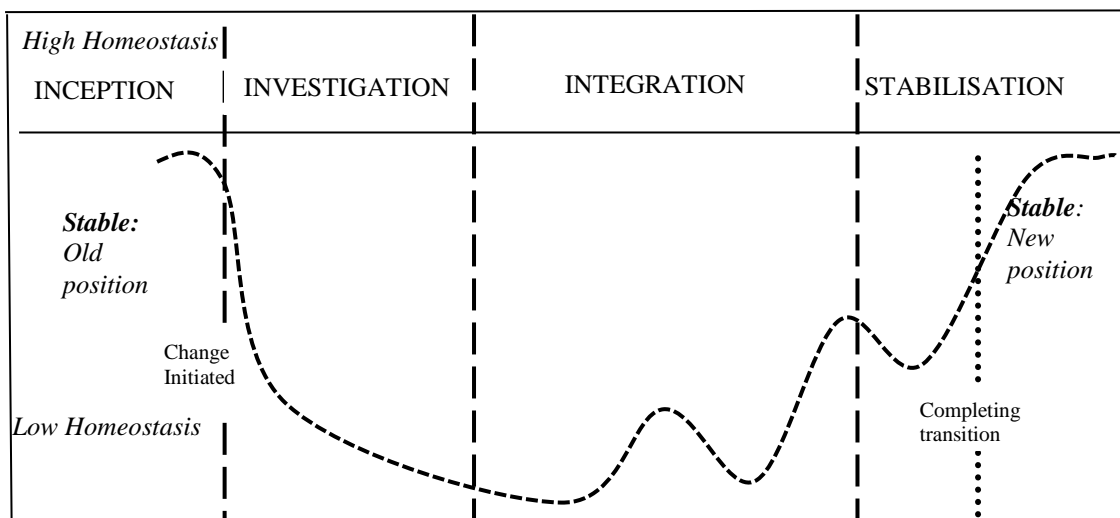


Figure 9.3 Stability in the Transition Process during reactive transitions

Finally, it is striking that, in all of the data, none of the cognitive transition expertise processes under discussion in this dissertation are used more frequently in reactive transitions than in initiated transitions. It is possible to conclude that, while transitions almost by definition involve successful movement through non-stable situations requiring new abilities or adaptation of old ones, when the transition environment and the requirements of a new career stage are more

controllable, then such a controlled context will be more supportive of generative cognitive processes that are so central to transition expertise.

## 9.3 Non-transitions

There were a number of situations where transitions did not take place. These *non-transitions* typically fell into two categories: 1) an individual failed to make a transition or 2) an individual chose not to make a transition.

Under the first category of *failed transition* there were three subcategories:

1.1 An individual failed to make a transition and this more or less proved to be the end of their hierarchical career development.

1.2 An individual failed to make a transition and used the learning from it to refine and develop their domain expertise or transition expertise or modify their career direction.

1.3 An individual failed a transition and this failure was a radical break for them which caused them to reconsider their goals, priorities and self image. Such radical breaks were identified as major life changing events.

Under *choosing to not make a transition* there were three sub categories:

2.1 An individual had to choose between different career domains and directions and in the process decided not to pursue further development in a domain.

2.2 An individual chose to not make a transition because it was not in line with life aspirations and values or it was contrary to their well being and happiness in their career or personal life.

2.3 An individual chose to step back from or reverse a successful transition i.e. moving back to the previous career stage or moving to a lateral position away from the previous transition.

## 9.3.1 Failed transitions

### 9.3.1.1 Failed transition: End of road

There were only a few cases amongst the participants in this study where a failed transition meant the end of further career progression.

In one case an individual who failed to transition to working with the national body stayed at the level of a coach:

*(Do you get involved in the management of... the policy of {national organisation}?) Yeah I did do at one stage but my views were probably not conducive to their views so they didn't really want me involved in that. (SPT R7 Alan)*

In a second case, an individual had reached Career Stage five and, following a failed transition, had to take early retirement. At the time of the interview he was considering how to re-launch his career:

*It does make you look back and think you know 'Where did I go wrong?' or 'Where were the points when I should have intervened and done something?' – I mean I was really sort of kicking myself that I didn't sort of take control of it 2/3 years ago and what I needed to do was demonstrate I can run businesses. (BSN R8 Karl)*

### 9.3.1.2 Failed transition: Leading to self refinement and modifications in career direction

More often, a failed transition was viewed as an impetus to seek other opportunities.

A failed transition helped an individual view things over the longer term and become more resilient in the face of short-term setbacks:

*Because after that, you know, you take a broader view, a longer view all the time, so you are not going to worry about small things or falling out with {orchestra} and not being re-engaged you know. As a matter of fact they did a*

*huge favour – without that I probably wouldn't have gone to {conservatoire}, without which I wouldn't have been head of wind there and wouldn't have been head of wind here. (MUS Vivian R3)*

A failed transition awoke a realisation in one individual that he was interested in “running something”:

*I was shortlisted – I mean I didn't get the job, but I was on the final short list of five or six people so I did an interview for it – I didn't do the interview very well. I mean in a way it was a one-off, I didn't then apply for other jobs quite like that, but I mention it because I think there was something going on in the background that was thinking 'maybe this is not going to be my life forever', you know 'maybe I will do something a little bit different at some point' and obviously I was also thinking in terms of running something. (MUS Robert R1)*

A person realised that she would need to pursue additional training i.e. in interview techniques to perform better in future transitions:

*A job came up at {conservatoire} when I was I think forty which was the Head of Keyboard job and I went for it. And {colleague} was appointed who was a very good pianist and I have a lot of respect for him and I didn't get it. It was my first interview ever, really and I was lousy, I was absolutely dreadful at interview, I felt I really didn't do, and I also felt they were quite, they asked me very challenging questions but I wasn't prepared in the right way for the interview because musicians aren't. (MUS Yvonne R1)*

In one case a failed transition i.e. not getting into the Olympic Games as a competitor, was accompanied by a simultaneous transition into coaching:

*I tried to do the Olympics in '84 and then in '88 I tried to do it and, I didn't win the trials but the guy who won the trials, I went to the Olympics with him in '88 as his coach and he won a gold medal then, so that's the start of that. (SPT R2 Alan)*

### **9.3.1.3 Failed transition: Major career adjustment**

In some cases the shock of a failure at a transition was so strong that an individual re-directed their career in their domain completely. In the following

three illustrations, it is worthwhile quoting at greater length to follow their retrospective reflection on the process.

One person stopped competing in his sport at an early age when he felt that he had not been “taken seriously.” He moved almost immediately into coaching:

*I felt desecrated almost; I mean violated. I felt I wasn't taken seriously – and which I think I wasn't, I think that my feeling was correct – but I have to admit that the guy who was the first goalie, who was 6 years older I think than I, and he was a darned good goal keeper. I mean in the coaches mind, there could never been a question about who should have been the first goalkeeper: it was that guy – he was actually really quite good, I later realised. I mean it was a traumatic experience. [...] The thing however is, is that I think after I left that club, which means that I was probably 19, I never played in a high performance match ever again, so it led to a drastic decision. I guess I said something like ‘I'm not going to allow for people to put me in that position’. So I started coaching more; I had already started coaching and I started coaching more, coaching very seriously, started playing again but I never played a high performance goal keeper match again, although I now realise that a goal keeper comes to his peak at 25 or 26. I never gave it that chance. (SPT Frank R4)*

This individual went on to become national director in his sport and led the national team in back-to-back wins at the Olympics.

Similarly, another individual felt he didn't reach his full potential as a performer due in part to the lack of support for youthful competitors within the sport:

*So at that point in time – sixteen – I was outstanding within the UK. I won the national championship in a record time by a record margin and a big gap between me and the rest which was interesting. Then a period of – how would you best describe it? – relative failure I suppose [...] I didn't get a helluva lot better – found myself trying to pursue this ambition with very little path to follow. The coach that had helped me to get to that national level, felt he wasn't able to take me further. The national team system as you might call it at the time, certainly offered me nothing. It was pretty fragmented; people cast opinion*



*saying 'Do this do that' and I guess I lost my way – is the simple truth [...] I was trying to learn all these new tricks and found myself doing a whole load of things I didn't understand, probably didn't particularly enjoy and wasn't particularly winning the level I would have aspired to [...] So we kind of fast forward to 18. No longer on the national squad because didn't make an obvious step up between 17 and 18. Got quite ill – had a number of bad {injuries}. (SPT Edward R2, 3)*

He subsequently moved into sport science and became one of the leading figures in his field of exercise physiology and scientific support for elite competitive performance. This eventually led to his becoming national director for his national team.

One individual was dismissed as the national coach:

*The biggest reverse for me as an athlete, was actually I was made {country} coach after I finished playing as a player; I became the coach for a World cup – it was held in {country} and we didn't do very well in the World Cup and I was fired within a few weeks of getting back and I felt that it was grossly unfair and looking back, I did, I went through sort of social death you know because for 25 years I'd given my heart to this sport and suddenly I had no status, no position, I was not playing any more, I felt as if I'd done everything I could. And what happened was as I reached coming out of the Kübler-Ross curve, I decided to walk away from sport – not professionally – but in my personal leisure time and I started politics. I started getting involved in sports politics. So instead of being a coach, I got involved in running a pressure group for women's sports and became an active feminist by this point; I'd brought those two interests together. (SPT R4 Diane)*

The individual decided to move to a parallel pursuit in the academic study of sporting culture politics. In this position she became a national leader in her field, attained international recognition for her work and significantly changed the direction of policies and practices in the field.

Another person's falling out with her opera company led to a major decision to move away from a singing career:

*They dropped me from the season, singing a role that I loved and had sung many, many times before and that was probably emotionally harder because it had confused very, very deep friendships that had set together in an esprit de corps and established this company who'd won the Prudential award for opera. You know, it was all great stuff. And then I was just dropped; that was appalling because it broke up a very, very dear friend as well. And what I am trying to ask myself today is whether that experience further turned me away from this area of pursuit. There were lots of other things I didn't like about it. I think I suspected – which sounded appalling after all the time, energy and care people had put into developing me – I think I suspected it would feel limited. That as a singer you were ultimately – of course you had the attention and the glory and a lot of emphasis on your physical health and looking if you felt alright or not – a bit like being an athlete, you know I had to be there, people were expecting you. But it didn't have – I mean lots of politics, but you had no – you were way down on the food chain. You were vital to them so, if you're not there it's a problem, but didn't have any influence on the direction; the overall direction of it – at least not in that day. (MUS R6 Susan)*

Subsequently this person went on to finish her PhD in musicology and eventually to become the president of a college.

#### **9.3.1.4 Summary: Failed transitions**

Amongst participants in this study, failed transition almost always led to reassessment and redirection. However, there seems to have been a gamut of responses to failed transitions ranging from minor course corrections, decisions to pursue more training, re-assessment of one's abilities, through to major course corrections and radical career changing moves. Only 1 participant out of the 24 in the main study failed in a way which effectively ended their progression in their career.

Intrapersonal intelligence seems to have played a key role in the response of individuals to a failed transition: participants in the study “think back,” “reassess,” “ask myself,” consider “doing something different” and generally self-assess after failure. This self assessment usually led to a decision to proceed in a modified or new direction. In some cases, individual changed careers directions almost overnight. In other cases this transition to a new field could take several years e.g., an individual who finished his performing career when he was 18 but didn’t actively take up a research career until 4 years later.

Failed transitions can often ‘push’ an individual to generalise their expertise. When movement was stopped in one direction, individuals often moved tangentially: from playing to coaching, from performing to studying performance, from singing to running a research project on musical performance, from playing to administering. Such ‘failed transitions’ that led to lateral moves within a field were most common in sport. This may reflect the nature of the different performance curves in the domains. Sports people often reach the end of their performing life at an early age, sometimes abruptly due to injury, and are ‘compelled’ to make a lateral transition.

A failure was generally not under control of the individual and seldom initiated. It is perhaps not surprising, therefore, that control over one’s career and maintenance of autonomy were important factors in the response to failed transitions. One of the most interesting responses to this failure was when an individual determined that as a consequence of the failure, they will take themselves out of an arena in which they have no power i.e. where other people make decisions about them or where they have no control over their own life. In

this context the response of the individuals was indicative of a variety of factors including motivation (Deci & Ryan, 1985), self belief (Bandura, 1997) and personality resilience (Block & Block, 1980).

Self reflection was more in evidence during failed transitions and was the basis for learning from failures. However, if over the course of a career an individual is repeatedly stymied in their transitions, it might be the case that intrapersonal intelligence would become a more recursive, neurotic recycling of thoughts of failure and self recrimination rather than a tool of development.

### **9.3.2 Choosing not to make a transition**

#### **9.3.2.1 Stopping performing in one domain to concentrate on another**

Early on in a career, often at the transition from student to performer or from performer to coach, some individuals had to make decisions about the domain to which they would dedicate themselves. Some typical examples are listed below.

Stopping law school to coach sport full time:

*I mean this was now a very serious team; I was actually being paid decently to do so to coach that team and I gave it everything I had – night and day, night and day – which is also when probably it coincided with the moment where I had to communicate to my parents that I was just not going to get this degree – I mean I'd been studying for 7 years but I was just not going to get this degree and I went full out with that one. We were successful; I coached the team for 4 years and we won the league. (SPT Frank R1)*

Stopping university to concentrate on sailing:

*I didn't really want to carry on with the aeronautical engineering – it was too deep, scientifically for me – and so, they gave me the opportunity of going straight into the Navy which meant seamanship, navigation, meteorology etc. So*

*it was still all inter-related to the sport, the scientific aspects of the sport. (SPT Alan, R1)*

Stopping music to concentrate fulltime on sport:

*Yes my music faded a bit while I was in PE college; I kept it going but not seriously and by the time I got to {university}it really was lapsed– you know sports had taken over.(SPT Diane R1)*

Stopping sport to concentrate on music:

*I just thought I'm a musician; I even stopped running because I used to run races and win them like mad and I now regret that I didn't go on being an athlete because I ran the mile in 4 minutes 28. At 17 that was quite important to me at that stage. (MUS R1 Richard)*

### **9.3.2.2 Choose to not transition because not the right choice**

Sometimes individuals choose not to make a transition because it was not the right choice. Often this was because the new position was incompatible with their values and life-purpose.

One individual stopped academic research to get back to teaching/coaching:

*I went to see my Masters tutor towards the end of my course and he sat me down and said 'You must go on and do a PhD' and I said 'No, I must stop being a student and start teaching'. I got a job in a high school. I had my eye on this high school for ten years – it was the one place I wanted to work because there was a very good woman head of department who I wanted to be my mentor. And he said to me 'No, no you must go on and do a PhD'. I mean now I look back I think he was probably right, but at the time I had been a student for five years and thought it was time to get out and earn a living and see the world and stop being a student. (MUS Diane R3)*

Some individuals choose not to transition because it conflicted with their values:

*The braver decision or the more confident decision would have probably been 'Go for it', but I think my whole sort of upbringing and way of thinking was 'No, no stick with the sort of corporate thing and you'll do well in there and you'll*

*continue to go to different things.’ There was a bit of discomfort of working in a sort of John Grisham like place where you’re basically selling your soul to extremely professional – nice – but people who were going to pretty much do anything to make a buck and that did feel a little uncomfortable. (BSN RI Karl)*

Some individuals choose not to transition because they felt they were at the right level of their aspirations:

*Last year I applied for two jobs and got short listed and both of them were slightly higher up the food chain than I am now and I very quickly realised, through doing the applications and then interviewing for them, that at the moment the tension between my administrative job, my managerial job, and my playing is at its fullest extent. I think step one further up and there’s no relationship possible really. You move further and further away from, not only from the hands-on educational experience but certainly the hands-on playing experience, the two become almost mutually exclusive then. So I had to really sort of come to terms with this dichotomy of, do I stay where I am because actually it enables me still to carry on doing the things that I want to do. (MUS Stephen RI)*

### **9.3.2.3 Achieve a transition but decide that the new stage is not what they want and choose to drop back or move tangentially**

This is perhaps the most interesting non-transition in which individuals who have made successful transitions decide that they don’t want to continue at that level of performance: they step off or back down the hierarchical career ladder. This is particularly the case where individuals have moved from coaching to running a department and subsequently decided to quit running the department in order to revert to coaching people.

One individual choose to reverse a transition because he didn’t want the administrative responsibilities:

*I felt a kind of bifurcation in the road coming up where either I had to sort of commit myself fully to these managerial aspects of the job, you know the*

*academic parts of the job. And most important of all, I had begun to feel that because I was carrying on teaching at the time – I had a lot of students here – I had a conversation with my line manager here and said ‘I am worried about this, I feel that my own teaching is suffering through it’ and he said ‘Well you shouldn’t be doing so much teaching’ and you know, that was the crunch for me, that was the crunch: I thought but this is, the first half of my life was playing oriented, the second half was teaching oriented, that’s what I loved doing, and what I, how I foresaw the job was enabling and facilitation myself and my colleagues to teach at the highest possible level in a productive and lively environment and yet my energies for doing that seemed to be getting gradually sucked away by other things. I think I also felt I was running out of ideas. For example when I started doing it, in one of the things I loved doing was organising master classes – getting people in from outside who I had always wanted to get in. By my last year of doing it, I was thinking ‘Oh God it’s the calendar deadline coming up for master classes and I haven’t arranged anything; who can I get?’ Sort of rather than thinking you know ‘What am I going to make of this opportunity’, sort of hanging on to keep up with the schedule and I just thought this no longer feels like what I wanted to do. (MUS R3Robert)*

Another quit as head of his national sporting association because he didn’t want to be managing people all the time:

*I think I did most things adequately; I mean I did some things very well. I think if you’re adept with the basic mathematics and can work a spreadsheet, you can make a pretty good job of tracking what your business is doing or interpreting management accounts when they come in if they’re done properly so some things were quite easy to do. I guess where I was least successful –and ultimately was probably the compelling reason I moved on from it – was the more routine day to day management of people, their needs, their challenges on a day to day and sometimes on an hour to hour basis on the ground is probably the thing I’ve been least effective at. [...] I don’t think I lack emotional intelligence if that’s the right understanding; when I’m in a coaching mode, I think I’m probably better than average in relating to people and working quite hard to see the world through their eyes, to ask questions and listen in a way that builds empathy and trust. I think that’s actually a very, very important feature of coaching in getting the best out of people. But that didn’t transcend*

*to all the challenges that comes with managing large teams of people and managing the culture and the climate that they're working in. That seemed to be something that I didn't do that well at in all honesty – or recognise that it needs to be done exceptionally well to then take things to higher levels, so I would happily settle for the description of me as a sort of a chief engineer designer of the world class programme that is now so successful in cycling and probably somebody who did a lot of innovation in the growth years to get it to a certain point. But where it has now gone to since is I think much more about managing those broader dynamics and something that's now got a very good foothold but realises the next level of performance is achieved by maintaining a level of stability when people are pushing that high all the time. And that's not a skill set that I think is one that I'm desperately driven to develop; actually I think I get – I don't want to say it was bored – but I think that once most of the milestones that I can see have been crossed, I'm kind of looking for the next challenge (SPT Edward R5)*

#### **9.3.2.4 Summary: Choose not to transition**

While failed transitions were almost always reactive, the choice not to transition tended to be initiated. Motivational factors were important as individuals made these decisions about what career paths they would follow. For example, it was common for musicians to decide that they needed to concentrate on music which led them to stop training in sport or in academic disciplines. Such decisions were usually taken upon entering more seriously into a performing career at the first or second stage transitions but, crucially, not before they had acquired some expertise in another domain which would support generalisation of their primary domain. Individuals also stopped training in a different domain which had no apparent overlaps with their primary domain such as law or engineering in order to pursue a sporting career. There were also choices to move away from performing or coaching in sport in order to pursue an academic career studying sporting performance. Such shifts away from performing but still within the field



of the primary domain were all made by the second and third stage transitions. They represent examples of Schein's (1978) inclusive or functional transitions.

Another factor which contributed to the choice not to transition involved values and life aspirations. Positions were sometimes offered which presented fundamental conflicts with personal values and ethics – and were declined. Individuals also chose not to make a transition because it would compromise the quality of their life or their family life. Still others chose not to transition because they were happy at the level they had reached: to move would take them away from the kind of work they loved.

Some individuals gave up a successful position to revert to a lower or lateral position. These latter choices were usually the result of a realisation that the new positions required too much administration or took them too far away from actually working with people. These types of non-transitions were mentioned more by musicians and sports people. While Ibarra's (2004) model of working identity is concerned with how individuals prepare for and then implement identity changes, the same process might be followed when an individual decides that they want to revert to a previous identify e.g., from head of a faculty of music to a performer. It seems clear that any understanding of the choices not to transition requires an understanding of how motivation (Deci & Ryan, 1986; Weiner, 1980) and values (Schein, 1990) operate to steer career choices.

It is possible to see convergent processes operating in choices to not transition as individuals weigh up factors and make considered decisions about whether to take up a position or to revert back to a different position. Similarly, after failed transitions, as they seek to regain control and develop capabilities, individuals

can react by seeking more control over future transitions and anticipate how they need to plan and develop further.

## **9.4 Concluding discussion**

During transitions an individual will move from a relatively stable homeostatic position into an unstable, non-homeostatic transition process before returning eventually to a newly stabilised position in a different role or function. Transition expertise provides individuals with the cognitive processes and abilities that enable them to traverse these transitions in ways that 1) take advantage of the opportunities that exist in the non-homeostatic transition situation through applying divergent cognitive processes while 2) using convergent cognitive processes to bring the transition situation under control so that they may operate effectively.

Transition expertise operates differently during reactive transitions than it does during initiated transitions. This difference highlights the key divergent/convergent dialectic that exists within the various elements of transition expertise. During initiated transitions there is more opportunity to use elements of transition expertise that bring stability or homeostasis to a situation through managing, planning and otherwise controlling the transition process and the environment into which one is transitioning. During reactive transitions individuals are more often called upon to use elements of transition expertise that are cognitively flexible and generative to respond to emergent issues and to adapt existing abilities or develop new ones. This duality of cognitive process that stabilise and control as well as generalise and adapt can work in 'cooperation' during most transitions. It is likely that too much of one or the other at the wrong

time or place may lead to difficulties in managing a transition. The capacity to judiciously decide how much and when to apply convergent and divergent types of transition expertise is an important meta-process during transitions which has not been fully explored in this project.

Non-transitions were of equal interest. A failed transition almost always resulted in an intrapersonal reassessment on the part of the participant and was accompanied by a decision to develop further capabilities or a decision to move or to change career direction or sometimes both. These non-transitions were often be the impetus for generalising domain expertise. Choices to not transition were often the product of this same reflective process which took place before the transition occurred.

The responses of the participants in the study during all of these various types of transitions indicated that other factors were in operation during transitions such as motivation, self beliefs, attributions of control and personality resilience that are beyond the scope of this project.

# Chapter 10. Conclusion

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## **10.1 Objectives and approach of this project**

This project has sought to understand how experts in high performance professions such as athletes, musicians and bankers are able to make repeated and successful career transitions to attain senior positions in their field. Initially it addressed five areas thought to have the biggest impact on career transitions: expertise, intelligence, self-beliefs, motivation and personality resilience. This proved overly ambitious and the areas under study were narrowed down to expertise and intelligence. Through taking a largely cognitive approach to studying the abilities and processes that enable successful career transitions, the parameters of the thesis were further narrowed and the research questions became more focussed. The use of retrospective interviews as the main methodology for the study was undertaken to develop an understanding of career transitions. Ultimately three main research areas were arrived at and research questions were formulated accordingly.

The first set of research questions address the operation of cognitive flexibility and inferential intelligence during transitions. The first of these questions concerned the characteristics of the cognitive flexibility that enables experts to overcome the constraints of expert domain specificity so that they can apply the expert processes and knowledge acquired within their primary domain during transitions and to new domains? This issue was addressed in Chapter 4. The second questions concerned the actual mechanisms that individuals use to generalise cognitive processes across different domains when making

transitions? These mechanisms were identified as induction, inference and analogy and were addressed in Chapter 5.

The second set of research questions address the operation of other aspects of intelligence during transitions. The first question proposed that personal intelligences, which are prominent in most theories of intelligence, would play a major role in how individuals managed transitions. This was addressed in Chapter 6. The second question proposed that practical intelligence would provide the abilities necessary to manage the environment into which an individual was moving – and its material resources –and could explain how expert knowledge and processes were applied pragmatically and contextually during transitions. This was addressed in Chapter 7.

The third set of two research questions addressed the nature of transitions themselves. The parameters of these questions emerged more clearly during the preliminary analysis of the data. Firstly, in order to understand career transitions one had to understand the career cycle and stages through which individuals progressed. These were initially reviewed in Chapter 1. But in studying transitions at the various career stages it emerged that transition expertise was not a static collection of processes and abilities: it developed over time. This question of how transition expertise evolved throughout the course of a career was addressed in Chapter 8. Secondly, a number of types of career transitions were identified in which transition expertise operated differently. Understanding the different ways transition expertise operated in these different transition situations would enable a better understanding of the nature of transitions and transition expertise as a whole. This was addressed in Chapter 9. This last set of

questions helped build a more coherent sense of how different elements of transition expertise interacted and, in the end, helped develop a more unified conception in which abilities, cognitive processes and skills developed over time into something that could be called transition expertise.

## **10.2. The findings of this study**

### **10.2.1 Expertise, generalisability and inferential mechanisms**

#### **10.2.1.1 The expert conundrum**

The arguments for the non-generalisability of expertise are compelling and the research extensive: expertise training, domain specificity, functional fixedness, reductive bias, and automatisisation can and do limit the generalisation of expertise (Dunker, 1945; de Groot, 1946; Simon & Chase, 1973; Sternberg, 1988; Salthouse, 1991; Sloboda, 1991; Krampe & Ericsson, 1996; Feltovitch, & Coulson, 1997; Ericsson, 2003; Chi, 2006; etc). The non-generalisability of expert processes and knowledge could limit the ability to make successful transitions between career stages. However, many of the cognitive processes and structures that support the application of expertise are in themselves innately malleable and there is equally extensive evidence for how cognitive flexibility can be developed to avoid the constraints associated with expertise or overcome them if they have been embedded in a specific domain (Egan & Greeno, 1974; Rumelhart & Norman, 1978; Holyoak, 1984; Keil, 1984; Spiro et. al., 1987; Amabile, 1996; Feltovitch & Coulson, 1997; Feltovitch, Spiro & Coulson, 1997; Demitriou, 1998; Baltes & Staudinger, 2000; Gobet, 2005; Krampe & Charness, 2006; Chi, 2006; Horn & Masunaga, 2006; etc.). Consequently and ultimately, it has not been the objective of this dissertation to determine **if** expertise can be

generalised: clearly it can be and is. Rather, the more pertinent questions are: **what** are the characteristics of expert processes and knowledge that make them generalisable and **how** do experts use this generalisability to support repeated and successful career transitions.

The ways in which individuals acquire their expertise is a main contributor to its generalisability. The findings of the study indicated that the early development of expertise in multiple domains contributed to its generalisability e.g., oboe players were also athletes, energy traders were also linguists and engineers, sports women were lawyers and musicians, engineers were athletes, athletes were engineers, musicians were scholars, and so forth. This development of multiple points of view from diverse domains contributed to cognitive flexibility (Spiro et al., 1989; Feltovich, Spiro & Coulson, 1997) and created expert domain knowledge and processes that were less domain tied, less rigid and less reductive. Expertise could become more open to variation and combination, more accessible from a multiple routes and generally more flexible. The cognitive processes used in transition expertise were less reductively biased, functionally fixed or automatic (Feltovitch et al., 1984; Hoffman, 1987; Woods et al., 1994; Gobet, 1998; Feltovitch, Spiro & Coulson, 1997). Individuals also developed a wider range of cognitive processing mechanisms (Salthouse, 1991; Ste Marie, 2003) which made them more able to perform effectively in new positions.

Individuals were able to generalise both expert domain processes and knowledge. While the domain specific knowledge that makes up the content of templates and schemata can tie their use closely to the domain to which the knowledge is acquired, there are also arguments for how discrimination nets can be broadened

(Gobet, 1998), multiple routes can allow varied access to templates (Gobet & Simon, 1996b), rule induction can take place (Egan & Greeno, 1974) and more general access to knowledge can be incorporated into semantic memory (Tulving & Thomson, 1973). All of these processes would enable domain knowledge to be generalised. However, expert processes seemed more readily generalisable than expert domain knowledge (Glick & Holyoak, 1983) and schema organised processes that might limit generalisability can be interrupted through reasoning based on “first principles” (Chi, Feltovitch, & Glaser, 1989) while cognitive processes and heuristics can “break free of perceptual and cognitive sets” (Amabile, 1996) and domain specificity over time. These and similarly malleable cognitive processes will enable individuals to respond to new situations without being limited by the primary domain expertise constraints associated with content specific structures and processes.

One of the more surprising findings in the study was the relatively few mention of deliberate practice (Ericsson, Krampe & Tesch-Römer, 1993) as a contributor to the acquisition of primary domain expertise and was not mentioned at all by participants in conjunction with transitions. This is not to say that individuals did not train and study hard: there were numerous mentions of assiduous training, particularly amongst sports people and musicians, but not in ways which conform to deliberate practice criteria. The two sports people who did mention training in ways that could be considered deliberate actually did not progress beyond third stage transitions in their sport. There is a strong possibility that deliberate practice may contribute to cognitive inflexibility and by default to difficulties in making transitions.



### **10.2.1.2 The inferential solution**

While cognitive flexibility enables the generalisation of cognitive processes and knowledge in general and expert processes and knowledge in specific, the cognitive mechanisms in most theories of intelligence generally described as induction, inference and analogy were the main tools identified by the participants in the study for making such generalisations.

*Induction* opened the door of generalisation. Individuals could revert to first principles (Hoffman, 1987) in their expertise and access deeper levels of meaning (Chi, 2006) to gain insight into new situations. In the findings of the study individuals used inductive processes to generalise from the specific experiences to more general ones (Carnap, 1962; Guilford, 1967; Carroll, 1993; Vickers, 2010). They could apply personal experience from their performing career to subsequent coaching and managing positions (Ste Marie, 2003) and derive principles from their domain experience in these earlier career stages to apply to more general policy and subsequent organisational leadership issues (Schein, 1992). *Inference* enabled individuals to apply existing processes and knowledge from one domain to another through inferring, mapping and application (Spearman, 1923; Sternberg, 1977). They were able to deduce common categories such as concepts, class membership, rules, processes and causal relationships to apply from one experience to another (Rumelhart & Ortony, 1977; Egan & Greeno, 1974).

Some inferences closely matched past experience with new situations, others were generalised more broadly, some stayed within their domain and others used knowledge from diverse domains and bridged multiple expert knowledge domain boundaries. *Analogies*, which are special cases of inferential induction, further enabled individuals to generalise rules, propositions, production processes, and schema laws from experience in one domain to another (Egan & Greeno, 1974; Rumelhart, 1980; Glick & Holyoak, 1983). Metaphor bridged the largest distances between domains. Generalisations from ‘modular’ intelligences beyond their domains of application often took place, despite Gardner’s (1985) contention that the domain specificity of symbolisation systems, critical thinking, and modular processes would limit general application. Even Fodor, a key proponent of modularity, acknowledges that individuals seemed to constantly ‘over-ride’ or circumvent these “modular intelligence” constraints in which “the higher flights of cognition” were mediated by “comparatively domain-free capacities” (1983, p. 43).

It was not evidenced in the data that the inferential and inductive cognitive processes used by participants in transitions operated in hierarchical or necessarily sequential ways. While some of the participants assessed their transition situations and planned accordingly, there were few indications that participants subjugated their inferential mechanisms to executive control in a linear, sequential way as characterised by Sternberg’s (1988) meta-component process. Individuals seemed to arrive at their own internally validated heuristics for managing transitions which did not appear to follow the linear process often imposed by cognitive scientists seeking to order the workings of the mind. This is not to say that there were not common patterns of usage of cognitive

inferential mechanisms amongst the participants in the study. However, each person used their own abilities and predilections to develop and refine their personal repertoire and idiosyncratic approach to using inferential mechanisms.

The data confirmed that inferential intelligence – whether one describes its mechanisms using the theories of Spearman (1927), Thurstone (1947), Carnap (1962), Miller (1970), Sternberg, (1978), Guilford, (1967), Carroll (1993), or others – operates in tandem with cognitive flexibility to generalise expert knowledge and processes.

Schema models (Rumelhart & Norman, 1978; Rumelhart, 1980; Glick & Holyoak, 1983; Goldman & Pellegrino, 1984; Zeits, 1997) provided useful cognitive constructs or frameworks with which to describe how inferential mechanisms operated to generalise expert knowledge and processes during transitions.

## **10.2.2 Personal Intelligences**

### **10.2.2.1 Intrapersonal intelligence: From self awareness to self regulation and back again**

In the analysis of the data, intrapersonal intelligence was divided into statements indicative of self awareness and self regulation. Most *self awareness* statements made by the participants in the study concerned issues of self identity, self confidence, self motivation, and self acceptance. Individuals used self awareness to accumulate self knowledge, understand themselves better, access their strengths and weaknesses, know their motivations, and ultimately to determine courses of action. As such, self awareness seemed to encompass more than Spearman's (1927) first noegenic laws: “the apprehension of one's own

experience.” Participants were actively involved in the “awareness and management of themselves” (Guilford, 1967) and intrapersonal intelligence was used in a way that reflected Gardner’s “project of the self” (1983). Metacognition (Flavell, 1979; Nelson & Narens, 1990), however, was less common than had been anticipated and participants in the study seemed less involved in thinking about how they thought and felt than had been anticipated in the original research questions. Intrapersonal intelligence used during transitions seemed to stop short of extensive metacognitive monitoring and control.

*Self regulation* processes were also mentioned less than had been hypothesised and there were few generalisations of self-regulatory processes from earlier performance stages to later transitions. Self regulatory processes used to enhance performance (e.g., Kuhl, 2000; Zimmerman, 2006) may be inappropriate for use in transitions because they tend to structure an activity through planning and ordering in an essentially linear, incremental ways. These processes may be more accessible and perhaps more suitable for maintaining existing, stable, predictable states than adapting to emergent, non-homeostatic transition states. Deliberate practice (Ericsson, Krampe & Tesch-Römer, 1993) is an illustration of a collection of self regulatory processes which can lead to enhanced expert performance but can also reduce cognitive flexibility. The fact that participants in the study mentioned self regulation less than self awareness and mentioned deliberate practice even more infrequently suggests that these kinds of controlled self-management processes may not provide the cognitive flexibility necessary to manage the transitions process itself.

Business people made more references to intrapersonal intelligence during transitions than sports people or musicians which was attributed to a need to develop greater self awareness because, typically, they tend to move further away from the familiarity of their primary domain knowledge earlier in their career. It is also probable that the intrapersonal intelligence which musicians and sports people developed in their studentship would be more likely to become tacit (Polyani, 1966; Wagner & Sternberg, 1985) whereas for business people intrapersonal intelligence is trained explicitly at later career stages.

The composite nature of emotional intelligence models (Goleman, 1995; Bar-On, 1997) that included motivation, self image, self beliefs, coping strategies, and affect management made them less useful for the purposes of this study. Nor was emotional or affective self regulation (Mayer & Salovey, 1997) widely mentioned by the participants in the study.

#### **10.2.2.2 Interpersonal intelligence: From self to other and back again**

As expected, interpersonal intelligence was generally used by the participants in the study to understand how to act in relationship to *others* as has been proposed by most of the earlier models of intelligence (e.g., Thorndike, 1920; Spearman, 1927; Vernon, 1959; etc.) Certainly, stage transitions to coaching and professorship in sport and music were heavily focussed on developing their students and protégés. But throughout the transition processes to subsequent career stages, participants remained concerned about the development of others. There were also clear examples of individuals using interpersonal intelligence to develop *themselves* through use of feedback from interpersonal sources, as was proposed by Gardner (1983). They adapted their behaviour based on this

feedback which they would seek from the people who they coached and managed and also from mentors and colleagues (Schien, 1990; Torbert, 2004). Furthermore, participants used interpersonal intelligence to understand and respond to *organisational* dynamics and corporate climate issues. This was most obvious in the ways they managed stakeholders and the politics of an organisation during later career transitions. This aspect of interpersonal intelligence could be explained as a “social intelligence” used to accomplish social tasks as described by Cantor and Kihlstrom (2000). It may also reflect the operation of a kind of structuration (Giddens, 1984) that involves a recursive self-reflective process whereby individuals are both socialised by the institutional culture into which they transition and in turn shape the culture and its processes. This may also characterise the relationship between organisational leadership and the development of corporate culture (Schein, 1992).

Some participants demonstrated strong indications of interpersonal intelligence early on in their careers and for others it only emerged at later stages in response to job requirement. But almost all of the participants continued to develop the skills associated with interpersonal intelligence progressively throughout their career transitions as they took on high degrees of responsibility in their field. This is consistent with the research from lifespan psychologies in which older adults are more likely to consider the social and interpersonal aspects of problems (Laipple, 1992) and will be more interpersonally sensitive to the actual nature of a problem than younger adults (Sinnott, 1989). Wisdom models of expertise describe this as “contextualisation meta-heuristics” (Alexander & Langer, 1990; Baltes, 1997).

## **10.2.3 Practical Intelligence:**

### **10.2.3.1 Grasping and manipulating the environment**

Practical intelligence was used by all of the participants to address “real-life” situations during transitions. *Problem solving and solution resolution* tended to operate as an inquiry during the early exploration stage of a transition as suggested by most transition models (e.g., Tiedman & O’Hara, 1963; Crites, 1976; Bridges, 1991) followed by “crafting” strategies (Mintzberg, 1985) during the subsequent integration stage. This is consistent with Ibarra’s (2004) “testing and learning” phases of transitions. But problem solving in practical intelligence was not rigid and linear; it was more “skilled” and “flexible” (Scribner, 1986). There were only a few illustrations of individuals sitting down to consciously use sequential, analytical processes during their transitions: practical intelligence was not synonymous with either analytical intelligence (Sternberg, 1996b) or sequential meta-components (Sternberg, 1987). Even business people who were trained regularly in analytical problem solving techniques did not mention them as contributing significantly to their transition expertise.

*Administrative* kinds of practical intelligence were mentioned more by musicians and sports people in transitions than business people. The “squeezing and moving” skills (Scribner, 1986) associated with this kind of practical intelligence were usually developed during their performance career stage which often required more self management than was the case with business people. After this, these practical intelligence skills become almost tacit before reemerging amongst sports people and musicians to be generalised explicitly during transitions to larger operations such as head of faculty or a head coaching

positions. Business people did develop administrative kinds of intelligence, often through formal training. However, they did not consider it to be so important for managing transitions. It is worth noting that in both problem resolution and administration, as they operate in practical intelligence, one can see the use of inferential mechanism as described in Carroll's *flexibility of use* and *induction* factors (Carroll, 1993), Guilford's *divergent production* operations (1967) or Sternberg's *performance* and *knowledge acquisition* components (1988).

Participants manipulated their *environmental resources*. They “adapted to and shaped” (Sternberg, 1988) their environment and drew upon “facilitating conditions” to “fit means” to situations (Welford, 1974). Because practical intelligence is so involved with the manipulation of the environment, it is necessary to view it contextually and, of all the intelligences, this is the one which is most amenable to an ecological (Gibson, 1986; Neisser, 1976) or social cognitive (Cantor & Kihlstrom, 1987; Scribner, 1984) explication. Practical intelligence, ultimately, is “instrumental” (Dixon & Baltes, 1986).

## **10.3 The Career Transition Cycle**

### **10.3.1 Transition expertise as a developmental process**

One of the key findings that emerged during the course of this study was that transition expertise develops and evolves over the course of a career. For example, in earlier career transitions (1 & 2) inferential processes were used primarily to apply knowledge from non-domain specific experiences to support expert performance in the primary domain. In mid-career transitions (3 & 4) expert knowledge and processes were generalised between different parallel arenas or positions within a field e.g., from heading a faculty of music to heading



a multi-media performing department. In later career transitions (4 & 5) individuals began to use their primary domain expertise as a source for the analogies and metaphors used to expand upon their experience to large arenas of application.

Inductive (Carnap, 1962; Vickers, 2010) expansion of expert knowledge from specific applications to more abstract principles (Hoffman, 1987) was used continuously throughout a career in ways that enabled individuals to develop increasingly broad understandings of the contexts into which they had transitioned and to apply their previous experience to these new situations. This enabled them, for example, to move from coaching others to managing operations to building corporate structures to developing organisational culture as they progressed successively through stage transitions. Inductive processes often worked in conjunction with practical intelligence to expand from specific experience to the general applications.

The evolution of the use of personal intelligences in transitions was more convoluted. In earlier career transitions, intrapersonal intelligence was important for self management and personal development as proposed by Gardner (1983) whereas interpersonal intelligence became more operative later when moving into positions which required managing people and teams of people which would indicate the operation of social intelligence (Cantor & Kihlstrom, 1987). In mid-career transitions, interpersonal intelligence continued to be developed for understanding stakeholders and the organisational context while intrapersonal intelligence was less in evidence as individuals seemed to be largely externally focussed. However, in the later career transitions both personal intelligences

reverted to more simple and intimate applications: intrapersonal intelligence was used to reflect on one's sense of purpose and direction in life and interpersonal intelligence was used to build rapport with colleagues and team members in one's intimate circle. This is congruent with life span learning theory (e.g., Laipple, 1992; Strough, Berg & Sansone, 1996).

Personal intelligences retained this malleability which enabled them to be used as a basis for inference from earlier domain performance to more general subsequent issues while still continuing to be used for managing oneself and one's intimate working relationships. This may reflect the fact that personal intelligences are not specific to the domains under investigation (Gardner, 1993) and so were less tied to domain content specific performance. But it may also reflects an evolving understanding by the participants in the study as to how best to use one's full range of intelligences. This may be more generally indicative of how transition expertise is consciously developed over the course of a career. A number of life development and transition career cycle theories support this evolutionary concept of self awareness. Erikson's epigenic matrix describes the psychology mechanisms of increasing self awareness during the life cycle in which "wisdom and integrity are active, life-long developing processes" (1985, p. 9); Gardner's "sense of self" is viewed as an "emergent capacity [that] grows out of the intrapersonal *and* the interpersonal intelligence" (1983, p. 296); Levinson's life structure "evolves through a standard sequence of periods" (1978, p. 41); Torbert's leadership development framework explains the unfolding "self transformation towards fully and regularly enacting the values of integrity, mutuality and sustainability" (2004, p. 65); Ibarra's working identity cycle is repeated until after "several loops around this cycle, we eventually

undergo a more profound change that allows fuller expression of whom we have become” (2004, p. 161).

Another conclusion about the evolution of transition expertise is that cognitive flexibility seemed to be developed during the early periods of an individual’s career. It is possible, if too inhibited through functional fixedness, automation, deliberate practice and other reductive training, that it could be constrained or “stunted”. This would make it more difficult for many cognitive structures to generalise expert processes and knowledge during transitions, to operate as robust yet flexible platforms for inferential mechanisms, or indeed to be more widely available for the multitude of applications required for successful performance in one’s career.

### **10.3.2 The transition process**

#### **10.3.2.1 Reactive and initiated Transitions**

Transition expertise operated differently during reactive and initiated transitions. While interpersonal intelligence was used to the same extent in both reactive and initiated transition, intrapersonal intelligence was more in evidence during initiated transitions. One interpretation of this is that initiated transitions give more scope for intrapersonal activities like reflecting, considering and – from a self-regulatory perspective – anticipating and planning for transition. The circumstances of initiated transitions may also enable the application of administrative and problem resolution types of practical intelligence as they support “dealing with constraints” (Goodnow, 1985) and developing an “apt formulation or redefinition of a problem” (Scribner, 1986). Domain knowledge generalisability was also more available during initiated transitions and it is

possible that an anticipated and controlled transition might make transfer of domain knowledge easier.

It is possible to conclude that a number of elements of transition expertise such as self reflection and anticipation, managing and regulating the transition environment, or the application of existing knowledge to a new situation may be used more readily in a transition situation where change is anticipated and consequently more controllable. A further possible conclusion is that, where they can be applied because the situation is more controlled, these kinds of processes may bring further stability to an otherwise uncertain transition situation and enable individuals to use existing knowledge to perform more within their previous range of experience. These conclusions are consistent with a number of transition process models (e.g., Bridges, 1991; Elsner & Farrands, 2006) in which the main focus is on controlling ambiguity and anxiety. It is also characteristic of adjustment theories (Tiedman & O'Hara, 1963; Crites, 1976; Nicholson, 1984).

Transitions, however, are movements through non-stable periods of a career. The operation of cognitive flexibility, inferential intelligence, and expert cognitive processes (as opposed to knowledge) are more likely to be the means whereby an individual adapts during unstable periods or in unknown situations through generalising existing abilities and, where necessary, developing new ones. The data suggests that these cognitive processes seem to have been used equally in anticipated and reactive transitions.

The use of different aspects of transition expertise in initiated versus reactive transitions seems to conform in a number of ways with the generally accepted

dichotomisation of the mechanisms of intelligence into convergent and divergent cognitive processes (Guilford, 1967). The main focus of this study has been on the divergent processes associated with cognitive flexibility and adaptation rather than the consistency and control more associated with convergent processes. However, it seems likely that individuals who are expert at transitions may use a judicious combination of both: they regularise what they can to reduce ambiguity and minimise lack of control and they use generative and flexible cognitions to adapt to changing circumstances and grow into new positions. Convergent cognitive processes that contribute to control and regulation might also allow divergent mechanisms such as inference, analogy and induction to make existing expert knowledge and processes more applicable and generalisable. A review of the transition process models seems to confirm this dual function. Some, like Bridges (1991) and Elsner and Farrands (2006), focus more on managing and controlling the transition process while others, like Ibarra (2004), are more concerned with generative processes.

#### **10.3.2.2 Non-transitions**

Amongst the participants of the study, there were, a number of non-transitions that could be divided into two categories: either a transition was attempted and failed or a choice was made not to transition. Failed transitions almost always resulted in a watershed experience in which individuals used intrapersonal intelligence to reassess themselves and their career positions and which in turn lead to decisions to develop further capabilities, change career direction or sometimes both. Importantly, such failures could often be the impetus for generalising domain expertise.

When an individual chose not to transition, other factors could be seen to be operating such as motivation, self belief, attributions of control and personality resilience. Most non-transitions involved motivation for autonomy, self actualisation and work satisfaction rather than a need for status or reward.

## **10.4 Limitations of this study**

Good qualitative research can produce “well-grounded, rich descriptions and explanations [...] more likely to lead to serendipitous findings and new theoretical integrations [in which] the findings from qualitative studies have a quality of ‘undeniability’ ” (Miles & Huberman, 1984, p. 13). It is hoped that the findings in this dissertation meet this standard since the study was entered into as an exploratory process and was intended to generate as much insight into the nature of transition expertise as possible. However, there were limitations in the scope and methodology of this study.

The study used three very different populations – sports people, musicians and business people – as a basis for comparison rather than a formal control group. This proved effective in the analysis of the data since noteworthy differences amongst the populations emerged in areas such as: the early acquisition of expertise; the use of the inferential, personal and practical intelligences; the number of reactive versus initiated transitions participants made; the types of training participants undertook to enhance their performance during career transitions; the length of their performing career’s overlap with subsequent career stages; and the types of inclusive and functional transitions (Schein, 1978) made in mid-career. No doubt other populations would have provided different comparators.

The different populations used in the study were limited to music, sport and financial/engineering business people. This was intentional (representative of Gardner's musical, kinaesthetic and logical/mathematical intelligences) so as to focus on three domains where the transitions from their primary performance domain to leadership in the field would require significant changes in their performance over time. This would provide the kind of distinct transitions to elicit how expertise was generalised. It would also enable the study to examine transition expertise itself since performance in the domains requires significantly different types of abilities, skills and expertise than would be required to perform in subsequent management and leadership career stages and during the transitions themselves. At the same time, it was decided to exclude permanent transitions out of a primary domain field e.g., from sport to business or engineering to advertising. This question of generalisation of expert performance to completely different field e.g., the rugby player who becomes a CEO of a bank or the jazz musician who runs an IT company, is an interesting and important issue. But it was beyond the self-imposed limitations of the scope of this study.

The study did not initially set out to investigate the early development of expertise and how this might influence its generalisability. However, in the interview process, time was given for participants to talk about their early education and development of their expertise. The participants were keen to discuss these early development periods and all the interviews 'overran' the time planned for discussing this period of their career. This proved fortuitous because the analysis of the data from this period of the participants' lives gave clear indications as to how the development of expertise could influence their

subsequent ability to manage transitions. A more targeted interview process for this studentship period would have provided more detailed information about the way in which expertise is developed that might influence its subsequent generalisability. This in turn would provide further information about how individuals might develop the ability to manage transitions more effectively.

## **10.5 Insights and surprises**

**Cognitive flexibility and expertise generalisation.** Expertise theory often presents a conception of expertise which is domain specific and non-generalisable. In reviewing the literature on expertise it was evident that domain specificity, functional fixedness, reductive bias, automatisisation, and other similar narrowing of the application of cognitive processes could limit expert generalisability and constrain transfer of knowledge and processes beyond a domain. This dissertation challenges the idea that expertise was non-generalisable. Rather, it maintains that expertise is susceptible to structuring which may render it non-generalisable through the narrowing of objectives and micro-targeting of goals during the acquisition processes, restricting career choices, inhibiting exploration in other domains, minimising experimentation and through the use of constraining acquisition processes like deliberate practice. But the nature of expertise is not synonymous with this characterisation and the participants in the study clearly demonstrated that such limitations to expertise and its generalisability need not prevail. Expert skills, processes and knowledge were regularly applied and generalised beyond domain performance situations. Cognitive flexibility was developed during studentship and early expertise in multiple domains supported transfer of knowledge and processes across domains.



Participants in the study avoided the most limiting consequences of rigid training processes: they remained open to emergent situations, they developed entrepreneurial attitudes, and they repeatedly used a variety of cognitive mechanisms such as induction, inference and analogy to generalise experience. The data demonstrate that expertise is neither inherently domain specific nor non-generalisable.

**Convergent and divergent thinking.** The division of transition expertise into convergent and divergent cognitive processes was not initially a focus of this study. However, this widely used dichotomy of cognitive operations or mechanisms emerged in the analysis of the data, particularly when comparing reactive and initiated transitions. It is too simplistic to say that convergent processes are more likely to operate during one type of transition or another. Rather, analysis of the data suggests that individuals may use more convergent processes and mechanisms to stabilise and control the transition environment while divergent processes and mechanisms will be used to generalise expertise in unfamiliar contexts and adapt previous experience to a new situation. But the data also suggests that convergent processes, when used in advance for anticipation and planning, may make it easier for generative processes to operate during the transition. The balance of convergent and divergent processes and the appropriate place for them to operate in the transition process would be of interest in future research.

**Domain knowledge and process generalisability.** The data suggests that expert domain processes are more readily generalised than domain knowledge. While this had not been anticipated in the initial research questions, it emerged in

conjunction with the overall analysis of cognitive generalisability. This could be explained in part because many theories of expertise and expert performance derive their theoretical foundations, early research data and general processes from models of memory acquisition, storage and retrieval which are closely tied to content. It is understandable from these perspectives that, the more detailed the domain content and the situation-specific expert knowledge, the less generalisable it might be. Consequently, where convergent processes operate during transitions, particularly when they are initiated, the less generalisable elements of expertise such as domain knowledge may be used more effectively.

**Secondary role of self regulation.** Another surprising finding in the study was that self-regulation played a secondary role in transitions. An initial hypothesis had been formed that individuals would use self regulation techniques as a central set of tools for managing their transitions. This was based upon research that indicated how important self-regulatory processes were for performance in elite domains like sport. While this may be the case in developing expertise, the use of self regulatory processes during transitions was not nearly as extensive as had been predicted. This might be because they were operating on a tacit level or because the data collection process was inadequate. However, when these results emerged in the preliminary data from the pilot, the questions for investigating this area were strengthened and targeted for use in the main study. But the main study also failed to indicate widespread use of self regulation. This led to the conclusion that this lack of self regulatory processes during transitions was not due to inadequacies in the methodology. Individuals who are successful in transitions simply do not use these kinds of controlled and deliberate process as central techniques with which to manage their transitions. They are more likely

used to maintain homeostasis in performance or add to incremental improvements in existing performance.

**Movement from interpersonal to intrapersonal intelligence over the course of a career.** Another unexpected finding was the way in which the use of personal intelligences evolved over the course of a career. It had been hypothesised that intrapersonal intelligence would be the more important than interpersonal intelligence for managing transitions because adapting to changing circumstances would require continued self reflection and self awareness. While this use of intrapersonal intelligence appeared to be important during the early transitions, interpersonal intelligence became increasingly more important during later transition stages. This can be explained if early career stages and the transitions between them are viewed as more concerned with self discovery in which self reflection is used to learn and acquire knowledge and expertise, whereas later transitions become increasingly involved with managing the world around oneself and utilising external resources which are often controlled by others. Another way of stating this is that earlier career stages and transitions concern learning how to manage oneself in relationship to one's domain whereas later transitions concern learning how to manage one's field in relationship to oneself.

## **10.6 Gender Issues**

Most gender studies (as discussed in the opening chapters) that concern women and careers tend to focus on issues of bias and discrimination for men and against women in career promotions rather than during career transitions themselves and consequently provide little theoretical leverage for addressing differences in man

and women during career transitions. And while no firm conclusions can be drawn from the data of this study concerning differences in demonstration of transition expertise between men and women, it is nonetheless likely that women will demonstrate some elements of transition expertise more often than men and visa-versa. Further studies following up this one would need to include direct comparators between men and women in terms of their the demonstration of different kinds of skills as part of their overall transition expertise, the kinds of career paths they follow, whether skills viewed more favourably as contributing to transition expertise in men are less valued in women, and generally whether women are better at some aspects of transition expertise than men or visa versa. Such studies would address whether transition expertise is equally subject to the cultural and gender-influenced biases so in evidence in comparisons between career development and promotion amongst men and women.

It is also possible that transition expertise may operate more “beneath the radar” than job skills and hence be less subject to discrimination or bias so that high degrees of transition expertise could be equally effective for both men and women. Intriguingly, it could also be possible that high degrees of transition expertise in women might be a larger contributing factor to their successful career development over time than would be the case with men if they are more likely to manage a successful transition or less likely to fail in the transition process itself. In other words high levels of transition expertise might actually contribute more to the successful career development of women than men.

## 10.7 Future areas of research

**Development of cognitive flexibility.** This area requires further study to clarify the educational and training practices which limit cognitive flexibility or augment it and the impact that they may have on longer term career development. This study would best be conducted in conjunction with identifying how expertise can be developed in ways which do not constrain its generalisability or an individual's overall development of cognitive flexibility.

**Development of transition expertise over time.** It seems clear from this study that transition expertise evolves over time. Future research in this area would help dis-entangle some of the overlapping of models that might explain this evolution. Is the development and evolution of transition expertise a general pattern of maturation over the course of a life cycle, is it specifically a response to changing contexts throughout the career, does it reflect the change of the operation of *gc* and *gf* over the lifetime, does it reflect a general evolution of self concept, or is it a reflection of the development of wisdom?

**Motivation.** It became clear in the review of the data that motivation was important for understanding how and why individuals make transitions. Important issues concerning the search for autonomy, the need for achievement, perseverance in the face of difficulties, the importance of work satisfaction in career choices, and the choosing of transitions that enable self actualisation are all linked to motivational factors. Many of these issues emerged in the interviews in which motivation proved important not only for making a transition choice but also for the nature of behaviour during the transition itself.

**Personality resilience.** The operation of personality traits in career selection, performance and transitions was not addressed in this study. While there are many different trait models and psychometric instruments for measuring such traits, a more rewarding area for future research in transition expertise would be the investigation of the role of personality resilience and issues like ego control and resiliency during transitions. This seems important if one is to understand how individuals responded to setback, failures, challenges and difficulties. Vulnerability and defensiveness could be inhibitors to successful transitions and also contribute to cognitive inflexibility. Initiative, opportunism and similar non-defended behaviour could enhance performance during transition when individual need to respond to emergent situations.

**Cognitive beliefs.** Self beliefs and cognitive attributions will influence the ways individuals act and respond during transitions. Attributions will influence behaviour during transitions. They shape the perceptions of control and stability in the environmental factors which in turn will shape the responses individuals make during transitions in these environments. Self efficacy beliefs may influence whether individuals think they can meet the demands of a new situation, how well they respond to challenges, the levels of challenge that they chose in a transition, and their perseverance in the face of obstacles. Both self efficacy beliefs and attributions are cognitive constructs about one's capability to perform and they may be subject to influences and factors similar to those involved in the acquisition of expertise. For example, the operation of self efficacy beliefs during transitions may be similar to expertise and their generalisability may be determined by how they are developed during the early stages of a career. Changes in self beliefs may also be influenced by an

individual's ability to use in inductive and inferential kinds of cognitive processes.

## **10.8 Implications for application in the field**

This project was initiated out of the recognition that as job mobility becomes ever more the norm career transitions have become increasingly important element of career paths in contemporary society. The study population was selected with the hope that there would be applications in the field when working with athletes, business people and musicians. I think that this hope has been realised and there are at least three major ways in which these findings might be applied.

**Coaching career transitions.** People regularly find themselves in career transitions without necessarily knowing how to manage them. It could be possible to 'profile' individuals in terms of their transition expertise by using the same process that was used to generate and analyse the data in this study, i.e. interviewing the subject on their past transitions and coding the data against the criteria established in this study. In the interview one could also ask more forward-looking questions steering the individual towards the kinds of issues they might encounter during the transition and asking them what processes they thought they might use to manage these issues. There are three advantageous opportunities during which this coaching support could take place.

- 1) At the beginning of transitions individuals could be coached to reflect on the nature of an imminent transition and the challenges they may face. Activating a self-reflective process before a transition would enable individuals to utilise more conscious planning and coordination of efforts

which was often under-utilised by participant in this study. Individuals could identify their strengths in order to optimise them and play to them and also identify their weaknesses and recognise how to compensate for them or at least mitigate the downside of these shortcomings.

- 2) Coaching in the midst of transition. Sometimes individuals make a transition and find they are struggling as they move into new or foreign territory. In these circumstances it is possible to coach an individual, in much the same fashion as the first instance, to profile them and then use this data and the discourse during subsequent meetings to address emerging issues that are challenging or unanticipated in light of their particular transition expertise profile.
- 3) While coaching can be done at all transition stages, there is an argument that the Transition Stage 2 from performing to coaching or managing may prove particularly fruitful. This is because an awareness raising process associated with the more prominent role of intrapersonal intelligence often takes place during this transition stage and could be supported by a coaching process. Developing the intrapersonal skills associated with this awakening may serve the individual to self manage better during transitions. Individual could learn to self-profile so that during subsequent transitions they will understand better their strengths and weaknesses and what they need to do to minimise the possibility of a transition failure. Equally, the Transition Stage 4 from heading a department to leading a division often involves significant breaks from both the expert content of the domain in which the individual had become an expert and the domain context in which they had hitherto operated.



Bridging these knowledge and cognitive gaps is not easily achieved without support.

**Talent Management.** The second area of applications in the field would support developing talent management programmes to prepare and enable individuals for career transitions. A key characteristic of successful organisations is their capacity to nurture and develop their people across repeated career progressions: businesses invest significant amounts of time and resources to develop people with a view to their progressing hierarchically to more senior levels in the organisation; music academies attract and retain faculty and will often invite previous graduates to take up teaching positions; national sporting associations like the Football Association and UK Sport run coaching programmes to enable retiring players to move into coaching roles. In almost all cases, (particularly in organisations and to a lesser degree in well-financed sports) considerable time, effort and money are invested in an individual. Successful organisations, sports associations and music academies can recoup their investment in recruiting people by either retaining them in the organisation or enabling them to return at later career stages: an organisation that enables an individual to make successful transitions is more likely to be viewed favourably by its members. A good talent management programme should facilitate repeated successful transitions and a programme that included the development of transition expertise could offer training programmes for the specific skills associated with transition expertise. It would profile individuals on the elements of transition expertise to predict how successfully they might encounter and manage transitions.

**Contextual support.** Organisational, contextual and ecological questions were not a primary focus of this study. Nonetheless it is clear that the organisational climate and culture within which one transitions can influence positively or deleteriously how the transition will be made and how effectively one settles into a new position. While there are sink-or-swim cultures in many organisations, there are also organisations which actively support individuals in making transitions. Elements of an organisational contexts that would support transitions include recognition and acceptance of both coaching and mentoring programmes, encouragement for generalising experience, support of cognitive flexibility and adaptivity, balance between single ways of doing things and innovative approaches, active interpersonal discourse and dialogue during transitions, support of entrepreneurial and initiating activities, as well as attempts to support intrinsically motivating factors as opposed to extrinsic rewards. Different performance criteria might give contextual feedback on how individuals are transitioning rather than how they are performing against the criteria of their new role.

Many business organisations are conscious of their culture and how this influences individual performance. Music organisation, on the other hand, while they may recognise the role of culture in creating an organisational context, are less involved with consciously building a climate to create a certain type of culture sometimes allowing a sink-or-swim climate. Sports organisations tend to fall somewhere between the two, often having a large array of supporting processes during the earlier transitions stages in the form of a tightly knit team identity and strong social interactions and mores which enable individuals to understand more the contexts into which they are transitioning and also to find

more readily the support and information they require to perform well in new roles.

## **10.9 Concluding comment**

Life transitions have been the subject of considerable research encompassing arenas that range from adolescence to marriage to geographical moves to death and dying. Career cycles, career stages and career transitions have also been widely studied. However, surprisingly little research has been conducted on the actual cognitive processes that contribute to successful transitions in careers. In particular there has been no systematic study of how these processes might interact, develop over time and aggregate into a coherent whole which in itself could become an expertise, i.e. *transition expertise*. The central objective of this project has been to discover what transition expertise is and how it operates. It is hoped that this dissertation has achieved its objective.

This study was an educational process approached through a research project. The scope has been kept intentionally broad because the objective has been to develop a more comprehensive understanding of the nature and operation of transition expertise while, where possible, validating and challenging existing models and theories of expertise and career transitions. The findings of the study have, I believe, done both. In the process of clarifying both the broad scope of the processes involved in transition expertise as well as their specific operation, this project has raised as many, if not more questions, as it has answered. For some this is indicative of a 'good' project while for others it may imply the limitations of the study. Nowhere is this more obvious than in my own reflections on this experience: I have broadened my understanding of the field of

expertise and in particular transition expertise enormously while I have simultaneously encountered boundaries of my comprehension and the limitations of my prowess as a researcher. The potential for further personal intellectual inquiry and growth is immense.

My encounter with expertise research has led me to conclude that the development of expertise is not neat and tidy: expertise – its acquisition, application and generalisation – can be more complex, multifaceted, irregular, full of exceptions, contradictory, and unpredictable than conceptualised by cognitive psychologists or studied in laboratories. The question “What is transition expertise?” will produce a multitude of answers depending upon 1) one’s theoretical approach, 2) what is studied, 3) who is studied, 4) the context in which they are studied, 5) what questions are asked, and 6) the methodology used to conduct the inquiry. Different combinations of these parameters can produce a wide range of answers, all of which will contribute to understanding how people make repeated and successful transitions throughout their career and life. It is hoped that this project has contribute to this enquiry or even laid a foundation for the framework within which to raise these further questions. However, a cautionary story told to me many years ago by Dr George Brown – psychologist, educationalist and friend – might illustrate the challenge to finding definitive answers to these questions.

*In a rural village two farmers met with the village Elder to resolve a conflict. Over a cup of tea brewed by the wise man’s wife they present their cases. The first farmer says: “Elder, all my life I have farmed our family land. All of his life my father farmed our family land and his father before him. And we have been*

content. But last year, after the spring floods, the river changed course and now it flows through my land and our northwest field is on the other side of the river. My neighbour on the west side of the river has claimed that this land is his. But, elder, it is my family's. For three generations we have cultivated our land and now our neighbour claims that it is his. Tell me, wise man, that the land belongs to my family and ask the neighbour to leave it." The wise man paused, reflected and then replied: "You're right, you're right, you're absolutely right." Then the second farmer spoke. "Elder, when our people moved to these lands in the times of our grandfathers, we laid down the laws for governing our community and reached agreements for the rights to the use of the land. Our three grandfathers agreed then that everything to the west of the river was my family's to cultivate and everything to the east of the river belonged to the family of my neighbour. This spring, after the big floods, the river's course was altered and some of the land that was on the east side of the river is now on the west side. I am still only farming the land west of the river in accordance with the agreement reached by our grandparents and as is my right. Wise man, tell me that this land belongs to me and my family and ask my neighbour to leave me in peace." The wise man paused, reflected a bit longer and replied: "You're right, you're right, you're absolutely right." Now, the wise man's wife who had been listening quietly in the background spoke out in protest: "But husband, our two farmers are fighting over the same piece of land and they give different arguments for why it is theirs. And to both of them you respond: 'You're right, your right, you're absolutely right'. But, husband, surely they cannot both be right." The wise man reflected, took a sip of tea, and after a still longer meditative pause responded to his wife: "You're right, you're right, you're absolutely right."



## References

- Abernathy, B., Farrow, D., & Berry, J. (2003). Constraints and issues in the Development of a General Theory of Expert Perceptual-Motor Performance. In J. L. Starkes & K. A. Ericsson (Eds.), *Expert Performance in Sports* (pp. 349-370). Champaign, Illinois: Human Kinetics.
- Adams, J. A. (1971). A closed-loop theory of motor learning. *Journal of Motor Behavior*, Vol. 3(2), 111-150.
- Adkins, D. C., & Lyerly, S. B. (1951). *Factor analysis of reasoning tests*. Chapel Hill, NC: University of Northern California, Department of Psychology.
- Alexander, C. N., & Langer, E. J. (1990). *Higher stages of human development*. Oxford: Oxford University Press.
- Allard, F., & Starkes, J. L. (1991). Motor-skill experts in sports, dance and other domains. In K. A. Ericsson & J. Smith (Eds.), *Toward a general theory of expertise: Prospects and limits* (pp. 126-152). Cambridge: Cambridge University Press.
- Allard, F., & Starkes, J.L. (1980). Perception in volleyball. *Journal of Sport Psychology*, 2, 22-33.
- Altheide, D. L., & Johnson, J. M. (1998). Criteria for assessing interpretive validity in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Collecting and interpreting qualitative materials* (pp. 283-312). London: Sage Publications.
- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview Press.
- Anderson, J. R., Kline, P. J., & Beasley, C. M. Jr. (1976). Complex learning processes. In R. E. Snow, P.A. Federico, & W. Montague (Eds.), *Aptitude, learning and instruction: Cognitive process analyses of learning and problem solving* (Vol.2). (pp. 199-232). Hillsdale, NJ: Erlbaum.
- Archer, D., & Akert, R. M. (1980). The encoding of meaning: A test of three theories of social interaction. *Sociological Inquiry*, 50, 393-419.
- Atchley, R. D. (1989). A continuity theory of normal aging. *The Gerontologist*, 29, 183-190.

Atkinson, J. R., & Shiffrin, R. M. (1968). Human Memory: A proposed system and its control processes. In K. Spence & J. Spence (Eds.), *The Psychology of learning and motivation* (vol. 2, pp. 89-195). New York: Academic Press.

Axelrod, R. (1984). *The Evolution of Cooperation*. New York: Basic Books.

Baddeley, A. D (2003). Working memory and language: An overview. *Journal of Communication Disorders*, 36, 189-208.

Baddeley, A. D. (1986). *Working memory*. Clarendon Press: Oxford

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology*, 23, 611-126.

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundations of developmental theory. *American Psychologist*, 52, 355-380.

Baltes, P. B. (2004). *Wisdom: The orchestration of mind and virtue*. Berlin: Max Plank Institutes of Human Development.

Baltes, P. B., & Baltes, M.M. (1986). *The psychology of control and aging*. Hillsdale, NJ: Erlbaum

Baltes, P., B. & Staudinger, U. M. (2000). Wisdom: A metaheuristic (pragmatic) to orchestrate mind and virtue toward excellence. *American Psychologist*, 55 (1), 122-136.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 122-147.

Bandura, A. (1997). *Self Efficacy: The Exercise of Control*. New York: W.H. Freeman.

Barker, R. G. (1968). *Ecological Psychology: Concepts and methods for studying human behavior*. Stanford, CA: Stanford University Press.

Barley, S. R. (1989). Careers, identities, and institutions: the legacy of the Chicago School of Sociology. In M. B. Arthur, D. T. Hall & B. S. Lawrence (Eds.), *Handbook of career theory* (pp. 41-65). Cambridge: Cambridge University Press.

Barnes, M. L., & Sternberg, R. J. (1989). Social intelligence and decoding of nonverbal cues. *Intelligence*, 13, 263-287.



- Bar-On, R. (1997). *The Emotional Quotient Inventory (EQi): Technical Manual*. Toronto: Multi-Health Systems.
- Bateson, G. (1972). *Steps to an ecology of mind*. New York: Ballantine.
- Becker, H. S. & Strauss, A. L. (1956). Careers, personality, and adult socialization. *American Journal of Sociology*, 62, 253-263.
- Beek, P. J. (2000). Towards a theory of implicit learning in the perceptual-motor domain. *International Journal of Sport Psychology*, 31, 547-554.
- Belbin, M. (1993). *Team roles at work*. Oxford: Butterworth-Heinemann, Ltd.
- Berg, B. L. (2004). *Qualitative research methods for the social sciences* (5th ed). Boston, MA: Allyn and Bacon.
- Berg, C. A., & Klaczynski, P. (1996). Practical intelligence and problem solving: Searching for perspective. In F. Blanchard-Fields & T. M. Hess (Eds.), *Perspective on cognition in adulthood and aging* (pp. 323-357). New York: McGraw-Hill.
- Berger, P. (1977). *Facing up to modernity*. Harmondsworth: Penguin.
- Berry, J. W. (1974). Radical cultural relativism and the concept of intelligence. In J. W. Berry & P. R. Dasen (Eds.), *Culture and cognition: Readings in cross-cultural psychology* (pp. 225-229). London: Methuen.
- Binet, A., & Simon, T. (1908). Méthodes nouvelles pour le diagnostic du nouveau intellectuel des anormaux [New methods for the diagnosis of the intellectual level of abnormals]. *L'Année psychologique*, 14, 1-94.
- Binet, A., & Simon, T. (1916). *The development of intelligence in children*. Baltimore, MD: Williams & Wilkins.
- Bjork, R. A. (1996). Memory and metamemory considerations in the training of human beings. In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 185-205). Cambridge, MA: MIT Press.
- Blanchard-Fields, F. (1994). Age difference in causal attributions from an adult developmental perspective. *Journal of Gerontology: Psychological Sciences*, 49, 43-51.
- Block, J. H., & Block, J. (1980). The role of ego control and ego resiliency in the organization of behavior. In W.A. Collins (Ed.), *Development of cognitive, affect*

*and social relations: The Minnesota symposium in child psychology.* (pp. 39-101). Hillsdale, NJ: Erlbaum.

Bloom, B. (Ed.) (1985). *Developing Talent in Young People*. N.Y: Ballantine Books.

Blumer, Herbert (1969). *Symbolic interactionism: Perspective and method*. Berkeley: University of California Press.

Boring, E. G. (1923). Intelligence as the intelligence test tests. *New Republic*, June 6, (pp. 35-37).

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.

Bridges, W. (1991). *Managing transitions: Making the most of change*. Cambridge, MA: Perseus Books.

Broadbent, D. E. (1954). The role of auditory localization in attention and memory span. *Journal of Experimental Psychology*, 47, 191-96.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Brown, L. T., & Anthony, R. G. (1990). Continuing the search for social intelligence. *Personality and Individual Differences*, 11, 463-470.

Bruner, J. S., Goodnow, J. J., & Austin, G. A. (1956). *A study of thinking*. New York: Wiley.

Burt, C. (1909-1910). Experimental tests of general intelligence. *British Journal of Psychology*, 3, 94-177.

Burt, C. (1949). The structure of the mind: A review of results of factor analysis. *British Journal of Educational Psychology*, 19, 176-199.

Butterfield, E. C., Nelson, T. O., & Peck, V. (1973). Developmental aspects of the feeling of knowing. *Developmental Psychology*, 24, 654-663.

Cantor, N., & Kihlstrom, J. F. (1987). *Personality and social intelligence*. Englewood Cliffs, N. J.: Prentice Hall.

Carnap, R. (1934). *Logische syntax der sprache*. Vienna: Springer.

- Carnap, R. (1962). *Logical Foundations of Probability* (2<sup>nd</sup> edition). Chicago, IL: University of Chicago Press.
- Carroll, J. B. (1976). Psychometric tests as cognitive tasks: A new "Structure of Intellect." In L. Resnick (Ed.), *The nature of intelligence* (pp. 27-56). Hillsdale, NJ: Erlbaum.
- Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analysis studies*. Cambridge: Cambridge University Press.
- Case, R. (1992). The mind's staircase: Exploring the conceptual underpinnings of children's thought and knowledge. Hillsdale, NJ: Erlbaum.
- Case, R. (1974). Structures and strictures: Some functional limitations on the course of cognitive growth. *Cognitive Psychologist*, 6, 544-573.
- Cattell, J. Mc. (1890). Mental test and measurements. *Mind*, 15, 373-381.
- Cattell, R. B. (1943). The measurement of intelligence. *Psychological Bulletin*, 40, 153-193.
- Cattell, R. B. (1957). *Personality and motivation structure and measurement*. New York: World Book.
- Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology*, 54, 1-22.
- Ceci, S. J., & Bronfenbrenner, U. (1985). Don't forget to take the cupcakes out of the oven: Strategic time-monitoring, prospective memory and context. *Child Development*, 56, 175-190.
- Ceci, S. J., & Liker, J. (1986a). Academic and non-academic intelligence: An experimental separation. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world* (pp. 119-142). New York: Cambridge University Press.
- Ceci, S. J., & Liker, J. (1986b). A day at the races: A study of IQ, expertise and cognitive complexity. *Journal of Experimental Psychology*, 115, 255-266.
- Charlesworth, W. R. A. (1979). An ethological approach to studying intelligence. *Human Development*, 22, 212-216.
- Charness, N (1981). Aging and skilled problem solving. *Journal of Experimental Psychology: General*, 110, 21-38.

Charness, N. (1979). Components of skill in bridge. *Canadian Journal of Psychology*, 33, 1-16.

Chase, W. G., & Ericsson, K. A. (1981). Skilled Memory. In J. R. Anderson (Ed.), *Cognitive Skills and their Acquisition* (pp.141-189). Hillsdale, N.J.: Erlbaum.

Chase, W. G., & Ericsson, K. A. (1982). Skill and working memory. In G.H. Bower (Ed.), *The Psychology of Learning and Motivation*, 16, (pp. 1-58). New York: Academic Press.

Chase, W. G., & Simon, H.A. (1973). Perception in chess. *Cognitive Psychology*, 4, 55-81.

Cherry, E. C. (1953). Some experiments on the recognition of speech, with one and with two ears, *Journal of Acoustic Society of America*, 25, 875-79.

Chi, M. T. H. (2006). Two approaches to the study of experts' characteristics. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge Handbook of Expertise and Expert performance* (pp. 21-30). Cambridge: Cambridge University Press.

Chi, M. T. H., Feltovitch, P., & Glaser, R. (1981). Categorisation and representation of physics problems by experts and novices. *Cognitive Science*, 5, 121-152.

Chi, M. T. H., Glaser, R., & Farr, M. J. (1988). (Eds.), *The nature of expertise*. Hillsdale, NJ. Erlbaum.

Chi, M. T. H., Glaser, R., & Rees, E. (1982). Expertise in problem solving. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence, Vol. 1* (pp. 7-75). Hillsdale, NJ: Erlbaum.

Cole, M. & Scribner, S. (1974). *Culture and thought*. New York: Wiley.

Cotter, D., Hermsen, J., Ovadia, S., & Vanneman, R. (2001). *Social forces: The glass ceiling effect*. Chapel Hill, NC: University of North Carolina Press.

Coulson, R. L., Feltovitch, P. J., & Spiro, R. J. (1989). Foundations of a misunderstanding of the ultrastructural basis of myocardial failure: A reciprocation network of oversimplifications, *Journal of Medicine and Philosophy*, 14, 109-146.

Coulter, W. A., & Morrow, H. W. (1978). *Adaptive behavior: Concepts and measurements*. New York: Grune & Stratton.

- Crites, J. O. (1976). A comprehensive model of career adjustment in early adulthood. *Journal of Vocational Behavior*, 9, 105-118.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper Collins.
- Dalton, G., Thompson, P. & Price, R. (1977). The four stages of professional careers. *Organizational Dynamics*, Summer, 19-42.
- Dance, K. A., & Kuiper, N. A. (1987). Self-schemata, social role, and a self-worth contingency model of depression. *Motivation and Emotion*, 11, 251-268.
- Danish, S. J., Petitpas, A. J., & Hale, B. D. (1993). Life development intervention for athletes: Life skills through sports. *The Counselling Psychologist*, 21, 352-385.
- Davidson, J. E., Deuser, J., & Sternberg, R. J. (1994). The role of metacognition in problem solving. In J. E. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about Knowing* (pp. 207-226). Cambridge, MA: Massachusetts Institute of Technology Press.
- Davidson, J. E. (1986). The role of insight in giftedness. In R. L. Sternberg and J. E. Davidson (Eds.), *Conceptions of Giftedness* (pp. 201-222) New York: Cambridge University Press.
- Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment*. Minneapolis, MN: University of Minnesota Press.
- de Bono, E. (1970). *Lateral Thinking: Creativity step by step*. New York: Harper & Row.
- de Groot, A.D. (1946/1965). *Thought and choice in chess*. The Hague, Netherlands: Mouton.
- Deakin, J. M., & Allard, F. (1991). Skilled memory in expert figure skaters. *Memory & Cognition*, 19, 79-86.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press.
- Demetriou, A. (1998). Cognitive development. In A. Demetriou, W. Doise, & K. F. M. van Lieshout (Eds.), *Life-span developmental psychology* (pp. 179-269). London: Wiley.

Demetriou, A. (2000). Organisation and development of self-understanding and self-regulation: Toward a general theory. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of Self Regulation* (pp. 209-251). London: Elsevier.

Deming, W. Edwards (1986). *Out of the Crisis*. Boston, MA: MIT Center for Advanced Engineering Study.

Denzin, N. K. (1992). *Symbolic interactionism and cultural studies: The politics of interpretation*. Cambridge, MA: Blackwell.

Denzin, N. K., & Lincoln, Y. S. (2003). (Eds.), *Strategies of qualitative inquiry*. Newbury Park: Sage Publications

Denzin, N. K., & Lincoln, Y. S. (2008). (Eds.), *The Sage handbook of qualitative research* (3<sup>rd</sup> edition). Newbury Park: Sage Publications

Dewey, J. (1896). The reflex arc concept in psychology. *Psychological Review*, 3, 357-370.

Dingwall, R. (1992). "Don't mind him – he's from Barcelona". Qualitative methods in health studies. In J. Daly, I. McDonald, & E. Willis (Eds.), *Researching health care* (pp. 161-174). London: Routledge.

Dixon, R.A., & Baltes, P. B. (1986). Towards life-span research on the functions and pragmatics of intelligence. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world* (pp. 203-235). New York: Cambridge University Press.

Dörner, D., & Kreuzig, H. (1983). Problemlösefähigkeit und intelligenz. *Psychologische Rundschau*, 34, 185-192.

Dörner, D., & Schölkopf, J. (1991). Controlling complex systems: Or expertise as "grandmother's know-how." In K. A. Ericsson & J. Smith (Eds.), *Towards a general theory of expertise: Prospects and limits* (pp. 218-239). Cambridge: Cambridge University Press.

Dunker, K. (1945). On problem solving. *Psychological Monographs*, 58, No. 70.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 9, 256-273.

Eccles, (Parsons) J., Adler, T.F., Futterman, R., Goff, S.B., Kaczala, C.M., Meece, J.L., et al. (1983). Expectancies, values and academic behaviors. In J.T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75-146). San Francisco: Freeman.

Egan, D. E., & Greeno, J. G. (1974). Theory of rule induction: Knowledge acquired in concept learning, serial pattern learning, and problem solving. In L. W. Gregg (Ed.), *Knowledge and cognition* (pp. 43-102). Potomac, MD: Erlbaum.

Egan, D. E., & Schwartz, B. J. (1979). Chunking in recall of symbolic drawings. *Memory & Cognition*, 7, 149-158.

Eisenstadt, M., & Kareev, Y. (1979). Aspects of human problem solving: The use of internal representations. In D. A. Norman & D. E. Rumelhart (Eds.), *Exploration in Cognitions* (pp. 308-346). San Francisco: W.H. Freeman.

Ekstrom, R. B., French, J. W., & Harman, H. H. with D. Dirmen (1976). *Manual and kit of factor-referenced cognitive tests*. Princeton, NJ: Educational Testing Service.

Elsner, R. & Farrands, B. (2006). *Lost in transition: How business leaders can successfully take charge in new roles*. London: Marshall Cavendish.

Endsley, M. R. (2006). Expertise and situation awareness. In K. A. Ericsson, N. Charness, P. J Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 633-652). Cambridge: Cambridge University Press.

Ericsson, K. A. (2003). How the expert performance approach differs from traditional approaches. In J. L. Starkes and K. A. Ericsson (Eds.), *Expert performance insports* (pp. 371-402). Champaigne, Illinois: Human Kinetics.

Ericsson, K. A. (2006). Introduction. In K. A. Ericsson, N. Charness, P. J Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 3-19). Cambridge: Cambridge University Press.

Ericsson, K. A., & Charness, N. (1994). Expert Performance: its structure and acquisition. *American Psychologist*, 49 (8), 725-747.

Ericsson, K. A., & Crutcher, R. J. (1990). The nature of exceptional performance. In P. B. Baltes, D. L. Featherman & R. M. Lerner (Eds.), *Life-span development and behavior* (Vol. 10 pp. 187-201). Hillsdale, NJ: Erlbaum.

Ericsson, K. A., & Kintsch, W. (1995). Long Term Working Memory. *Psychological Review*, 102, 211-245.

Ericsson, K. A., & Lehman, A.C. (1996). Expert and exceptional performance: Evidence on maximal addapation and task constraints. *Annual Review of Psychology*, 47, 273-305.

Ericsson, K. A., & Smith, J. (1991). Prospects and limits of empirical studies of expertise: An introduction. In K. A. Ericsson & J. Smith (Eds.), *Toward a general theory of expertise* (pp. 1-38). New York: Cambridge University Press.

Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100, No 3, 363-406.

Erikson, E. H. (1985). *The life cycle completed: A review*. New York: W. W. Norton.

Eysenck, H. J. (1990). Biological dimensions of personality. In (Eds.) H. J. Eysenck & L. A. Pervin, L. A. Handbook of personality: Theory and research, (pp. 244-276). New York: Guilford Press.

Feigenbaum, E.A., & Simon, H.A. (1984). EPAM-like models of recognition and learning. *Cognitive Science*, 8, 305-336.

Feltovitch, P. J., Johnson, P. E., Moller, J. H., & Swanson, D. B. (1984). LCS: The role and development of medical knowledge in diagnostic expertise. In W. J. Clancey & E. H. Shortliffe (Eds.), *Readings in Medical Artificial Intelligence: The first Decade* (pp. 275-319). Reading, MA: Addison Welsley.

Feltovitch, P. J., & Barrows, H. S. (1984). Issues of generality in medical problem solving. In H. G. Schmidt & M. L. de Volder (Eds.), *Tutorials in problem based learning* (pp. 128-144). Maastricht, NL: Van Gorcum.

Feltovitch, P. J., Spiro, R. J., & Coulson, R. L. (1993). Learning, teaching and testing for complex conceptual understanding. In N. Fredrikson & I. Bejar (Eds.), *Test theory for a new generation of tests* (pp. 181-217). Hillsdale, NJ: Erlbaum.

Feltovitch, P. J., Spiro, R. J., & Coulson, R. L. (1997). Issues of expert flexibility in contexts characterised by complexity and change. In P. J. Feltovitch, K. M. Ford, & R. R. Hoffman (Eds.), *Expertise in context* (pp. 125-146). Cambridge, MA: MIT Press.

Fikes, R. E. (1982). A commitment-based framework for describing informal cooperative work. *Cognitive Science*, 6, 332-348.

Flavell, J.H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, pp. 906-911.

Fodor, J. A. (1975). *The language of thought*. Cambridge, MA: Harvard University Press.



- Fodor, J. A. (1983). *The modularity of mind*. Cambridge, MA: MIT Press.
- Ford, M. E., & Tisak, M.S. (1983). A further search for social intelligence. *Journal of Educational Psychology*, 75, 196-206.
- Fransella, F. (2005). (Ed.), *The Essential Practitioner's Handbook of Personal Construct Psychology*. Chichester: John Wiley & Sons.
- Frensch, P. A., & Sternberg, R. J (1989). Expertise and intelligent thinking: When is it worse to know better? In R. J. Sternberg (Ed.), *Advances in the Psychology of human intelligence* (Vol. 5) (pp. 157-188). Hillsdale, NJ: Erlbaum
- Frensch, P. A., & Sternberg, R. J. (1991). Skill-related differences in game playing. In R. J. Sternberg & P. A. Frensch (Eds.), *Complex problem solving: Principles and mechanisms* (pp. 343-381). Hillsdale, NJ: Erlbaum.
- Gagné, F. (2000). Understanding the complex choreography of talent development through DMGT-based analysis. In K. A. Heller, F. J. Mönks, R. J Sternberg, & R. F. Subotnik (Eds.) *International handbook of giftedness and talent* (pp. 67-79). Oxford: Elsevier Science.
- Galton, F. (1869, 2005). *Hereditary genius: An inquiry into its laws and consequences*. London: MacMillan, Elbron Classics.
- Gardner, H, (1999). *Intelligence reframed: Multiple intelligences in the 21<sup>st</sup> century*. New York: Basic Books.
- Gardner, H. (1973). *The quest for mind*. Chicago. IL: University of Chicago Press.
- Gardner, H. (1983). *Frames of mind* (2<sup>nd</sup> edition). London: Fontana press.
- Gardner, H. (1985). *The mind's new science: A history of the cognitive revolution*. New York: Basic Books.
- Gardner, H. (1993). *Multiple Intelligences: Theory in practice*. New York: Basic Books.
- Gardner, H., Krechevsky, M., Sternberg, R. J., & Okagaki, L. (1994). Intelligence in context: Enhancing students' practical intelligence for school. In K. McGilly (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 105-127). Cambridge, MA: Bradford Books.

- Garmenzy, N. Z. (1993). Vulnerability and resilience. In. D. C. Funder, R. D. Parke, C. Tomlinson-Keasey, & K. Widaman (Eds.), *Studying lives through time* (pp. 377-397). Washington DC: American Psychological Association.
- Ghiselli, E. (1966). *The validity of occupational aptitude tests*. New York: Wiley.
- Ghiselli, E. E. (1973). The validity of aptitude tests in personnel selection. *Personal Psychology*, 26, 461-478.
- Gibbs, G. R. (2002). *Qualitative Data Analysis: Explorations with NVivo*. Maidenhead: Open University Press
- Gibson, E. J., & Pick, A. D. (2003). *An ecological approach to perceptual learning and development*. New York: Oxford University Press.
- Gibson, J. J. (1986). *The ecological approach to visual perception*. Hillsdale, NJ: Erlbaum.
- Giddens, A. (1979). *Central problems in social theory*. Berkley, CA: University of California Press.
- Giddens, A. (1984). *The constitution of society*. Berkley, CA: University of California Press.
- Glaser, B. G., & Strauss, A. L. (1965). *Awareness of dying*. Chicago: Aldine.
- Glaser, B. G., & Strauss, A. L. (1971). *Status passage*. Chicago: Aldine.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine
- Glick, M. L., & Holyoak, K. J. (1983). Schema induction and analogic transfer. *Cognitive Psychology*, 15, 1-38.
- Gobet, F. (1993). A computer model of chess memory. *Proceedings of the 15<sup>th</sup> annual Meeting of the Cognitive Science Society* (pp. 463-468). Hillsdale NJ: Erlbaum.
- Gobet, F. (1997). A pattern-recognition theory of search in expert problem solving. *Thinking and Reasoning*, 3, 291-313.
- Gobet, F. (1998). Expert memory: a comparison of four theories. *Cognition*, 66, 115-152.

Gobet, F. (2000). Some shortcomings of long-term working memory. *British Journal of Psychology*, 91, 551-570.

Gobet, F. (2005). Chunking models of expertise: Implications for education. *Applied Cognitive Psychology*, 19, 183-204.

Gobet, F., & Simon, H.A. (1996a). Recall of rapidly presented random chess positions is a function of skill. *Psychonomic Bulletin and Review*, 3, 159-163.

Gobet, F., & Simon, H.A. (1996b). Templates in chess memory: Mechanisms for recalling several boards. *Cognitive Psychology*, 31, 1-40.

Goffman, E. (1974). *Frame analysis*. New York: Harper.

Goldin, C., & Katz, L. F. (2001). *On The Pill: Changing the course of women's education*. The Milken Institute Review, 2<sup>nd</sup> quarter.

Goldman, S. R., & Pellegrino, J. W. (1984). Deductions about induction: Analyses of developmental and individual differences. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 2) (pp. 149-197). Hillsdale, NJ: Erlbaum.

Goleman, D. (1995). *Emotional intelligence*. New York: Bantam Books.

Goodnow, J. J. (1976). The nature of intelligent behaviour: Questions raised by cross-cultural studies. In L. B. Resnick (Ed.), *The nature of intelligence* (pp. 169-188). New York: Erlbaum.

Goodnow, J. L. (1986). Organising and reorganising. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world* (pp. 143-162). New York: Cambridge University Press.

Goodnow, J. L., & Burns, A. (1985). *Home and school: Child's eye view*. Sidney, Australia: Allen & Unwin.

Gottfredson, L. S. (1979). Aspiration-job match: Age trends in a large, nationally representative sample of young, white men. *Journal of Counselling Psychology*, 26, 319-328.

Gottfredson, L. S., & Becker, H. J. (1981). A challenge to vocational psychology: How important are aspirations in determining male career development? *Journal of Vocational Behavior*, 18, 121-137.

Gottschalk, L. A. (1995). *Content analysis of verbal behaviour: new findings and clinical applications*. Hillsdale, NJ: Erlbaum.

- Gould, R. (1978). *Transformations: Growth and change in adult life*. New York: Simon and Shuster.
- Green, R. F., Guilford, J. P., Christensen, P. R., & Comrey, A. L. (1953). A factor analytic study of reasoning abilities. *Psychometrika*, 18, 135-160.
- Gremler, D. D. (2004). The Critical Incident Technique in service research. *Journal of Service Research*, Vol. 7, No. 1, August, 65-89.
- Gross, L. (1974). Modes of Communication and the Acquisition of Symbolic Capacities. In D. Olsen (Ed.), *Media and Symbols* (pp. 56-80), Chicago: University of Chicago Press.
- Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin*, 53, 267-293.
- Guilford, J. P., & Hoepfner, R. (1971). *The analysis of intelligence*. New York: McGraw-Hill.
- Guilford, J.P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Hall, D. T. (1976). *Careers in organizations*. Glenview, IL: Scott, Foresman.
- Hall, D. T., & Nougaim, N. (1968). An examination of Maslow's need hierarchy in an organizational setting. *Organizational Behavior and Human Performance*, 3, 12-35.
- Hammersley, M. (1992). *What's wrong with ethnography? Methodological explorations*. London: Routledge
- Hansen, J. C., & Campbell, D. P. (1985). *Manual for the SVIB-SCII (4th edition)*. Palo Alto: Stanford University.
- Havinghurst, R. J., & Albrecht, R. (1953). *Older people*. New York: Longmans, Green.
- Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.
- Hesse, M. B. (1966). *Models and analogies in science*. Notre Dame: University of Notre Dame Press.
- Hilbert, D. (1927). Über das Unendliche. *Jahresbericht der Deutschen Mathematiker-Vereinigung*, 36, 201-215.

Hirst, P. (1974). *Knowledge and the Curriculum*. London: Routledge & Kegan Paul.

Hoffman, R. R. (1987). The problem of extracting the knowledge of experts from the perspective of experimental psychology. *AI Magazine*, 5 Summer, 53-64.

Hogan, R. (1969). Development of an empathy scale. *Journal of Consulting & Clinical Psychology*, 33, 302-116.

Holland, J. L. (1973). *Making vocational choices: A theory of careers*. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1978). *The occupations finder*. Palo Alto, CA: Consulting Psychologists Press.

Holyoak, K. J. (1984). Analogic thinking and human intelligence. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 2) (pp.199-230). Hillsdale, NJ: Erlbaum.

Holzinger, K. J. (1938). Relationships between three multiple orthogonal factors and four bifactors. *Journal of Educational Psychology*, 29, 513-519.

Homans, G. (1961). *Social behaviour: Its elementary forms*. New York: Harcourt Brace.

Horn, J. L. (1994). Theory of fluid and crystallized intelligence. In R. J., Sternberg (Ed.), *Encyclopaedia of human intelligence* (pp. 43-451). New York: MacMillan.

Horn, J. L. & Cattell, R. B. (1966). Refinement and test of the theory of fluid and crystallized intelligence. *Journal of Educational Psychology*, 57, 253-270.

Horn, J. L., & Masunga, H. (2006). A merging theory of Expertise and Intelligence. In K. A. Ericsson, N. Charness, P. J Feltovich, & R. R. Hoffman (Eds.), *The Cambridge Handbook of Expertise and Expert Performance* (pp. 587-611). New York: Cambridge University Press.

Horn, J..L. (1986). Intellectual ability concepts. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence*. (Vol. 3) (pp. 35-74). Hillsdale, NJ: Erlbaum.

Hughes, E. C. (1958). *Men and their work*. Glencoe, IL: Free Press.

Hughes, E. C. (1971). *The sociological eye: Selected papers on work, self and the study of society*. Chicago: Aldine.

- Hunt, T. (1928). The measurement of social intelligence. *Journal of Applied Psychology*, 12, 317-334.
- Hurst, C. E. (2007). *Social Inequality*. Boston, MA: Pearson Education, Inc.
- Ibarra, H. (1999). Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly*, 44 (4), 764-791.
- Ibarra, H. (2004). *Working identity*. Boston, MA: Harvard Business School Press,
- James, W. (1890/1950). *The principles of psychology*. New York: Holt
- Jerison, H. (1973). *Evolution of the brain and intelligence*. New York: Academic Press.
- Kalish, R. (1966). A continuity of subjectively perceived death. *The Gerontologist*, 6, 73-76.
- Keele, S. W (1968). Movement control in skilled motor performance. *Psychological Bulletin*, Vol. 70 (6, Pt.1), 387-403
- Keil, F. C (1984). Mechanisms in cognitive development and the structure of knowledge. In Robert Sternberg, (Ed.), *Mechanisms of cognitive development* (pp. 81-100). Prospect Heights, IL: Waveland Press, Inc.
- Kelly, G. (1963). *The psychology of personal constructs*. New York: Norton.
- Kepner, C. H., & Tregoe, B. B. (1965). *The rational manager: A systematic approach to problem solving and decision making*. New York: McGraw Hill.
- Kihlstrom, J. F., & Cantor, N. (2000). Social Intelligence. In R. J. Sternberg. (Ed.), *Handbook of intelligence* (pp. 359-379). New York: Cambridge University Press.
- Kintsch, W. (1988). The use of knowledge in discourse processing: A construction-integration model. *Psychological review*, 95, 163-182.
- Kintsch, W., & van Dijk, T. S. (1978). Towards a model of text comprehension and production. *Psychological review*, 85, 363-394.
- Klahr, D. (1984). Transition processes in quantitative development. In Robert Sternberg (Ed.), *Mechanisms of cognitive development* (pp. 101-140). Prospect Heights, IL: Waveland Press.

Klahr, D., & Wallace, J. G. (1976). *Cognitive development: An information processing view*. Hillsdale, NJ: Erlbaum.

Klahr, D., Langley, P., & Neches, R. (1984) *Production system: Models of learning and development*. Cambridge, MA: MIT Press.

Kleiber, D., Greendorfer, S., Blinde, E., & Sandall, D. (1987). Quality of exit from university sports and subsequent life satisfaction. *Journal of Sports Sociology*, 4, 28-36.

Koestler, A. (1964). *The act of creation*. London: Hutchinson.

Koukouris, K. (1991). Quantitative aspects of the disengagement process of advanced and elite Greek male athletes from organized competitive sport. *Journal of Sport Behavior*, 14, 227-246.

Kozmitzki, C., & John, O. P. (1993). The implicit use of explicit conceptions of social intelligence. *Personality and Individual Differences*, 15, 11-23.

Krampe, K. Y., & Ericsson, K. A. (1996). Maintaining excellence: Deliberate practice and elite performance in young and older pianists. *Journal of Experimental Psychology: General*, 125, 331-359.

Krampe, R.T., & Baltes, P.B. (2003). Intelligence as adaptive resource development and resource allocation. In R. J Sternberg & E. L. Grigorenko (Eds.), *The Psychology of abilities, competencies and expertise* (pp. 31-69). New York: Cambridge University Press.

Krampe, R.T., & Charness, N. (2006). Aging and Expertise. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp.723-742). Cambridge: Cambridge University Press.

Krechevsky, M., & Gardner, H. (1990). The emergence and nurturance of multiple intelligences. In M. J. A. Howe (Ed.), *Encouraging the development of exceptional abilities and talents* (pp. 222-245). Leister: The British Psychological Society.

Kübler-Ross, E. (1969). *On death and dying*. New York: Macmillan.

Kuder, G. F. (1946). *Manual, Kuder Preference Record, Vocational*. Chicago: Science Research Associates.

Kuder, G. F. (1966). The Occupational Interest Survey. *Personnel and Guidance Journal*, 45, 72-77.

- Kuhl, J. (2000). A functional-design approach to motivation and self regulation: The dynamics of personality systems interactions. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of Self Regulation* (pp. 111-169). London: Elsevier.
- Kunzmann, U., & Baltes, P. B. (2005). The psychology of wisdom: Theoretical and empirical challenges. In R. J. Sternberg & J. Jordan (Eds.), *A handbook of wisdom: Psychological perspectives* (pp. 110-138). New York: Cambridge University Press.
- Kurtz, Lester R. (1984). *Evaluating Chicago sociology: A guide to the literature, with an annotated bibliography*. Chicago: University of Chicago Press.
- Labouvie-Vief, G. (1990). Wisdom as integrated thought: Historical and developmental perspectives. In R. J. Sternberg (Ed.), *Wisdom: Its nature, origins and development* (pp. 52-83). New York: Cambridge University Press.
- Laipple, J. S. (1992). Problem-solving in young and old adulthood: The role of task interpretation. *Dissertation Abstracts International*, 53 (1-B), 582.
- Lambert, N. M., Windmiller, M., Cole, L., & Figueroa, R. (1975). *AADM adaptive behaviour scale: Public school version*. Washington DC: American Association on Mental Deficiency.
- Langley, P. (1984). A general theory of discrimination in learning. In D. Khlar, P. Langley, & N. Neches (Eds.), *Production systems: Models of learning and development*. Cambridge, MA: MIT Press.
- Langley, P., Neches, R., Neves, D. M., & Anzai, Y. A. (1981). A domain-independent framework for procedure learning. *Policy analysis and information systems*, 4 (2), 193-197.
- Lashley, K. (1950). In search of the engram. *Society of Experimental Biology, Symposium 4*, 454-482.
- Lavallee, D., & Wylleman, P. (2000). *Career transitions in sport: International perspectives*. Morgantown, VA: Fitness Information Press.
- Lazarus, R.S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Leonesio, R. J. & Nelson, T. O. (1990). Do different metamemory judgements tap the same underlying aspects of memory? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16, 464-470.



- Lerch, S. (1984). Athlete retirement as social death: An overview. In N. Theberge & P. Donnelly (Eds.), *Sport and the sociological imagination* (pp. 259-272). Fort Worth, Texas: Christian University Press.
- Levinson, D. J. (1986). A conception of adult development. *American Psychologist*, 41 (1), 3-13.
- Levinson, D. J., & Levinson, J. D. (1996). *The seasons of a woman's life*. New York: Knopf.
- Levinson, D. J., Darrow, C. N., Klein, E. B., Levinson, M. H., & Braxton, McK. (1978). *The seasons of a man's life*. New York: Ballantine.
- Lévi-Strauss, C. (1962/66). *The savage mind*. London: Weidenfeld & Nicholson.
- Lieberman, D. A. (1979). Behaviorism and the mind. *American Psychologist*, 34, 319-333.
- Lindenberger, U., & Baltes, P. B. (1997). Intellectual functioning in old and very old age: Cross-sectional results from the Berlin Aging Study. *Psychology and Aging*, 12, 410-432.
- Lindlof, T. R., & Taylor, B. C. (2002). *Qualitative communication research methods* (2<sup>nd</sup> edition). Thousand Oaks, CA: Sage Publications.
- Linnville, P. W. (1985). Self complexity and affective extremity: Don't put all of your eggs in one cognitive basket. *Social Cognition*, 3, 94-120.
- Linnville, P. W. (1987) Self complexity as a cognitive buffer against stress-related illness and depression. *Journal of Personality and Social Psychology*, 52, 663-676.
- Lohman, D. F. (2000). Complex information processing and intelligence. In R. J. Sternberg (Ed.) *Handbook of intelligence*. New York: Cambridge University Press.
- Lohman, D. F. (1986). The effect of speed accuracy trade-off on sex differences in mental rotation. *Perception and Psychophysics*, 39, 427-436.
- Lohman, D. F. (1988). Spatial abilities as traits, processes and knowledge. In R. J., Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 4) (pp. 181-248). Hillsdale, NJ: Erlbaum.
- Luria, A. R. (1975). *The mind of a mnemonist*. Harmondsworth, Middlesex: Penguin.

- Luria, A. R. (1976). *Cognitive development: Its cultural and social foundations*. Cambridge, MA: Harvard University Press.
- Lyness, K. S., & Heilman, M. E. (2006). When fit is fundamental: Performance evaluations and promotions of upper-level female and male managers, *Journal of Applied Psychology*, 91 (4), pp.777–785.
- Lyness, K. S., & Thompson, D. E. (1997). Above the glass ceiling?: A comparison of matched samples of female and male executives, *Journal of Applied Psychology*, Vol. 82, No. 3, pp. 359–375.
- Marcus, H. (1977). Self schemata and processing information about the self. *Journal of Personality and Social Psychology*, 3, 551-558.
- Marcus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41(9), 954-969.
- Marcus, H., & Wurf, E. (1987). The dynamic of self concept: A social psychological perspective. *Annual Review of Psychology*, 38, 337.
- Maslow, A. H. (1968). *Toward a psychology of being*. NY, NY: John Wiley and Sons.
- Massey, D. (2007). *Categorically Unequal: The American stratification system*. NY: Russell Sage Foundation.
- Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds.), *Emotional development and emotional intelligence: Implications for educators* (pp. 3-31). New York: Basic Books.
- Mayer, J. D., Salovey, P., & Caruso, D. (2000). Competing models of emotional intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence (2<sup>nd</sup> edition)*. New York: Cambridge University Press.
- McCall, M. W., & Kaplan, R. E. (1985). *Whatever it takes: Decision makers at work*. Englewood Cliffs, N.J.: Prentice Hall.
- McClelland, D., Atkinson, J. R., Clark, R. & Lowell, E. (1953). The achievement motive. New York: Appleton, Century, Crofts.
- McCrae, R. A., & Costa, P. T. (2008). The five factor theory in personality research. In O. P. Johns, R. J. Robbins, & L. A. Pervin (Eds.), *Handbook of personality* (pp. 59-181). New York: Guildford Publications.

- McPherson, B. D. (1980). Retirement from professional sport: The process and problems of occupational and psychological adjustment. *Sociological Symposium*, 30, 126-143.
- Mead, G. H. (1964). *Selected Writings* (A J. Reck, Ed.). Chicago, IL: University of Chicago Press.
- Mercer, J. R. (1978). Theoretical constructs of adaptive behavior: Movement from a medical to a social-ecological perspective. In W. A. Coulter & H. W. Morrow (Eds.), *Adaptive behavior: Concepts and measurements*. New York: Grune & Stratton.
- Mercer, J. R., Gomez-Palacio, M., & Padilla, E. (1986). The development of practical intelligence in cross-cultural perspective. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in everyday life*. New York: Cambridge University Press.
- Metcalf, J. (1996). A computational modelling approach to novelty monitoring, metacognition, and frontal lobe dysfunction. In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 137-156). Cambridge, MA: MIT Press.
- Michel, W. (1970). Towards a cognitive learning reconceptualisation of personality. *Psychological Review*, 80, 252-283.
- Miles, M. B., & Huberman, A. M. (1984). *Qualitative Data Analysis: A sourcebook of new methods*. London: Sage Publications.
- Miller Analogies Test Manual*. (1970). New York: The Psychological Corporation.
- Miller, D. C., & Form, W. H. (1951). *Industrial Sociology*. New York: Harper.
- Miller, G. A., Gallanter, E., & Pribram, K. H. (1960). *Plans and the structure of behavior*. New York: Holt Rinehart and Winston Inc.
- Miller, G.A (1956). The magical number of seven plus or minus two: Some limits of our capacity for processing information. *Psychological Review*, 63, 81-97.
- Miller, G.A. (1979). Images and models, similies and metaphors. In A. Ortony (Ed.), *Metaphor and thought*. New York: Cambridge University Press.

- Minsky, M. (1975). A framework for representing knowledge. In P. H. Winston (Ed.), *The Psychology of computer vision* (pp. 211-277). New York: McGraw Hill.
- Minsky, M. (1977). Frame-system theory. In P. N. Johnson-Laird & P. C. Watson (Eds.), *Thinking: Readings in cognitive science* (pp. 355-376). Cambridge: Cambridge University Press.
- Mintzberg, H. (1987). Crafting strategy. *Harvard Business Review*, 65 no. 4, 66-75.
- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of “unstructured” decision processes. *Administration Science Quarterly*, 21, 246-275.
- Mischel, W. (1984). Convergences and challenges in the search for consistency. *American Psychologist*, 39, 351-364.
- Moss, F. A. (1931). Preliminary report of a study of social intelligence and executive ability. *Public Personnel Studies*, 9, 2-9.
- Moss, F. A., Hunt, T., Omwake, K.T., & Woodward, L. G. (1955). *Manual for George Washington University series social intelligence test*. Washington, DC: Center for Psychological Services.
- Myers, I. B., & Myers, P. (1980). *Gifts differing: Understanding personality type*. Mountain View, CA: Davies-Black Publishing.
- Neisser, Ulric (1976). *Cognition and reality: Principles and implications of cognitive psychology*. San Francisco: Freeman.
- Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. Bower (Ed.) *The psychology of learning and motivation* (Vol. 26). New York: Academic Press.
- Nelson, T. O., & Narens, L. (1996). Why investigate metacognition. In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 1-26). Cambridge, MA: MIT Press.
- Nelson, T. O., Gerler, D., & Narens, L (1984). Accuracy of feeling-of-knowing judgements for predicting perceptual identification and relearning. *Journal of Experimental Psychology: General*, 113, 282-300.
- Neugarten, B. L. (1976). Adaptation and the life cycle. *Counselling Psychologist*, 6 (1), 16-20.

- Neumann, J. & Morgenstern, O. (1944). *Theory of Games and economic behavior*. Princeton, NJ: Princeton University Press.
- Newell, A. & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice Hall.
- Newell, A. (1990). *Unified theories of cognition*. Cambridge, MA: Harvard University Press.
- Newell, A., Shaw, J. C., & Simon, H. A. (1959). Report on a general problem-solving program. Proceedings of the International Conference on Information Processing. pp. 256-264.
- Nicholson, N. (1984). A theory of work role transitions. *Administrative Science Quarterly*, 29, 172-191.
- Nihara, K., Foster, R., Shellhaas, M., & Leland, H. (1969). *Adaptive behaviour scale*. Washington DC: American Association on Mental Deficiency.
- Norman, G. R., Brooks, L. R., & Allen, S. W. (1989). Recall by expert medical practitioners and novices as a record of processing attention. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 15, 1166-1174.
- Norman, G. R., Eva, K., Brooks, L.R., & Hamstra, S. (2006). Expertise in medicine and surgery. In K. A. Ericsson, N. Charness, P. J Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert Performance* (pp. 339-354). Cambridge: Cambridge University Press.
- O'Sullivan, M., Guilford, J. P., & DeMille, R. (1965). The measurement of social intelligence. *Reports from the Psychological Laboratory, University of Southern California*, No. 434.
- Oakes, W. F. (1955). An experimental study of pitch naming and pitch discrimination reaction. *Journal of Genetic Psychology*, 86, 237-259.
- Oatley, K., & Bolton. W. (1985). A social-cognitive theory of depression in reaction to life's events. *Psychological Review*, 92, 372-388.
- Oerter, R. (1981). Cognitive socialisation during adolescence. *International Journal of Behavioral Development*, 4, 61-76.
- Openheimer, J. R. (1956). Analogy in science. *American Psychologist*, 11, 127-135.

Osborn, A. F. (1963). *Applied imagination: Principles and procedures of creative thinking*. New York: Scribner's.

Osipow, S. H. (1983). *Theories of career development, (3rd edition)*. Englewood Cliffs, NJ: Prentice-Hall.

Papoušek, M. (1982). Musical elements in mother-infant dialogues. Paper presented at the International Conference on Infant Studies. March, 1982 Austin, Texas.

Patel, V L., & Groen, G. J (1991). The general and specific nature of medical expertise. In K. A. Ericsson & J. Smith (Eds.), *Toward a general theory of expertise* (pp. 93-125). Cambridge: Cambridge University Press.

Patton, M. Q. (1990). *Qualitative evaluation and research methods (2<sup>nd</sup> edition)*. London: Sage Publications.

Pearson, R. E., & Petitpas, A. J. (1990). Transitions of athletes: Developmental and preventative perspectives. *Journal of Counselling and Development*, 69, 7-10.

Peirce, C. S. (1934). *Collected Papers of Charles Sanders Peirce* (Ed., C. Hartshorne). Cambridge, MA: Harvard University Press.

Pellegrino, J. W., & Kail, R (1982). Process analyses of spatial aptitude. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 1, pp. 311-366) Hillsdale, NJ: Erlbaum.

Pellegrino, J. W., & Glaser, R. (1979). Cognitive correlates and components in the analysis of individual differences. *Intelligence*, Vol. 3, 187-214.

Petitpas, A. J. (1978). Identity foreclosure: A unique challenge. *Personnel and Guidance Journal*, 56, 558-561.

Piaget, J (1954). *The construction of reality in the child*. New York: Basic Books

Piaget, J. (1972). *The psychology of intelligence*. Totowa, NJ: Littlefield, Adams.

Pollock, G. H. (1987). The mourning-liberation process: Ideas on the inner life of the older adult. In J. Sadavoy & M. Leczcz (Eds.), *Treating the elderly with psychotherapy*. Madison, CT: International Universities.

Polster, E., & Polster, M. (1974). *Gestalt therapy integrated: contours of theory and practice*. New York: Vintage Books.

- Polya, G. (1965). *Mathematics and plausible reasoning: Induction and analogy in mathematics* (Vol.1). Princeton, NJ: Princeton University Press.
- Polyani, M. (1966). *The tacit dimension*. New York: Doubleday.
- Pylyshyn, Z. W. (1980). Computation and cognition: Issues in the foundation of cognitive science. *Behavioral and Brain Science*, 3, 111-132.
- Pylyshyn, Z. W. (1986). *Computation and cognition: Toward a foundation for cognitive science*. Cambridge, MA: MIT Press.
- Rapoport, A., & Chammah, A. M. (1965). *Prisoner's Dilemma*. Ann Arbor: University of Michigan Press.
- Reitman, J. S. (1976). Skilled perception in GO: Deducing memory structure from inter-response times. *Cognitive Psychology*, 8, 336-356.
- Reitman, J. S., & Reuter, H. H. (1980). Organisation revealed by recall orders and confirmed by pauses. *Cognitive Psychology*, 12, 554-581.
- Renzulli, R. (2005). The three-ring conception of giftedness. In R. J. Sternberg & J.E. Davidson (Eds.), *Conceptions of Giftedness*, (pp. 246-279). New York: Cambridge University Press.
- Revesz, G., & Berkeley, G. (1950). *Psychology and the art of the blind*. New York: Longmans.
- Rhianon, A., Reber, A. S., & Reber, E. (2009). *Penguin dictionary of psychology*. London: Penguin.
- Richman, H. B., Gobet, F., Staszewski, J. J., & Simon, H.A. (1995). Perceptual and memory processes in the acquisition of expert performance: The EPAM model. In K. A. Ericsson (Ed.), *The Road to Excellence: The acquisition of expert performance in the arts and sciences, sport, and games*. (pp. 167-188). Mahwah, New Jersey: Erlbaum.
- Richman, H. B., Staszewski, J. J., & Simon, H. A. (1995). Simulation of expert memory with EPAM IV. *Psychological Review*, 102, 305-330.
- Ridgeway, C. L. (2001). Gender, status, and leadership. *Journal of Social Issues*, Vol. 57, No. 4, pp. 637-655.
- Roe, A. (1952). *The making of a scientist*. New York: Dodd, Mead & Co.

Roe, A. (1957). Early determinants of vocational choice. *Journal of Counselling Psychology*, 4, 212-217.

Rogers, C. (1951). *Client-centered therapy: Its current practice, implications and theory*. London: Constable.

Roid, G. H., & Barram, R. A. (2004). *Essentials of Stanford-Binet Intelligence Scales (SB5) Assessment*. Hoboken, NJ: John Wiley and Sons, Inc.

Rosch, E., & Mervis, C. B. (1975). Family resemblances: Studies in the internal structures of categories. *Cognitive Psychology*, 7, 573-605.

Rosenberg, E. (1981). Gerontological theory and athletic retirement. In S. L. Greendorfer & A. Yiannakis (Eds.), *Sociology of sport: Diverse perspectives* (pp. 119-126). West Point, New York: Leisure Press.

Rosenthal R., Hall, J. A., DiMatteo, M. R., Rogers, P. L., & Archer, D. (1979). *Sensitivity to nonverbal communications: The PONS test*. Baltimore: Johns Hopkins University.

Rotter, J. B. (1954). *Social learning and clinical psychology*. Englewood Cliffs, NJ: Prentice-Hall

Rounds, J. B., Dawis, R. V., & Lofquist, L. L. (1987). Measurement of person-environment fit and prediction of satisfaction in the theory of work adjustment. *Journal of Vocational Behavior*, 31, 297-318.

Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. Spiro, B. Bruce, & W. Brewer (Eds.), *Theoretical issues in reading comprehension*. Hillsdale NJ: Erlbaum.

Rumelhart, D. E., & Norman, D. A. (1978). Accretion, tuning and restructuring: Three modes of learning. In J.W. Cotton & R. L Klatsky (Eds.), *Semantic factors in cognition*. Hillsdale, NJ: Erlbaum.

Rumelhart, D. E., & Ortony, A. (1977). The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, & W.E. Montague (Eds.), *Schooling and the acquisition of knowledge* (pp. 99-135). Hillsdale, NJ: Erlbaum.

Runco, M.A. (1992). *Creativity as an educational objective for disadvantaged students*. Storrs, CT: National Research Center on the Gifted and Talented.

Salthouse, T. A. (1991.) Expertise in the circumvention of human processing limitations. In K. A. Ericsson & J. A. Smith (Eds.), *Towards a general theory of*



*expertise: Prospects and limits* (pp. 286-300). New York: Cambridge University Press.

Schein, E. H. (1971). The individual, the organization, and the career: A conceptual scheme. *Journal of Applied Behavioral Science*, 7, 401-426.

Schein, E. H. (1978). *Career dynamics: Matching individual and organization needs*. Reading, MA: Addison-Wesley.

Schein, E. H. (1990). *Career Anchors: Discovering your real values*. San Diego, CA: University Associates.

Schein, E. H. (1992). *Organizational leadership and corporate culture*. San Francisco, CA: Jossey-Bass Inc.

Schmidt, R. A. (1975). A schema theory of discrete motor skill learning. *Psychological Review*, Vol. 82 (4), 225-260.

Schommer, M. & Walker, K. (1995). Are epistemological beliefs similar across domains? *Journal of Educational Psychology*, 85, 406-411.

Schön, D. A. (1983). *The reflective practitioner*. New York: Basic Books.

Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology*, Vol. 74 (4), 548-556.

Schunk, D. H., & Zimmerman, B.J. (1998). *Self-regulated learning: From teaching to self-reflective practice*. New York: Guilford.

Schutz, W.C. (1958). *FIRO: A Three Dimensional Theory of Interpersonal Behavior*. New York: Holt, Rinehart, & Winston.

Scribner, S. (1984). Cognitive studies of work. Special issue. *Quarterly Newsletter of Laboratory of Comparative Human Cognition* 6 (1,2). San Diego, CA: University of California.

Scribner, S. (1986). Thinking in action: Some characteristics of practical thought. In R. J. Sternberg & R. K. Wagner (Eds.), *Practical intelligence: Nature and origins of competence in the everyday world* (pp. 13-30). New York: Cambridge University Press.

Scribner, S., & Cole, M. (1981). *The psychology of literacy*. Cambridge, MA: Harvard University Press.

Shah, J. Y., & Kruglanski, A. W. (2000). Aspects of goal networks: Implications for self-regulation. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self regulation* (pp. 85-110). London: Elsevier.

Shank, R., & Abelson, R. (1977). *Scripts, plans, goals and understanding*. Hillsdale, NJ: Erlbaum.

Shanley, L. A., Walker, R. E., & Foley, J. M. (1971). Social intelligence: A concept in search of data. *Psychological Reports*, 29, 1123-1132.

Shimamura, A. P., & Squire, L. R. (1986). Memory and metamemory: A study of the feeling-of-knowing phenomenon in amnesia patients. *Journal of Experimental Psychology: General*, 113, 556-570.

Shinke, R. J., Bloom, G. A., & Salmela, J. H. (1995). The career stages of elite Canadian basketball coaches. *Avante*, 1, 48-62.

Simon, H. A. (1957). A behavioral model of rational choice. In H. A. Simon (Ed.), *Models of man, social and rational: Mathematical essays on rational human behavior in a social setting*. (pp. 99-118). New York: Wiley.

Simon, H.A., & Chase, W.G. (1973). Skill in chess. *American Scientist*, 61, 394-403.

Simonton, D. K. (1988). *Scientific Genius*. Cambridge: Cambridge University Press.

Sinnott, J. D. (1989). A model for solution of ill-structured problems: Implications for everyday and abstract problem solving. In J. D. Sinnott (Ed.), *Everyday problem solving: Theory and applications* (pp. 72-99). New York: Praeger.

Sloboda, J. (1976). Visual perception of musical notation: Registering pitch symbols in memory. *Quarterly Journal of Experimental Psychology*, 28, 1-16.

Sloboda, J. (1991). Musical expertise. In K. A. Ericsson & J. Smith (Eds.), *Toward a general theory of expertise* (pp. 93-125). New York: Cambridge University Press.

Smith, C. P., Atkinson, J. W., McClelland, D. C., & Veroff, J. (1992). *Motivation and personality: Handbook of thematic content analysis*. Cambridge: Cambridge University Press.

Snyder, M. (1974). Self-monitoring of expressive behaviour. *Journal of Personality and Social Psychology*, 30, 526-537.

Sosniak, L. A. (2006). Retrospective interviews in the study of expertise and expert performance. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 287-302). Cambridge: Cambridge University Press.

Spearman, C. (1904). "General Intelligence," Objectively determined and measured. *The American Journal of Psychology*, Vol. 15, No 2, 201-292.

Spearman, C. (1923). *The nature of intelligence and the principles of cognition*. London: Macmillan.

Spearman, C. (1927). *The abilities of man: Their nature and measurement*. London: Macmillan.

Spiro, R. J., Coulson, R. L., Feltovitch, P. J., & Anderson, D. K. (1988). Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domain. In *Proceedings of the 10<sup>th</sup> Annual Conference of the Cognitive Science Society* (pp. 375-383). Hillsdale, NJ: Erlbaum.

Spiro, R. J., Coulson, R. L., Feltovitch, P. J., & Anderson, D. K. (1989). Multiple analogies for complex concepts: Antidotes for analogy-induced misconception in advanced knowledge acquisition. In S. Vosniadou & A. Ortony (Eds.), *Similarity and analogic reasoning* (pp. 498-531). Cambridge: Cambridge University Press.

Spiro, R. J., Vispoel, W., Schmitz, J., Samarapungavan, A., & Boerger, S. (1987). Knowledge acquisition for application: Cognitive flexibility and transfer in complex content domains. In B. C. Britton (Ed.), *Executive control processes* (pp. 177-199). Hillsdale, NJ: Erlbaum.

Spokane, A. R. (1985). A review of research on person-environment congruence in Holland's theory of careers. *Journal of Occupational Behavior*, 26, 306-343.

Starkes, J. L., & Deakin, J. M. (1985). Perception in sport: A cognitive approach to skilled performance. In W. F. Straub & J. M. Williams (Eds.), *Cognitive sport psychology* (pp. 115-128). Lansing, NY: Sport Science Associates.

Starkes, J. L., & Ericsson, K. A. (2003). (Eds.), *Expert Performance in Sports: Advances in Research on Sport Expertise*. Champagne, IL: Human Kinetics.

Starkes, J. L., Cullen, J. D., & MacMahon, C. (2004). A life-span model of the acquisition and retention of expert perceptual-motor performance. In A. M. Williams & N. J. Hodges (Eds.), *Skill Acquisition in Sport: Research, theory and practice* (pp. 259-281). Oxford: Routledge.

- Starkes, J. L., Weir, P. L., & Young, B.W. (2003). What does it take for older expert athletes to continue to excel? In J. L. Starkes & K. A. Ericsson (Eds.), *Expert Performance in Sports: Advances in Research on Sport Expertise* (pp. 251-272). Champagne, IL: Human Kinetics.
- Staszewski, J. J. (1988). Skilled memory and expert mental calculation. In M. T. H. Chi, R. Glaser, & M. J. Farr (Eds.), *The nature of expertise* (pp. 71-128) Hillsdale, NJ: Erlbaum.
- Staudinger, U. M., & Baltes, P. B. (1994). Psychology of wisdom. In R. J. Sternberg (Ed.), *Encyclopaedia of intelligence*, (Vol. 1, pp. 143-152).
- Staudinger, U. M., & Baltes, P.B. (1996). Interactive minds: A facilitative location of wisdom-related performance? *Journal of Personality and Social Psychology*, 71, 746-762.
- Staudinger, U. M., Smith, J., & Baltes, P. B. (1992). Wisdom-related knowledge in a life review task: Age difference and the role of professional specialization. *Psychology and Aging*, 7, 271-281.
- Ste-Marie, D. (2003). Expertise in sport judges and referees – Circumventing information processing limitations. In J. L. Starkes & K. A. Ericsson (Eds.), *Expert performance in sports: Advances in research on sport expertise* (pp. 169-190). Champagne, IL: Human Kinetics.
- Sternberg, R. J. (1996a). The cost of expertise. In K. A. Ericsson, (Ed.), *The Road to excellence* (pp.347-353). Mahwah, NJ: Erlbaum.
- Sternberg, R. J. (1977). *Intelligence, information processing and analogic reasoning: The componential analysis of human abilities*. Hillsdale, NJ: Erlbaum.
- Sternberg, R. J. (1980). A componential approach to intellectual development. In R. J. Sternberg, (Ed.), *Advances in the psychology of human intelligence* (Vol. 1) (pp. 413-463). Hillsdale, NJ: Erlbaum.
- Sternberg, R. J. (1981). Intelligence and nonentrenchment. *Journal of Educational Psychology*, 73, 1-16.
- Sternberg, R. J. (1982). A componential approach to human intelligence. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 1). Hillsdale, NJ: Erlbaum.
- Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.

Sternberg, R. J. (1988). *The Triarchic Mind: A New Theory of Human Intelligence*. New York: Viking.

Sternberg, R. J. (1996b). *Successful Intelligence*. New York: Plume.

Sternberg, R. J. (2000). The concept of intelligence. In R. J. Sternberg (Ed.) *Handbook of Intelligence* (pp. 3-15). New York: Cambridge University Press.

Sternberg, R. J. (2003). *Wisdom, intelligence, and creativity synthesized*. New York: Cambridge University Press.

Sternberg, R. J., & Frensch, P. A. (1992). On being an expert: A cost-benefit analysis. In R. R. Hoffman (Ed.), *The Psychology of Expertise: Cognitive research and empirical AI* (pp. 191-203). New York: Springer-Verlag.

Sternberg, R. J., & Horvath, J.A. (1999). (Eds.), *Tacit knowledge in professional practice*. New Jersey, Erlbaum.

Sternberg, R. J., & Lubart, T. I. (1996). Investing in creativity. *American Psychologist*, 51, 677-688.

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. In R. J. Sternberg (Ed.), *Handbook of Creativity* (pp. 3-15) New York: Cambridge University Press.

Sternberg, R. J., & Smith, C. (1985) Social intelligence and decoding skills in nonverbal communication. *Social Cognition*, 3, 168-192.

Sternberg, R. J., & Wagner (1986). *Practical Intelligence: Nature and origin of competence in the everyday world*. New York: Cambridge University Press.

Sternberg, R. J., Conway, B.E., Ketron, J. L., & Bernstein, M. (1981). People's conceptions of intelligence. *Journal of Personality and Social Psychology*, 41, 37-55.

Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J. A., Wagner, R. K., Williams, W. M., Snook, S. A., & Grigorenko, E. L. (2000). *Practical intelligence in everyday life*. New York: Cambridge University Press.

Sternberg, R.J. (2005). The WICS model of giftedness. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of Giftedness* (pp. 327-342). New York: Cambridge University Press.

Strauss, Anselm. (1959). *Mirrors and masks: The search for identity*. Glencoe, IL: The Free Press.

- Streufert, S., & Streufert, S. C. (1978). *Behavior in the complex environment*. Washington, DC: Winston.
- Strough, J., Berg, C., & Sansone, C. (1996). Goals for solving everyday problems across the lifespan: Age and gender differences in the salience of interpersonal concerns. *Developmental Psychology*, 32, 1106-1115.
- Super, D. E. (1957). *The psychology of careers*. New York: Harper and Row.
- Super, D. E. (1963). *Career development: Self concept theory*. New York: CEEB.
- Super, D. E. (1980). A life-span life-space approach to career development. *Journal of Vocational Behavior*, 26, 182-296.
- Svoboda, B., & Vanek, M. (1982). Retirement from high level competition. In T. Orlick, J. Y. Partington, & J. H. Salmela. (Eds.), *Proceedings of the 5th World Congress on Sports Psychology* (pp. 166-175). Ottawa: Coaching Association of Canada.
- Tan, H., & Libby, R. (1997). Tacit managerial versus technical knowledge as determinants of audit expertise in the field. *Journal of Accounting Research*, 35, 97-113.
- Tannebaum, A. J. (1983). *Gifted children: Psychological and educational perspectives*. New York: MacMillan.
- Taylor, J. & Ogilvie, B. C. (1998). A conceptual model of adaptation to retirement among athletes. *Journal of Applied Sport Psychology*, 6, 1-20.
- Thomas-Hunt, M. C. & Phillips, K. W. (2004). When what you know is not enough: Expertise and gender dynamics in task groups. *Personality and Social Psychology Bulletin*, 30 (12), pp. 1585–1598.
- Thomas-Hunt, M. C., & Phillips, K. W. (2004). When what you know is not enough: Expertise and gender dynamics in task groups. *Personality and Social Psychology Bulletin*, 30 (12), pp. 1585–1598.
- Thorndike, R. L. (1903). *Educational Psychology*. New York: The Science Press.
- Thorndike, R. L. (1920). Intelligence and its uses. *Harpers Magazine*, 140, pp. 227-235.
- Thurstone, L. L. (1938). Primary mental abilities, *Psychometric Monographs*, Vol. 1. Chicago: Chicago University Press.

- Thurstone, L. L. (1947). *Multiple-Factor analysis: A development and expansion of 'The Vectors of the Mind.'* Chicago, IL: University of Chicago Press.
- Tiedeman, D. V., & O'Hara, R. P. (1963). *Career development: Choice and adjustment.* New York: College Entrance examination Board.
- Tolbert, W. R., & Rooke, D. (2005). Transformations of leadership. *Harvard Business Review*, April, 66-77.
- Torbert, B. (2004) *Action inquiry: The secret of timely and transformational leadership.* San Francisco, CA: Berrett Koehler.
- Tulving, E. (1972). Episodic and semantic memory. In E. Tulving and W. Donaldson (Eds.), *Organization of memory* (pp. 381-402). New York: Academic Press.
- Tulving, E., & Oesler, S. (1968). Effectiveness of retrieval cues in memory for words. *Journal of Experimental Psychology*, 1968, 77, 593-601.
- Tulving, E., & Thomson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review*, 80, No. 5, 332-373.
- Ullman, S. (1980). Against direct perception. *Behavioral and Brain Sciences*, 3, 373-415.
- Valliant, G. (1977). *Adaptation to life.* Boston: Little Brown.
- Van Gennep, A. (1960). *The rites of passage.* Chicago: University of Chicago Press.
- Van Maanen, J. (1977). Experiencing organization: Notes on the meaning of careers and socialization. In J. Van Maanen (Ed.), *Organizational careers: Some new perspectives* (pp. 15-48). New York: Wiley.
- Van Mannen, J. (1973). Observations on the making of a policeman. *Human Organizations*, 32, 407-418.
- Vernon, P. E. (1950). *The structure of human abilities.* New York: Wiley.
- Vickers, J. (2010). "The problem of Induction" *Stanford Encyclopaedia of Philosophy.* Palo Alto, CA: Stanford University Press.

Voss, J. F., Greene, T. R., Post, T., & Penner, B.C. (1983). Problem solving skill in the social sciences. In G. Bower (Ed.), *The psychology of learning and motivation*. (pp. 165-213). New York. Academic Press.

Voss, J. F., Perkins, D. N., & Segal, J. W. (Eds.). (1981). *Informal reasoning and education*. Hillsdale, NJ: Erlbaum.

Voss, J.F., Tyler, S., & Yengo, L. (1983). Individual differences in the solving of social science problems. In R. Dillon & R. Schmeck (Eds.), *Individual differences in cognition* (pp. 206-232). New York: Academic Press.

Vroom, V. (1966) Organizational choice: A study of pre- and post-decision processes. *Organizational Behavior and Human Performance*, 1, 212-215.

Vygotsky, L.S. (1978) *Mind in Society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wagner, R .K., & Sternberg, R. J. (1985). Practical intelligence in real world pursuits: The role of tacit knowledge. *Journal of Personality & social Psychology*, 49, 437-458.

Wagner, R. K. (1987). Tacit knowledge in everyday intelligent behaviour. *Journal of Personality and Social Psychology*, 52 (6), 1236-1247.

Wagner, R. K. (2000). Practical Intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 380-395). New York: Cambridge University Press.

Wagner, R. K., & Sternberg, R. J. (1990). Street smarts. In K .E. Clark & M. B. Clark (Eds.) *Measures of Leadership* (pp. 493-504). West Orange, NJ: Leadership Library of America.

Wanous, J. P. (1980). *Organizational entry*. Reading, MA: Addison-Wesley.

Waterman, D. (1975). Adaptive production systems. *Proceedings of the Fourth International Joint Conference on Artificial Intelligence* (pp. 296-303). Cambridge, MA

Wechsler, D. (1958). *The measurement and appraisal of adult intelligence (4<sup>th</sup> edition)*. Baltimore: Williams & Wilkins.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale (3<sup>rd</sup> edition)*. San Antonio, TX: The Psychological Corporation.

Wedek, J. (1947). The relationship between personality and psychological ability. *British Journal of Psychology*, 37, 133-151.



- Weiner, B. (1980). *Human motivation*. New York: Holt, Reinhart and Winston.
- Welford, A.T. (1976). *Skilled performance: Perceptual and motor skills*. Glenview, IL: Scott Foreman.
- Werthner, P., & Orlick, T. (1986). Retirement experiences of successful Olympic athletes. *International Journal of Sports Psychology*, 17, 337-363.
- Whorf, B. L. (1956). *Language, thought and reality*. Boston: MIT Press.
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory in motivation. *Contemporary Educational Psychology*, 25, 68-81.
- Wilding, J., & Valentine, E. (1994). Mnemonic wizardry and the telephone directory-But stories are another story. *British Journal of Psychology*, 85, 501-509.
- Wilding, J., & Valentine, E. (2006). Exceptional memory. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 539-552). Cambridge: Cambridge University Press.
- Wiley, J. (1998). Expertise as mental set: The effects of domain knowledge in creative problem solving. *Memory and Cognition*, 26, 716-730.
- Williams, A. M., & Hodges, N. J. (2004). (Eds.), *Skill acquisition in sport: Research, theory and practice*. Oxford: Routledge.
- Wilson, R. C., Guildford, J. P., Christensen, P. R., & Lewis, D. J. (1954). A factor-analytic study of creative-thinking abilities. *Psychometrika*, 19, 297-311.
- Wong, C. T., Day, J. D., Maxwell, S. E., & Meara, N. M. (1995). A multitrait-multimethod study of academic and social intelligence in colleges students. *Journal of Educational Psychology*, 87, 117-133.
- Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock-Johnson tests of Cognitive Ability-Revised*. Ithaca, IL: Riverside.
- Woods, D. D., Johannese, L. J., Cook, R. I. & Sarter, N. B. (1994). *Behind human error: Cognitive systems, computers and hindsight*. Wright-Patterson Air Force Base, OH: CSE-RIAC.
- Young, B. W., & Salmela, J. H. (1998). Athletes' perceptions of deliberate practice in Canadian middle distance running. *Journal of Applied Sport Psychology*, 10 (Suppl.), S89-90.

Zeitz, C. M. (1997). Advantages of abstraction. In P. J. Feltovich, K. M. Ford, & R. R. Hoffman (Eds.), *Expertise in context* (pp. 43-65). Cambridge, MA: MIT Press.

Zimmerman, B. A. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self efficacy in changing societies* (pp. 202-231). Cambridge: Cambridge University Press.

Zimmerman, B. J. (2000). Attaining Self-Regulation: A social cognitive perspective. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self regulation* (pp. 13-39). London: Elsevier.

Zimmerman, B. J. (2006). Development and adaptation of expertise: The role of self-regulatory processes and beliefs. In K. A. Ericsson, N. Charness, P. J. Feltovich, & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 705-722). Cambridge: Cambridge University Press.

Zuckerman, H. (1977). *Scientific elites: Nobel Laureates in the United States*. New York: The Free Press.

## **Appendix 1. Informed consent and debriefing forms**

**“The Transition in expertise from Individual performance to Coaching, Managing & Teaching”**

**Conducted by Christopher Connolly, MA**

**INFORMED CONSENT SHEET:**

The School of Social Sciences and Law at Brunel University requires that all persons who participate in psychology studies give their written consent to do so. Please read the following and sign it if you agree with what it says.

I freely and voluntarily consent to be a participant in the research project entitled "Mid Career Transitions: a cross domain study in Music, Sport and Business" to be conducted at Brunel University, with Christopher Connolly, principal investigator. The broad goal of this research program is to explore the attributes of individuals who make a transition from performance as an individual in a specific domain such as being a violinist, energy trader or sprinter to working as a team leader, coach or educator in the same or possibly different field. Specifically, I have been told that I will be asked to take part in a retrospective interview in which I will discuss how I experienced such a transition. The session should take no longer than two hours to complete.

I have been told that my responses will be kept strictly confidential. I also understand that if at any time during the session I feel unable or unwilling to continue, I am free to leave without negative consequences. That is, my participation in this study is completely voluntary, and I may withdraw from this study at any time. My withdrawal would not result in any penalty, academic or otherwise. My name will not be linked with the research materials, as the researcher is interested in similarities and differences across the three domains in general -- not any particular individual's experiences or attributes in particular.

I have been given the opportunity to ask questions regarding the procedure, and my questions have been answered to my satisfaction. I have been informed that if I have any general questions about this project, or ethical issues relating to the project, I should feel free to contact Christopher Connolly at christopher.connolly@brunel.ac.uk

I have read and understand the above and consent to participate in this study. My signature is not a waiver of any legal rights. Furthermore, I understand that I will be able to keep a copy of the informed consent form for my records.

\_\_\_\_\_  
Participant's Signature                      Please Print                      Date

I have explained and defined in detail the research procedure in which the above-named has consented to participate. Furthermore, I will retain one copy of the informed consent form for my records.

\_\_\_\_\_  
Principal Investigator Signature                      Please Print                      Date

**“The Transition in expertise from Individual performance to Coaching, Managing & Teaching”**

**Conducted by Christopher Connolly, MA**

**DEBRIEFING FORM**

This research is seeking to identify the attributes common to individuals who make a transition from one type of expertise to another in the same field e.g. when a professional athlete reaches the end of their individual performance career due to age or injury and seeks to make a transition to a coaching or management position; when an equities trader is promoted to a position which requires management skills, interpersonal intelligence and organisational understanding; or when a musician seeks to expand their impact musically by lecturing at a college of music or leading a chamber group.

In particular:

- What are the differences between the skills and abilities required by a performer in their individual domain vs. those skills and abilities required in domains which involve leading, educating, or coaching others?
- What skills have individual performers acquired which help them to make the transition?
- What new skills do individuals have to acquire in order to make the transition?
- How do individuals think about and represent to themselves their knowledge and experience from their first domain in a way which enables such a transition?
- What motivational factors influence their transition?

The following studies might be of interest to you:

Gardner, H. (1993). *Frames of Mind* (Second Edition). Hammersmith London: Fontana Press

Sternberg, R. (1997). *Successful Intelligence*. New York: Plume

Ericsson, K A (Ed.) (1996). *The Road to Excellence*. New Jersey Lawrence Erlbaum Associates, Publishers

Bloom, Benjamin (Ed.) (1985). *Developing Talent in Young People*. New York: Ballantine Books

Deci, E. with Flaste, R. (1995). *Why we do what we do*. London: Penguin

Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. New York: HarperCollins

Once again, thank you for taking part in this study.

## Appendix 2. Interview Protocol

# Expertise Transition Research Project Christopher Connolly Main Study 2 Interview Questions

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The objective of this interview is to explore how you have continued to develop your expertise in your profession throughout your career. I am going ask you to discuss how developed through several stages of your career and in particular how you made the transitions between these stages.

- The first period will be about the development of your expertise or knowledge for your profession leading up to and through the beginning of your early career.
- The second stage will be the development beyond the first stages of your career and acquiring your expertise in your profession. There may be several career changes or developments during this period each with a specific transition.
- The third stage will be about further periods in your career where you progressed towards responsibility for larger or more ‘organisational, coaching or educational’ roles.

In discussion each of these periods I will ask you about how you further developed your expertise at that phase of your career. I will also ask you questions about the nature of your career transitions and what you did to manage those transitions.

## **1a Early Development of Expertise**

**(INTELLIGENCE)** How would you describe your **early experience of the potential or intelligences** required to pursue your profession?

**(EXPERTISE & SELF REGULATION)**

**How did you develop** this early potential? E.g. how did you manage your time, resources, learning experiences, utilise feedback, set goals, etc?

**(CONTEXT)**What in **your environment, people, etc. supported** your early development?

**(MOTIVATION)**What **motivated you to develop this potential?** To put in the required time, effort, commitment, etc.

**(SELF EFFICACY)** What **lead you to believe that you could excel** in performing in this area?

**Learning experiences, feedback, emotional experiences or mental insights?**

## **1 Transition to early career**

### **(FIRST CAREER TRANSITION)**

**Describe the early position** you moved into as a professional & how old you were.

**(CONTEXT)** Describe the context i.e. **the environment, resources, people**, etc. that you encountered or utilised and how they enabled or challenged you.

**(EXPERTISE)** How would you **describe the skills and expertise** which you brought to your early professional career that made you successful in the transition?

**(INTELLIGENCE)** How would you **describe the way you used your mind to adapt** and respond during the transition? Did you use any special techniques, ways of thinking, early experience or other special approaches during the transition? Did you have any special abilities?

**(RESILIENCE)** How did you **deal with the demands of the situation** e.g. challenges, stress, setbacks, opportunities? How did you develop confidence and resilience in these circumstances?

**(SELF EFFICACY)** When or how **did you know that you had established or stabilised your expertise** at this new level or performance and what characterised this attainment?



## **2 Transitions in Career Stages**

### **(This is repeated for each transition)**

Now let's talk about the phase of your career when you moved beyond your performance as an individual or member of a team or small group. Describe the new position you were moving into as a professional and how old you were.

#### **(TRANSITION STATE)**

Was this a **sudden change or a gradual transition?**

An **unexpected change or anticipated or even planned?**

**(CONTEXT)** What was the context in which this transition took place?

**Environment and resources**

**People, peers, mentors, team**

**Learning or training, etc.**

#### **(TRANSITION EXPERTISE)**

How would you **characterise your ability to make this transition?**

What **skills** to make the transition?

What were your **mental attitudes?**

How did you **analyse the situation and shape your responses?**

**(INTELLIGENCE)** How would you **describe the way you used your mind to adapt** and respond during the transition?

Did you use any **special techniques, ways of thinking**

Did you have **early experience or other special approaches?**

Did you have any **special abilities?**

**(SELF REGULATION)**

How did you did you manage **resources, learning experiences, utilise feedback, etc.**

Did you engage in **conscious planning, goal setting, etc?**

Did you **reflect or self evaluate** very much?

Did you **practice** a lot?

How did you **organise the new knowledge?**

**(RESILIENCE)** How did you deal with the demands of the new situation?

**Opportunities or surprises?**

**How did you adapt to changes or setbacks?**

**Challenges, stress, frustrations?**

**How would you characterise your self confidence?**

**(MOTIVATION)**

What were your **motives to take up this new challenge?**

The **same motive or different from the earlier phases** of your career?

What **sustained you when the going got difficult?**

### **3 Transition Summary**

#### **(Transition Expertise)**

What would you say are the characteristics of being able to make a successful transition to a new or different level of expertise?

What are the **skills and abilities** required in making **transitions**?

How would you **assess yourself against these skills**?

How would you **characterise your successes** in making transitions?

Where have you been **most challenged** and what did you do?

Would you say you **are good or an expert at making such transitions**?

### Appendix 3. Summary of Coding Hierarchy

<i>Early expertise in multiple domains and early cognitive flexibility</i>												
	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Early cognitive flexibility	8	41	5.13	8	29	3.63	6	25	4.17	22	95	4.32
Early Multiple Domain Expertise	7	23	3.29	3	8	2.6	3	5	1.67	13	35	2.77
<i>Cognitive flexibility in transitions</i>												
	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
General cognitive flexibility	6	14	2.83	1	2	2	5	8	1.43	16	24	1.5
Non-fixedness or non-reductive bias	7	21	3.14	4	6	1.75	7	15	2.14	18	42	2.44
Non-automaticity	2	2	1	3	8	2.33	7	14	2	12	24	2
Totals	8	37	4.63	5	16	3.2	8	37	4.63	21	90	4.26
<i>Domain process and knowledge generalisability during transitions</i>												
	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Domain Process Generalisability	8	23	2.88	4	12	2.6	4	12	3	16	47	2.94
Domain Knowledge Generalisability	8	18	2.25	7	20	2.86	3	8	2.67	18	46	2.56

TOTAL	8	41	5.13	7	32	4.57	4	20	5	19	93	4.89
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*Intelligence generalised during transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
General experience transferred	7	17	2.43	4	7	1.75	6	19	3.17	17	43	2.53
Generalising through induction & inference Analogies & metaphor	8	19	2.36	5	18	3.6	5	17	3.4	18	54	3
	5	11	2.2	5	5	1	6	11	1.83	16	27	1.69
TOTAL	8	47	5.88	7	27	3.86	8	47	5.89	23	124	5.4

*Intrapersonal intelligence during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
During Transition	8	21	2.63	7	39	5.57	7	56	8	22	116	5.27
Total		21			39			56			116	

*Metacognition & self regulation during transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
<b>SELF REGULATION</b>												
Forethought	3	6		2	3		6	13		11	22	
Performance Control	1	2		1	2		1	1		3	5	
Self Reflection	0	0		0	0		2	2		2	2	
General Self Regulation	7	16		8	18		6	14		21	48	
<b>META COGNITION</b>												
Controlling	2	2		1	1		4	6	7	7	9	
Monitoring	1	1		1	1		4	6	6	5	8	
General Metacognition	2	2		2	4		3	7	7	7	13	
Total		29			29			49			107	

*Interpersonal intelligence during transitions*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
EARLY Interpersonal intelligence	3	4	1.33	3	4	1.33	5	9	1.8	11	17	1.56
DURING TRANSITION Interpersonal Intelligence	7	22	3.14	8	28	3.5	8	59	7.38	23	109	4.74
POST TRANSITION Interpersonal Intelligence	8	21	2.65	6	17	2.83	6	20	3.33	20	58	2.9
TOTAL	8	47	5.88	8	49	6.13	8	88	11.0	24	184	7.67

*Interpersonal intelligence during transitions in specific arenas*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
SELF Openness to Feedback	1	1	1	4	6	1.50	6	34	5.67	11	41	3.73
OTHERS Supporting Others	6	12	2.0	5	16	3.20	5	15	3.0	16	43	2.69
Motivating Others	6	7	1.17	3	7	2.33	5	12	2.40	14	26	1.86
Giving Autonomy	2	5	2.50	3	11	3.67	6	22	3.67	11	38	3.45
CONTEXT Corporate & Stakeholder	3	4	1.33	0	0	0	5	14	2.8	9	18	2.0
TOTAL	8	29	3.63	8	40	5.0	8	97	12.13	24	166	6.92

*Practical intelligence and problem solving during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Problem formulation	2	2	1	6	13	2.17	4	12	3.0	12	27	2.25
Problem resolution	3	7	2.33	3	3	1	7	16	2.29	13	26	2
Total	4	9	2.25	6	16	2.67	8	28	3.5	18	53	2.94

*Practical intelligence during transition*

	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Administra- tion Intelligence	7	18	2.57	5	20	4	4	9	2.25	16	47	2.94

<i>Practical intelligence and resource management during transition</i>												
	Music			Sport			Business			TOTAL		
	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave	Cases	Ref	Ave
Knowledge expertise	3	8	2.57	7	17	2.43	5	10	2	15	35	2.33
Environment Support	7	14	2	7	14	2	5	10	2	19	38	2
Education and training	3	3	1	7	15	2.14	4	18	4.5	14	36	2.57
Total	7	25	3.57	8	44	5.5	8	38	4.75	23	107	4.65