Parents and their children's choice of school science subjects and career intentions: a study from Mauritius

Introduction: parental influence on subject choice

This article examines the varied and complex forms of parental influence that shape young people's decisions to begin – and continue – studying science subjects in school and beyond. We report here on a small-scale study that investigates parental influences on school children's subject choices in the Republic of Mauritius. Parents represent just one of many influences on young people and there is considerable literature relating to dispositions towards science as a result of teachers, peers, museums, film, television, fiction or media images more generally, and this is the case in Mauritius as it is in many other countries. We adopt a broadly phenomenological approach, which Edmund Husserl (1859-1938) saw as the study of life through the description of personal experiences. The phenomenon under scrutiny here is the nature of parental influence on their children's school and career aspirations. We reach for these personal experiences through our use of an open 'home-based' questionnaire, which we developed, with a purposive sample of parents. Our procedures begin by discussing the context of the study, then 'bracketing' our pre-understandings of the phenomenon of 'parental influence'. Our intention is to capture figural aspects of the 'less visible but integral' contextual background before then looking to understand aspects of parental influence itself. We follow this by generating appropriate responses and thematising the resulting data, before offering some summary comments.

First, then, some cultural context. The Republic of Mauritius includes Mauritius, the islands of Rodrigues and Agalega and small islands, coral reefs and sandbanks called the Cargados Carajos and is situated in the Indian Ocean some 800 km east of Madagascar. Since independence in 1968, a considerable number of changes have taken place in the education system with financial and other resources being aimed at infrastructural development. Primary education has been compulsory since 1992 and secondary education since 2003. The Mauritian Education system is based on the British model and it is structured with three years of pre-primary education (3-5 years of age), six years of primary education (5-11 years of age) and five years of secondary education (12-16 years of age), leading to School Certificate (SC) examinations and two years of

optional further education (17-18 years of age), leading to Higher School Certificate. Science is compulsory up to Form III (age 14) and then optional for Forms IV and V.

Mauritius places great importance on scientific and technological literacy that will, it is hoped, enable its citizens to contribute to human and national development. It is a vision linked both to the relevance of science in the everyday life of its citizens and to the creation of a pool of future scientists. However, the Master Plan of Education (1991) and the White Paper in Science (1992) sounded the alarm regarding the low take-up of science (25%) by students after the compulsory level (Form III, year 9, age 14). Those reports noted that the majority of students chose accountancy or economics. In common with many countries, of the 25% who opted for science, the number of girls taking science was much lower than boys. At that point, a number of initiatives and activities were introduced, for example, through a science action plan, science exhibitions and competitions. Ensuing statistics show an increase in the number of pupils taking science to around 40%, of whom 60% are boys and 40% are girls (Statistics Mauritius 2013).

Following the Education and Human Resource Strategy Plan 2008-2020, education is regarded as a key element for economic and social development in Mauritius, and it is believed that an educated population would lead to economic progress and an increase in the country's wealth. Mauritius is a newly developed country and, by achieving its goal of economic competitiveness and social development, it aims to become a knowledge hub in the Sub-Saharan Region. As a small island state this depends heavily on the scientific and technological literacy of its human resources and there is a growing political need to empower the younger generation scientifically and technologically to meet the challenges confronting them. There is a growing recognition both in Mauritius and internationally of the importance of science in all realms of life, at individual as well as the wider socio-economic and political level. With development and changes taking place in Mauritius, young people are being called to take a stance on socio-scientific and technological issues, to become more critical and able to solve problems so that Mauritius achieves its vision. Besides scientific literacy, Mauritius needs a critical mass of scientists, technologists, engineers and others in science-related occupations. In addition, it can be argued that science education is important for acquiring citizenship skills as well as preparing students for the globalised world of work, new technologies and a knowledge-based society. The publication of *Mauritius: Vision 2030* (Prime Minister's Office 2015) further emphasises the strategic thrusts around development of key areas requiring scientific and technological know-

how. Substantial resources are being invested in research and development to move the country forward with a view to creating many opportunities in the scientific and technological fields. The economic zone of the country is quite large, as it comprises both land and sea, and there is a rich source of wealth to be explored in the context of the new ocean economy and the setting up of a seafood hub and technology parks (MRC 2014).

While these initiatives have been important, we note the work of Archer, DeWitt, Osborne, Dillon, Willis and Wong (2012) in the UK, who describe how children's aspirations and attitudes to science are complex and socially embedded. These authors conclude that:

> Children's aspirations and view of science careers are formed within families, and these families play an important, albeit complex, role in shaping the boundaries and nature of what children can conceive of as possible and desirable and the likelihood of their being able to achieve these aspirations. (p. 902)

In these terms, we recognise there has been little exploration of the role of parents in Mauritius in the science choices that their children make and surprisingly little in other countries more generally, and so this paper looks to address this in some part. We note that the the existing literature on cultural assumptions about what scientists do and the role of parents in whether students do or do not choose to have careers in science is mostly composed North American and European studies and perspectives; we therefore hope that this study contributes towards a rebalancing of the literature.

Bracketing parental influence

There are numerous studies that identify parental involvement as an important way to promote academic success (e.g. Epstein and Sanders 2002; Hill and Taylor 2004; Jeynes 2009; Seginer 2006), but the nature of parental influence remains vague, often being a general form of influence rather than specific to the study of science. So, for example, Fouad and Bynner (2008) concluded from their three-year study that it is the self-confidence instilled by parents that is important for school learning, rather than the young person's initial interest (cf. Rose and Smith 2008).

In an early study focused on science, McNeal (1999, 2001) considered the relationship between parental involvement and science achievement and concluded that parent-child discussions

based on science education had a significant influence on improving achievement in science-related subjects. Others though, for example Salhejee and Watts (2015), report that, while such influences may be present, they are not as important as might be supposed. In this vein, Whiston and Keller (2004) note numerous studies that report young people's perceptions of parental influence on their career choices: only about 21% of young people claim that their career choices are made collaboratively with their parents, and only about 2% state that their parents were the main drivers behind their actual decisions. In a recent survey, one of the world's leading design, engineering and project management consultancies reported the responses of 300 women engineers (Atkins 2013). While 91% had at least one inspirational teacher, 68% also said that their school careers advice had been weak and, importantly, the majority (73%) said that the idea to be an engineer was largely their own (p. 17) and independent of their parents. Similarly, in reports about high school students' career intentions in the USA, Sahin, Gulacar and Stuessey (2015) and Sahin, Ekmecki and Waxman (2017a) both note a range of influences on students, from school-based experiences, project work, science Olympiads and summer camps to personal factors such as individual motivation and maths efficacy. Only one part of the overall influence on student choices lay with parents, and this showed a general pattern – somewhat unsurprisingly – that students with higher parent encouragement were more likely to select a STEM major after graduating from high school (Sahin, Ekmecki and Waxman 2017b).

Archer, DeWitt, Osborne, Dillon, Willis and Wong (2012, 2013, 2014) certainly see positive engagement with school science to be shaped primarily by socio-cultural factors such as home, family, social status, peers and schools. Families play an important, albeit complex, role in shaping the boundaries and nature of what children can conceive of as possible and desirable and the likelihood of their being able to achieve these aspirations. Archer and her colleagues focus on the visioning of possible careers (Archer and Tomei 2014) and one conclusion from their work is that most young people and parents are unaware that science can lead to diverse career routes. This leads to a widespread but narrow view that science is 'not relevant for me'. Where this happens, school students are therefore unlikely to study science or aspire to STEM-related careers. Macdonald's (2014) comprehensive survey takes a similar tack so that, while parents' influences are important, this is played down and it is positive and informed careers advice that is actually key to science recruitment.

A ‘spectrum of influence’, then, might be seen to extend from parents’ broad non-understanding to direct intervention. It extends from lack of, or very narrow, knowledge of science and/or of their offsprings’ likely subject choices on the one hand, through general disinterest, to a broad approval of and support for anything the child wants to do, then onwards towards forthright intervention either directly for, or against, science. So, for example, in the Atkins (2013) research mentioned above, 94% of respondents said that their families were solid in providing almost unstinting support for their career choice (with the news coming as a complete surprise to some 11%), although this was largely of the ‘we’ll support you in whatever you want to do, darling’ kind and not necessarily directed towards a science career. In a stronger sense, Stambler (1998) suggests that parents are ‘clearly influential’ in young people’s career choice, while Ferreira et al. (2006) go beyond ‘influential’, suggesting that parents are one of the ‘key’ influences that bear on the vocational behaviour of adolescents. Further, Biggart et al. (2004), in an analysis of the Scottish School Leavers Survey (SSLS) data, reported that parents are the most commonly reported ‘catalyst’ for initiating the choice process.

At this ‘directly catalytic’ end, Baranowski et al. (2002) see parental influence through a variety of mechanisms, three of which are: (i) silent encouragement around particular subject choices and careers, (ii) direct and explicit parent-child communication about possible choices, and (iii) parental behaviour modelling. The ‘modelling hypothesis’ is often based on Bandura’s (1977) social learning theory, arguments that suggest a connection between parental occupation and children’s choices. Bengtsson (1983) sampled 98 female university students and showed that a greater proportion of the women studying natural sciences than those studying humanities had fathers who had studied natural sciences and worked in the field. Another early study by Breakwell and Beardsell (1992) surveyed almost 400 UK pupils aged 11-14. Boys were seen to have more positive attitudes to science and greater levels of participation in scientific extra-curricular activities, and these positive attitudes were strongly positively related to having a father and mother who supported science and to having scientific peers. Having a father who supported science, having parents who engaged in activities jointly with their children and having scientific peers all predicted greater involvement in scientific extra-curricular activities. Smith and Hausafus (1998) highlighted that, irrespective of ethnicity, students worked better in their school science lessons when their parents took them to science museums and fairs, which helped the students to understand the importance and relevance of science education in their lives. The top three student reasons for an interest in STEM reported by Christensen, Knezek

and Tyler-Wood (2014) were: (i) a supportive parent/family member (26%), (ii) a high quality/motivating teacher (17%), and (iii) self-motivation/naturally inclined (14%). Such a spectrum of influence need not, of course, always be seen as positive. There are clearly instances, too, where parental influence can 'catalyse' in an adverse way, moving the young person towards – or away from – science as an act of rebellion (Salehjee and Watts, 2015). In their work, Archer et al. (2012) also allow for the possibility of children 'going against the grain' (Reay, Crozier and Clayton 2010) of formative social and familial expectations. This was seen to work both ways, with some young people resisting a strong science 'steer' from home and others proactively choosing science despite little awareness or science resources at home.

So, from 'indifference' to 'guidance', to 'influence', to 'key', to 'catalyst': a survey of research illustrates that parents have enormously varied reach. However, while work into intended career choice has demonstrated the general influence of parents, as well as the role of decisions made by students themselves, we are interested in the shape, and the avenues, through which parents influence their children in such matters within one small country where science is seen as being of particular importance and where there is a gap in the literature. Our study has been shaped by a key concern: not what influence the offspring notice and describe, but in charting what parents themselves say.

Research approach, methods and sample

Generally speaking, a broad phenomenological approach is concerned with first-hand descriptions of particular phenomena and, through the use of a parental survey questionnaire, our study has been shaped by a key concern: not what influence students notice and describe, but what parents themselves say. Our aim has been to find an answer to the research question: 'What do parents see as the nature of their influence on their child(ren)'s choice of science subjects in Mauritius?'. In using a phenomenological framework, we seek to capture the essence of parental influence rather than define causes or – at this stage – systematically count numbers.

Most secondary schools in Mauritius are single-sex; there are only a small number of co-educational (mixed-sex) schools, which are run by the confessional bodies or the private sector. The four secondary schools in this study were purposely selected so as to include two single-sex girls' schools and two mixed-sex schools. The mixed-sex schools were included in the study in

order to find out, as part of a larger study, whether the presence of boys affected the girls' choice of subjects at Form III level.

The instrument used in this study was a questionnaire developed by us through a process of thorough discussion and piloted in Mauritius with parents from similar backgrounds to the ones under study. After making relatively minor modifications through the feedback we received, the revised questionnaire was administered to the parents of the students in Form III (aged 14) in the four case study schools. The schools were accessible and it was relatively straightforward to contact parents through them. The four schools, A, B, C and D, are characterised in Table 1.

Table 1 about here

The questionnaire

The majority language and lingua franca of Mauritius is French-based Creole. According to the Organisation Internationale de la Francophonie (2007), almost all Mauritians speak French; French is a common language in education and the dominant language of media. English, though, is used as the prime medium of instruction in public schools and so we used an English version of the questionnaire, presented this to the rector/principal of each of the four schools, issued a letter to parents and talked to the pupils involved about the aim of the research, all in order to help parents complete the questionnaires. We obtained a pleasingly high response: 112 returns from 135 sent out, a rate of 83%.

We worked to ensure the questions were formulated in simple English (Appendix 1). Clear instructions were given on how to answer; careful thought was given to the length and order of the questions. Both parents (where possible) were invited to discuss the questionnaire with one another and complete the questionnaire jointly. There might have been instances where parents needed some clarifications or help with questions; however, this was not evident from the responses. There were a few cases where some words in the responses were written in French and these were checked for meaning with no indications that there were any misunderstandings of the questions being asked. We included some internal validity checks by asking open-ended questions in different forms; for example, in several questions we asked respondents to give reasons for their answer to a closed question. The survey included some

general open-ended questions for details about the participants; none required a great deal of time to complete, and we were careful to be sensitive and not invade privacy. Overall, the survey covered a range of issues relating to young people's education; three questions in particular were concerned with parents' perceptions of science, their influence on the choice of subjects their child would take after compulsory-level schooling, and their influence on their child's subsequent career path.

Below, data for the four schools were initially combined to obtain an overall picture of the responses made by the parents. The data for each school are then presented separately for the closed answers with selected excerpts from the open questions being presented and interpreted. Most of the questions generated responses from all respondents; in only a few cases did the respondents omit answers. This was particularly the case for a question that referred to the level to which the responding parents had studied science. Omissions here were not surprising, suggesting that respondents' education in science seldom reached School Certificate level.

Data analysis

Phenomenological approaches aim to engage the reader in the phenomena themselves, to render living experience immediately sensible, 'close up' and recognisable. In this research, we collected the questionnaires from the four case study schools and gave each questionnaire an identifier in order to preserve anonymity, for example A1, A2 …, B1, B2 …, C1, C2 … and D1, D2 ... etc., according to the schools in which they were administered. Raw numerical data were sorted for descriptive analysis – the first three items in the questionnaire were of Yes/No type – and for this we used Excel software. The remaining questions required open answers, where the parents were free to formulate replies as they wished. These free-response responses were coded and thematised to reflect the various categories in the research question and from which extracts were produced. In general, we followed Braun and Clarke's (2006) six-phase guide for conducting this kind of research: (i) familiarising ourselves with the data; (ii) generating initial codes; (iii) looking for themes; (iv) reviewing; and (v) defining these; and then (vi) writing these up. Braun and Clarke (2006) also distinguish between two levels of thematic analysis: semantic and latent. The semantic deals with the "... explicit or surface meanings of the data" (p. 84) and, at this level, the analyst is not looking for much beyond what a participant has said. This is how

we first present the parents' responses.

Given the considerable differences between the schools both in terms of parental backgrounds (socio-economic status and education history) and student intake (single- or mixed sex) we have organized the analysis by school so as more easily to demonstrate whether inter-school differences are important.

Parents' responses

(i) Parents' employment

The parents in the sample were placed in five categories based their employment:

1: Manual work (e.g. labourer)

2: semi-skilled work (e.g. builder, mechanic)

3: Office work (e.g. clerk, secretary, administrative officer)

4: Professional (e.g. engineer, accountant, surveyor, lecturer)

5: Not specified.

Table 2 shows the aggregated data for the four schools. While both parents (where possible) had been invited to participate, the responses indicate that slightly over half of the questionnaires were completed by the mothers (59 mothers; 53 fathers). None of the questionnaires were completed by both parents.

Table 2 about here

Table 2 shows that 56 of the 112 mothers were involved in manual work whereas only 28 of the 112 fathers were; 22 mothers and 38 fathers were in semi-skilled occupations. A smaller number of parents (16 mothers and 26 fathers) were in office or professional work, and 18 mothers and 21 fathers did not specify their type of occupation.

Parents' science education

Figure 1 shows the science education backgrounds of the respondents across the four schools. Most of the parents (71 out of 112) in the various social categories had a background of science education at secondary level. However, as might be expected, those who were in the manual and semi-skilled occupations were less likely to have studied science at this level. Parents in these occupations are likely to have had little opportunity to study beyond primary level. As noted earlier, compulsory science education at secondary level to Form III was only introduced in Mauritius in the early 1980s; many of the parents are likely to have been educated at a time when most schools did not teach science.

Figure 1 about here

Figure 2, though, shows that the study of science is highly valued by the great majority of respondents irrespective of their occupation. In all, 106 out of 112 parents attached great importance to the study of science.

Figure 2 about here

We explore some of the reasons given for this when discussing the parents' responses school-by-school below. However, while they can be seen to value science, the majority of parents in each occupational category claimed that they did not influence their children's choice of subjects at age 14 (Figure 3).

Figure 3 about here

This is especially the case among the semi-skilled workers. A minority said that they did give some explicit encouragement around particular subject and career choices. Interestingly, as a proportion, more manual-work parents said they gave specific advice than did those in other employment categories.

The parents

School A is a single-sex girls' school in a semi-urban region. A majority of the mothers (22 out of 31) were employed in manual work whilst 15 out of 31 of the fathers were in semi-skilled occupations and a limited number were office workers or professionals. Slightly over half of the parents involved in manual and semi-skilled occupations had not themselves studied science at secondary school, but a large majority (29 out of 31) acknowledged the importance of science (Table 3).

Table 3 about here

The qualitative data indicate that some parents were of the opinion that the study of science is important for progress:

> *Parent A1 (semi-skilled): Science is making the world and civilisation progress and it has helped a lot in making people achieve comfort in everyday life.*
>
> *Parent A2 (professional): It helps us to explore and discover the world in which we live and make scientific discoveries.*

Allied to the notion of science being important for progress is the belief that it enhances career opportunities or is of general value to the individual. Parents A3 and A4 were of the view that science is important for these reasons, respectively:

> *Parent A3 (professional): Because it enables a child to become a doctor or engineer and it is a very interesting subject.*
>
> *Parent A4 (manual work): Science is based on facts and a basic knowledge in science is necessary for everyday life. We get to know life and understand it better.*

In response to the question: *Would you like your daughter/son to study science after Form III? Give reasons for your answer,* parents A1 and A4 answered:

> *Parent A1: Yes. It will be first of all because it's quite an interesting field and also with wide range of job opportunities. As a parent, I will be proud to see my daughter studying science and later working in a science field.*

Parent A4: Firstly, my daughter has a preference for accounts and economics. Besides, it costs quite a lot of money to pursue studies in science subjects in higher classes and more at tertiary level.

That said, only a minority of parents (7 out of 31) from the different social categories said they have any specific influence on the choice of subjects:

Parent A1: No I do not influence her; it's her choice.

Parent A4: I advise her about the pros and cons of different fields of study and the long-term consequences.

School B is a mixed-sex school in an urban area. None of the parents were involved in manual work; all were in semi-skilled, office work or professional occupations. Table 4 and the extracts given below illustrate the views held by the parents of the pupils. The large majority (18 out of 22) of the parents in School B had studied science at secondary level.

Table 4 about here

Almost all of these parents have positive attitudes towards the study of science. Parent B1, a housewife whose spouse is a semi-skilled worker, said:

It [science] helps us to understand our surroundings. It helps in the development of general knowledge … He [their son] is very good in science. He seems interested in this subject.

Although Parent B2 did not study science at secondary level, 'because I wasn't interested in it', he does value the importance of science, stating that science equips people with knowledge:

Because in science, we get to know a lot of things, so people will not be able to fool us … Yes. It is important and to increase her [daughter's] knowledge.

Parent B3 is female and a Muslim, occupation not specified, has a daughter in school B, and has not studied science. She recognises the need for scientific and technological literacy:

Subject was not yet introduced in school. Science is important because now everything around us is science, new technology and to know how it works … Yes. It is very advantageous.

In response to the question*: What would you like your daughter/son to do as a career?*, parents answered:

> *Parent B1: Computer engineer. It is a very interesting job as we are in the computer age.*
>
> *Parent B2: Doctor or teacher for science subjects.*
>
> *Parent B3: I want him to work in big enterprises, such as banks. Because he will get a good salary and obtain loan facilities.*

In response to the question: *Do you influence your daughter/son in the choice of subjects?*, parent B1 answered:

> *No. He chooses his subjects on his own.*

However, parent B2 would offer some help to her daughter on the choice of subject:

> *As I have some ideas and as I know how she works in the subjects, I help her choose her subjects.*

Similarly, parent B3 would influence his son on his choice of subject, but:

> *Only by explaining him, how important these subjects are and its importance in his future life.*

Another parent (B4) noted that her daughter had been influenced by her father's illness, so that that she was eager to help those who were poor and suffering.

School C is a single-sex girls' school located in an urban area. The respondents are mainly mothers. The majority of the parents have a science background to secondary level. Those who did not study science at secondary level were principally in manual and semi-skilled occupations (Table 5).

Table 5 about here

Again, science appears to be highly valued (with only two parents presenting contrary views):

> *Parent C1: Study of science is important. There are many prospects in this field.*

Parent C2, a male of Hindu origin, who has a professional science background, wrote:

Study of science is important. Science is the basis behind everything in life so a good understanding is important.

Similarly, parent C3 wrote:

Science and languages are needed everywhere. Almost everything around us is somehow related to science.

In response to the question: *Would you like your daughter/son to study science after Form III?*, many parents wanted their daughters to study science after Form III:

Parent C1: Yes. I would have liked her to choose science subjects but unfortunately she has opted to study economics and accounts.

Parent C2: By studying science she would have a broad choice of careers later ranging from being a teacher, engineer or other professional.

Parent C3: She intends to pursue further studies in a scientific field.

Even though they would have liked their daughters to take up science careers (Parent C1: 'Dietician. Because youngsters eat too much junk food'; Parent C2: 'Medical practitioner'; Parent C3: 'Paramedical field. Self-employed in the future'), the great majority of parents (23 out of 27) maintained that they do not influence their children on their choice of subjects. However, this kind of response contained anomalies so that, even though they said they do not influence the girls' choices, they do 'guide' once their choice has been decided:

Parent C1: Yes, some [influence]. By explaining to her the importance of certain subjects in the understanding of the world. But what decision she takes by the end of the day is her choice. It is important that she chooses a career she feels comfortable and happy with.

Parent C2: Yes. We guide her so that her [subject] choices reflect the career she has chosen. She wants to be a medical practitioner [doctor]. This is her ambition.

Parent C3: Yes. I direct her, especially in her future career.

So, here the 'influences' come after career choices have been made and relate to choice of appropriate subjects that will enable the girls' eventual ambitions. Only one parent was avowedly anti-science:

Parent C4: ... there is little scope for scientific jobs in the Mauritian context, as we do not give much importance to research and development.

School D is located in a rural area and most of the parents are involved in manual work; there are only a minority in semi-skilled occupations: of 32 parents, 20 had studied science at secondary level. As in the other schools, a very high proportion of parents (31 out of 32) in school D attach great importance to the study of science (Table 6).

Table 6 about here

The parents stated that science is interesting and vital as it enables people know what is happening around them and to their body. They appreciate that many jobs require knowledge of science subjects.

Parent D1, male, of Hindu origin, does manual work and has not studied science as he has only studied up to primary level, replied:

Science is important. Because nowadays everywhere we use science. Yes. If my daughter after her education wants to search for a job, I think if she has a science certificate she can find it easily.

Parent D2, female of Hindu origin, does manual work and has not studied science, wrote:

So as to know what is happening in the world. So as we know what is happening to ourselves. Yes, because my daughter is very good in science. Because my daughter loves doing science so as one day she can become a professional scientist.

In response to the question: *What would you like your daughter/son to do as a career?,* parents D1 and D2 wrote they left the choice of the career to their daughters:

Parent D1: Depends on my daughter. Because I can't make her choices. Everyone has the right to choose everything at every time as it concerns her education.

Parent D2: Because she is doing something brave and great.

Again, these parents on the whole claimed that they do not exert any influence on the choice of subjects. The majority said that they let their sons or daughters decide on the choice of subjects.

There were some examples of contrasting opinions:

> *Parent D1: No. Because it is she who will take part in the exams, not us.*
>
> *Parent D2: Yes. By encouraging her to take this subject – my daughter knows why she is choosing her subject.*

Even while these parents want their children to choose a career that suits them, they want their children to aim high so as to improve their status in life.

Discussion

Phenomenology is generally interested in human experiences of everyday life, both the mundane and exceptional. Experience is seen as a valid means to interpret the world:

> The phenomenon being studied is not measured or defined through the lens of its accepted reality; rather an understanding is sought of how the participants make sense of their everyday world (Eddles-Hirsch, 2015, p. 251).

Braun and Clarke's (2006) second level of thematic analysis is called the 'latent'. The latent level looks beyond what has been said and "... starts to identify or examine the underlying ideas, assumptions, and conceptualisations – and ideologies – that are theorised as shaping or informing the semantic content of the data" (p. 84). This level is represented here by our five themes drawn from the responses above.

The similarities in the findings for these four Mauritian schools, despite the differences between them in regards to family backgrounds and whether the students are single- or mixed-sex, suggest that overt parental influence on the choice of subjects, at least from these responses, is not a strong factor in the choice of science subjects. Our findings are therefore consonant with the argument of Baranowski et al. (2002), who see one route of parental influence as being via silent encouragement around particular subject choices and careers. Furthermore, there do not seem to be any substantial differences in the results obtained from the four quite different schools. Our findings do not therefore agree with the early finding of Bengtsson (1983) that parental occupation is important in affecting offspring STEM choices. Our questionnaire aimed at finding out how parents perceived their influence on their children's choice of subjects, and the pattern of results shows that the majority of the parents, irrespective of their social

background, claim not to influence their children in choosing their subjects at that level. Overall, 87 out of 112 parents maintained that they do not influence their children in choosing their school subjects and careers; they maintain that they leave that choice to their sons and daughters. While a minority of parents are quite clear that they do influence their children's choices, for the majority there is general confidence in their offspring's self-esteem and capabilities in the subjects of their choice. In stating that they do not influence their children, these parents do so from several distinct directions: (a) they are not in a strong position to offer any advice; (b) it is not up to them, it is the child's right (responsibility, task) to make the choice; (c) no matter what they say, the child will make their own choices, regardless; (d) they can offer support but their children are actually quite capable of making the right choice by themselves.

Five themes

However, this broad picture needs some unpicking.

Life in Mauritius involves the blending of several cultures from its history, and some of this blend has been noted as we discuss parents' responses to our questionnaire. The parental responses are not homogeneous and, as is to be expected, there are several 'thematic voices' that emerge from the data, even from the same set of responses. This may reflect a debate between parents, or between parents and offspring, during the completion of the questionnaire or, more probably in our view, several different interpretations of what 'to influence' actually means. Understandings of 'influence', and how it operates, are varied and, at times, seemingly contradictory, even within single sets of answers. To cope with this, we derive five overall themes, or 'categories of influence', from the data, that we record as follows:

(i) The 'silent', tacit, unspoken influences that derive from the general milieu of the home, be it agnostic, directed towards or away from science. We see this a manifestation of Bourdieu's 'habitus', as described by Archer et al. (2012) and Gokpinar and Reiss (2016), and entailing the intersection of occupations, class, culture and faith within the home. This may act to spur the child towards greater effort in order to 'lift themselves' into a 'better life', or dampen their aspirations because such a future is unthinkable.

(ii) Indirect influence from role-modelling, parental or otherwise. There are some cases, for example in school B, where having a relative as a role model in the family was linked to

a girl's choice of science (cf. Gorgolin and Swartz 1992; Jacobs et al. 2005). Where parents could not themselves role model, they expected some guidance from teachers' role-modelling on this issue of choice (cf. Kellner and Share 2007).

(iii) A broad 'liberal' influence, articulated as: 'We support him in whatever he chooses to do' and 'We will let her make her own choices'. For example, as Parent D1 said, she influenced her daughter on her choice of subject simply by encouraging her in the subjects that she liked and in which she performed well.

(iv) Influence 'after the fact'. There are indications here that influence blurs with 'help', 'advice', 'guidance', 'support' and 'enabling' – though this kind of influence is discussed as occurring *after* the young person has reached her or his own decision (e.g. Parent C2). So, while there is parental intervention beyond simple encouragement, this is portrayed as a kind of 'gentle hand on the tiller' to guide the young person in what they are doing.

(v) Direct influence before, during and after the fact. Clearly, some parents saw it as their role to provide direct advice – indeed, a degree of pressure – to influence the young person's subject choice and subsequent career choice. Interestingly, this was not always met with conformity, Parent C1, for example, noting somewhat ruefully that: '*unfortunately* she has opted to study economics and accounts'.

We do not claim that these themes are entirely discrete – in particular, there are links between themes 3 and 4. Rather, our intention in identifying these themes is to provide 'lenses' that can be used to view the data (the act of viewing itself serving as an organisational device). We hope that these five themes might serve as heuristics for other studies. We do not want at this point to indicate the relative strength of each of these five forms of influence, not least because – as noted earlier – expressions of these different categories might appear even within the same set of responses.

We note some specific points here in relation to these findings. First, we cannot say that this state of affairs is peculiarly Mauritian; indeed, we envisage that these kinds of thematic categories have purchase in other countries and contexts elsewhere in the world. So, despite the sustained government policy and pressure within the confines of a small country and a small population, we find perceptions of and attitudes of 'influence and support' to resemble those in other cultural contexts. Similarly, other studies have shown that girls generally tend to pay more

attention than do boys to the advice of their parents where choice of subjects and career are concerned (Dawson and O'Connor 1991); the parents here overwhelmingly attribute considerable value to the study of science by their daughters (cf. Koballa et al. 1990; Andre et al. 1999). At the same time, we find it both noteworthy and encouraging that the parents overwhelmingly see science as important and worthy of study.

We do see these responses and the ensuing themes as a way to discuss the varied and complex forms of parental influence that shape young people's decisions to begin and continue studying science subjects in school. In particular, there is value in collecting data on parental views about such matters. Our study, though, is limited because it is small-scale and, while we have taken several appropriate measures to maximise the reliability and validity of our work (cf. da Silva Lopes, Pedrosa-de-Jesus and Watts 2015), there needs to be a fuller, more encompassing study to secure and further explore these outcomes. In addition, interviews with parents would have been likely to produce richer data and there would clearly be merit in a study that used the same approaches to data collection and analysis for parents and for their children.

This 'spectrum of influence' does raise some interesting questions: how might policy towards parents change if countries (small and large) want to increase the number of young people entering science-based study, careers and employment? Given that 'parental push' is just one factor that shapes students' study and career aspirations and destinations, how might this push become stronger than other factors that serve to 'tug' young people away from science? Do we educate parents away from being broadly 'liberally' supportive to their children, towards being more explicit, direct and 'catalytic'? Is this even desirable and, if so, how might it be achieved? While these questions are highly relevant to the Mauritian context, they are pertinent in many other countries, too.

Conclusion

We know from previous research that parents may influence their children's decisions about whether or not to study science once it is no longer compulsory in school. In this study we have sought to identify the extent to which parents believe they influence the choice of science subjects in Mauritius among their children at the end of the third year of secondary education, the point at which science ceases to be compulsory subject, and to see whether such influence depends on families' social backgrounds. Our two key findings are, first, that parents on the

whole believed that they did not influence their children in the choice of subjects or eventual careers, and secondly that these findings are independent of the families' social backgrounds.

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