

Running head: MOTIVATION PROFILES

Vlachopoulos, S. P., Karageorghis, C. I., & Terry, P. C. (2000). Motivation profiles in sport: A self-determination theory perspective. *Research Quarterly for Exercise and Sport*, 71, 387-397.

Motivation Profiles in Sport: A Self-determination Perspective

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Revision submitted: 28 February, 2000

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The authors are grateful to the Brunel University Non-formulaic Fund for supporting this research.

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Abstract

The present study examined the link between motivation profiles among adult sports participants and the outcomes of enjoyment, effort, positive and negative affect, attitude toward sport participation, intention to continue sport participation, satisfaction, and persistence in sport. Two samples of participants ($n = 590$ and $n = 555$) completed the Sport Motivation Scale and a range of self-report measures to assess the outcome variables. Exploratory cluster analyses applied to Sample 1 and confirmatory cluster analysis applied to Sample 2 identified two clusters of sport participants. The first comprised participants with high scores on both non self-determined and self-determined motives. The second comprised participants with high scores on self-determined motives but low scores on non self-determined motives. Participants in the first cluster scored higher on all outcome variables. The results are discussed with reference to a more in-depth understanding of the motivation dynamics of sport participation based on Self-Determination Theory.

Key words: Cluster analysis, intrinsic motivation, extrinsic motivation, participation motives

Motivation Profiles in Sport: A Self-determination Perspective

The intrinsic and extrinsic motives associated with participation in sport have received a great deal of attention from researchers in sport psychology. This area of research has been based predominantly on Self-Determination Theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000). Deci and Ryan postulate that three distinct motivational forces can influence behavior: intrinsic motivation, extrinsic motivation, and amotivation. According to Deci and Ryan (1985), intrinsically motivated behavior is typified by participation in an activity for the pleasure and satisfaction derived from it. Hence, the motive for participation essentially lies in the *process* of participation rather than in the derived external reward or avoidance of negative consequences associated with non-participation. In contrast, when someone participates in an activity to gain external rewards or to avoid negative consequences, it is indicative of extrinsic motivation. Finally, amotivation refers to a lack of intent to engage in a particular behavior, and, therefore represents a lack of motivation. Feelings of amotivation are associated with a lack of perceived competence and expectations of noncontingency between the behavior and the outcome (Deci & Ryan, 1985).

Dimensions of Intrinsic and Extrinsic Motivation

In the past, extrinsically motivated behavior was viewed as prompted by forces external to the individual (Deci, 1975). However, more recent conceptualizations of extrinsic motivation by Deci, Ryan, and colleagues (Deci & Ryan, 1985; Ryan & Connell, 1989; Ryan, Connell, & Grolnick, 1992; Ryan & Deci, 2000) proposed four types of extrinsically motivated behavior: external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation refers to behavior regulated by external forces such as pay, rewards, or coercive pressures. Introjected regulation refers to individuals who have internalized initially external reasons for engaging in a behavior. In the strictest sense, such behavior is not authentically self-selected, but instead individuals impose pressure on

1 themselves to engage in particular behaviors. Identified regulation refers to individuals who
2 engage in behaviors that they both value and consider important for their personal
3 development. Despite the instrumental and non process-oriented nature of this type of
4 motivation, the activity will be pursued out of choice. Finally, integrated regulation also refers
5 to participation in an activity out of choice. However, at this stage, the individual's
6 motivation is in harmony with other aspects of the self, such as values and needs. Hence, a
7 decision to participate in an activity will be made when the activity is perceived as congruent
8 with other aspects of self. Extrinsically motivated, yet self-determined, behavior helps to
9 explain the puzzling behavior of people who seem to engage voluntarily in physical activity
10 that isn't enjoyable.

11 Intrinsic motivation has traditionally been operationalized as a unidimensional
12 construct. However, Deci (1975) and more recently Vallerand and colleagues (Vallerand et
13 al., 1992, 1993) proposed that intrinsic motivation may be differentiated into more specific
14 motives. These are intrinsic motivation to know, intrinsic motivation toward
15 accomplishments, and intrinsic motivation to experience stimulation. According to Vallerand
16 (1997), intrinsic motivation to know is evident when someone engages in an activity for the
17 pleasure and satisfaction experienced while learning, exploring, or trying to understand
18 something new. Intrinsic motivation toward accomplishments is evident when someone
19 engages in an activity for the pleasure and satisfaction derived from being achievement-
20 oriented. Finally, intrinsic motivation toward stimulation is evident when someone engages in
21 an activity in order to experience stimulation, fun, and excitement.

22 *Consequences of Motivation*

23 Many studies have investigated the relationships between intrinsic motivation,
24 extrinsic motivation, and a range of cognitive, affective, and behavioral outcome variables.
25 Cognitive outcome variables used in motivation research include concentration and attention

1 (Vallerand, Blais, Briere, & Pelletier, 1989). Affective outcomes include interest (Koestner,
2 Ryan, Bernieri, & Holt, 1984), positive emotions (Ryan & Connell, 1989), satisfaction (Deci,
3 Connell, & Ryan, 1989; Vallerand et al., 1993), and anxiety (Ryan & Connell, 1989). Finally,
4 behavioral outcomes include persistence at the task (Vallerand & Bissonnette, 1992) and
5 academic performance (Fortier, Vallerand, & Guay, 1995).

6 Deci and Ryan (1985) contend that all proposed forms of motives (i.e., from
7 amotivation to intrinsic motivation) lie on a self-determination continuum. Given that self-
8 determination is associated with positive psychological functioning (Deci, 1980), Vallerand
9 (1997) suggested that different types of motives may correspond with qualitatively different
10 outcomes. That is, more self-determined forms of motivation are expected to correspond with
11 more positive outcomes whereas less self-determined forms are expected to correspond with
12 more negative outcomes. Several studies have provided support for this assumption, using a
13 range of cognitive, affective, and behavioral outcomes in contexts such as interpersonal
14 relationships, education, leisure, and aging (see Vallerand, 1997; Vallerand & Reid, 1990).
15 Finally, the expected pattern of outcomes has also been demonstrated in a sport environment
16 by examining dependent variables such as persistence, positive emotions, interest, and sport
17 satisfaction (Pelletier et al., 1995).

18 In the present study, a range of motivational consequences was assessed, representing
19 cognitive, affective, and behavioral factors. First, attitudes toward sport participation
20 represented the cognitive outcomes. Second, intrinsic interest, positive and negative affect,
21 and satisfaction with sport participation represented the affective outcomes. Third, strength of
22 behavioral intention, integrated intention, degree of effort exerted in training sessions, and
23 behavioral persistence in sport participation represented the behavioral outcomes.

24

25

1 *Motivation Profiles*

2 Vallerand and Fortier (1998) observed that there have been two main theoretical
3 strands regarding the nature of the relationship between intrinsic and extrinsic motivation.
4 One strand supports the proposition that the relationship is additive. That is, the combination
5 of both intrinsic and extrinsic motivation can lead to higher levels of motivation (Porter &
6 Lawler, 1968). The other strand supports the interactive nature of the relationship between
7 intrinsic and extrinsic motivation. Hence, when one type of motivation is high, the other is
8 low (Lepper & Hodell, 1989). Vallerand and Fortier have suggested that the relationship
9 depends upon the type of extrinsic motivation involved and the level of generality of the
10 constructs. Vallerand (1997) described the levels of generality at which the motivational
11 processes reflected in his model of intrinsic and extrinsic motivation could take place.
12 Starting from the more general to the more specific, these levels are the personality level, the
13 contextual or domain level, and the situational level. Hence, Vallerand and Fortier (1998)
14 proposed that at the contextual level (e.g., the context of work, education, sport etc.), intrinsic
15 motivation will show an additive relationship with self-determined forms of extrinsic
16 motivation (e.g., identified regulation) as both of these types of motivation are self-
17 determined in nature, whereas the relationship between intrinsic motivation and nonself-
18 determined forms of extrinsic motivation (e.g., external regulation, introjected regulation)
19 will be orthogonal or slightly negative. The statistical independence demonstrated by Pelletier
20 et al. (1995) between non self-determined forms of extrinsic motivation and the three forms
21 of intrinsic motivation concurs with the assumptions made by Vallerand and Fortier (1998).

22 The purpose of the present study was twofold: (a) to explore and identify conceptually
23 meaningful subgroups of sport participants who may differ in their configuration of motives
24 for participating; (b) to examine how these motivation profiles are related to positive and
25 negative motivation consequences. Addressing these questions may provide information

1 about differences between sports participants regarding the strength and the quality of their
2 motivation for sport and knowledge about which profile is associated with the most desirable
3 consequences.

4 In line with Vallerand and Fortier's (1998) view of the relationship between intrinsic
5 and extrinsic motivation, the following groups of sports participants were hypothesized to
6 exist: (a) the traditional self-determined profile, with participants scoring high on self-
7 determined forms of motivation and low on nonself-determined motivation; (b) participants
8 with high scores on both self-determined and nonself-determined forms of motivation; (c)
9 participants with high scores only on nonself-determined motives; and (d) participants with
10 low scores on both forms of motivation.

11 However, for the third and fourth groups, it was judged that the probability of
12 identifying such people in a sample of currently active sport participants would be very small.
13 Participants driven by nonself-determined motivational forces or lacking motivation are,
14 theoretically, not likely to persist in sport. Given that self-determination is associated with
15 enhanced psychological functioning (Deci, 1980; Ryan, Deci, & Grolnick, 1995) it was
16 hypothesized that positive motivation consequences would be associated with higher scores
17 on self-determined motives.

18 Method

19 *Participants*

20 Data were collected from sports participants at sports clubs and community centers,
21 and from members of sports teams at two universities in west London, England. Two
22 completely independent samples were used. Sample 1 comprised 637 sports participants.
23 However, 17 cases reporting ages below 18 years were removed as the focus of the study was
24 exclusively upon adult participants. A further 30 cases were removed owing to missing data.
25 The resultant data set included 590 sports participants comprising 353 men (59.9%), 236

1 women (40.1%), and 1 participant who did not indicate gender. Participants' ages ranged
2 from 18 to 67 yr. ($M = 23.35$ yr., $SD = 7.54$ yr.) with 90% in the range 18 - 32 yr.

3 Thirty-seven respondents participated at recreational level (6.3%), 220 at club level
4 (37.5%), 33 at district level (5.6%), 99 at county level (16.9%), 71 at regional level (12.1%),
5 70 at national level (11.9%), and 57 at international level (9.7%). Three participants did not
6 report the level at which they participated. Participants' years of experience in their sport
7 ranged from 1 - 50 yr. ($M = 9.84$ yr., $SD = 6.41$ yr.) with 90% within the range 1 to 17 years.
8 Finally, the sports represented were track and field, field hockey, netball, triathlon, golf,
9 skiing, soccer, rugby, horse riding, cricket, weightlifting, badminton, lacrosse, tennis,
10 volleyball, cycling, swimming, canoeing, basketball, judo, gymnastics, kickboxing, squash,
11 water polo, and bowling.

12 Sample 2 comprised 557 participants. Two cases were removed owing to missing
13 data. Of the remaining sample, 305 were men (55%) and 250 were women (45%).
14 Participants' ages ranged from 18 to 62 years. ($M = 23.48$ yr., $SD = 6.56$ yr.) with 90%
15 ranging from 18 - 30 yr. There were 91 participants at recreational level (16.4%), 221 at club
16 level (39.8%), 19 at district level (3.4%), 106 at county level (19.1%), 52 at regional level
17 (9.4%), 39 at national level (7%), and 24 at international level (4.3%). Three participants did
18 not report their level of participation. Participants' years of experience ranged from 1 - 57 yr.
19 ($M = 10.43$ yr., $SD = 6.41$ yr.) with 90% ranging from 1 to 17 years. The sports represented in
20 Sample 2 were the same as Sample 1 with the addition of figure skating and surfing.

21 *Measures*

22 *Sport motivation scale.* The Sport Motivation Scale (SMS; Pelletier et al., 1995) was
23 used to assess seven forms of motivation for sport participation based on the tenets of Deci
24 and Ryan's (1985) Self-Determination Theory. The SMS consists of 28 items that represent
25 reasons for participation in sport. The participation motives operationalized by the SMS, from

1 the most self-determined to the least self-determined, are: intrinsic motivation to know (e.g.,
2 “for the pleasure it gives me to know more about the sport I practice”); intrinsic motivation
3 toward accomplishments (e.g., “because I feel a lot of personal satisfaction while mastering
4 certain difficult training techniques”); intrinsic motivation to experience stimulation (e.g.,
5 “for the pleasure I feel in living exciting experiences”); identified regulation (e.g., “because in
6 my opinion it is one of the best ways to meet people”); introjected regulation (e.g., “because it
7 is absolutely necessary to do sports if one wants to be in shape”); external regulation (e.g.,
8 “because it allows me to be well regarded by people that I know”); and amotivation (e.g., “I
9 used to have good reasons for doing sports, but now I am asking myself if I should continue
10 doing it”). Participants respond on a Likert-type scale ranging from 1 (does not correspond at
11 all) to 7 (corresponds exactly). Integrated regulation is not assessed by the SMS because of
12 the difficulty in developing items that represent the fine distinction from identified regulation.

13 Pelletier et al. (1995) provided evidence of the reliability and validity of the English
14 version of the SMS. Specifically, the factor structure was supported using confirmatory factor
15 analysis, while correlations between subscales and with criterion measures were consistent
16 with theoretical predictions. In addition, evidence of the internal consistency of subscales and
17 temporal stability was provided over a 5-week period.

18 *Enjoyment-Intrinsic Interest.* The degree to which participants enjoyed their
19 participation in sport was assessed using the enjoyment-interest subscale of the Intrinsic
20 Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989; Ryan, 1982). Participants
21 indicated their agreement with five statements (e.g., “I would describe participating in the
22 sport I practice as very interesting”) on a Likert-type scale ranging from 1 (strongly disagree)
23 to 5 (strongly agree).

24 *Effort-Importance.* The effort-importance subscale of the IMI (McAuley, Duncan, &
25 Tammen, 1989; Ryan, 1982) modified to the present context was used to examine the degree

1 to which participants exerted effort and thought it was important to do well in training
2 sessions for their sport. Participants indicated their agreement to four statements (e.g., “I put a
3 lot of effort into the training sessions of the sport I practice”) on a Likert-type scale ranging
4 from 1 (strongly disagree) to 5 (strongly agree).

5 *Positive and Negative affect.* The Positive and Negative Affect Schedule (PANAS;
6 Watson, Clark, & Tellegen, 1988) was used to assess affective responses during training
7 sessions. Positive affect (PA) and negative affect (NA) have been shown to be highly
8 distinctive and independent constructs (Watson et al., 1988). They also exhibit trait-like
9 stability when long-term instructions are used (as in the present study). The measure consists
10 of 20 items, 10 for each dimension. According to Watson et al., (1988):

11 High PA is a state of high energy, full concentration, and pleasurable engagement
12 whereas low PA is characterized by sadness and lethargy. In contrast, NA is a
13 general dimension of subjective distress and unpleasurable engagement . . . with
14 low NA being a state of calmness and serenity (p. 1063).

15 Participants indicated their feelings on a Likert-type scale ranging from 1 (very slightly or not
16 at all) to 5 (extremely) regarding their participation in training sessions in their sport during
17 the previous 4 weeks.

18 *Attitude Toward Sport Participation.* Attitude toward sport participation was assessed
19 by the question “I think that participating in the sport I currently practice is . . .”. Participants
20 responded to six bipolar adjectives on a 7-point semantic differential scale (i.e., 1–extremely
21 boring; 7–extremely interesting; see Ajzen & Fishbein, 1980). The adjectives used were:
22 boring-interesting, worthless-valuable, harmful-beneficial, punishing-rewarding, unpleasant-
23 pleasant, and unimportant-important. Scores were summed to provide a general index
24 representing participants’ attitude toward sport participation.

1 *Strength of Behavioral Intent.* Intent to continue sport participation was measured
2 using the mean of three items: I intend/I will try/I am determined to continue participating in
3 the sport I currently practise during this year. Responses were provided on a semantic
4 differential scale ranging from 1 (extremely unlikely) to 7 (extremely likely).

5 *Integrated intention.* The quality of the respondents' intention to continue
6 participating in sport (i.e., integrated intention; Chatzisarantis, Biddle, & Meek, 1997) was
7 also examined. This variable assesses the participants' self-determined versus nonself-
8 determined intention to participate in sport. High scores in integrated intention reflect
9 intentions that are experienced as autonomous with low scores reflecting intentions that are
10 experienced as controlled (Deci & Ryan, 1987). This variable was included, because
11 theoretically, the degree of self-determination involved in the motives for sport participation
12 was expected to correspond with the degree participants' intentions were self-determined.

13 Participants indicated the extent to which they intended to continue participating in
14 their sport because they "have to" versus they "want to". In the instructions, it was clarified
15 that "have to" denoted a sense of obligation and pressure to participate in sport, while "want
16 to" denoted a desire to participate, emanating from the true self without feeling any obligation
17 or pressure to do it. Respondents indicated their intention on a Likert-type scale ranging from
18 1 (I have to) to 7 (I want to) responding to the items "I intend/I will try/I am determined to
19 continue participating in sport because...."

20 *Satisfaction.* Participants' satisfaction with their participation in sport was assessed by
21 a single item using a Likert-type scale ranging from 1 (I do not feel at all satisfied) to 7 (I feel
22 extremely satisfied).

23 *Demographic variables.* Demographic variables included participants' gender, age,
24 main sport, level of participation (i.e., recreational, club, district, county, regional, national,
25 and international), and years of experience in their main sport.

1 *Procedures*

2 Trained proctors approached participants and informed them of the study's general
3 purpose. After signing an informed consent form, they were assured there was no potential
4 danger involved and that their answers were confidential. Participants first completed the
5 demographic questionnaire followed by the Sport Motivation Scale and, finally, the measures
6 that assessed the motivation consequences. After completion of the questionnaires,
7 participants were thanked verbally for their participation.

8 *Data Analysis*

9 Cluster analysis was used to identify theoretically meaningful subgroups of
10 participants based on their scores on the SMS. According to Aldenderfer and Blashfield
11 (1984), cluster analysis "is a multivariate statistical procedure that starts with a data set
12 containing information about a sample of entities and attempts to reorganize these entities
13 into relatively homogeneous groups." (p. 7). Consistent with the recommendations of
14 Aldenderfer and Blashfield, variables used in the cluster analysis were guided in this case,
15 Self-Determination Theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000).

16 A significant issue in cluster analysis is the type of clustering method used. The two
17 most common are the hierarchical agglomerative method and the iterative partitioning method
18 (Aldenderfer & Blashfield, 1984). The former attempts to uncover the "natural" clusters in
19 the data, whereas the latter requires researchers to specify the number of clusters they expect
20 to emerge. Hence, the former is "structure seeking", or exploratory, whereas the latter is
21 "structure imposing", or confirmatory. In the present study, despite theoretical expectations
22 regarding the types of clusters to emerge, an exploratory analysis was deemed appropriate in
23 the light of a confirmatory analysis to follow. This strategy provides greater confidence in the
24 emergent clusters as they are based on clustering procedures belonging into different
25 clustering families.

1 To determine the number of clusters in each hierarchical procedure, the “fusion”
2 coefficient was observed (Aldenderfer & Blashfield, 1984) to show the degree of similarity of
3 the clusters to be merged in the next step of the hierarchical procedure. According to Norussis
4 (1994):

5 Small coefficients indicate that fairly homogeneous clusters are being
6 merged. Large coefficients indicate that clusters containing quite dissimilar
7 members are being combined. . . These coefficients can also be used for
8 guidance in deciding how many clusters are needed to represent the data.

9 You usually want to stop agglomeration as soon as the increase between
10 two adjacent steps becomes large (p. 91).

11
12 Two validation techniques have been suggested to be appropriate in the context of cluster
13 analysis (Aldenderfer & Blashfield, 1984). First is the degree of replicability of a cluster
14 solution across a number of data sets. That is, the repeated emergence of a cluster solution
15 across different samples reflecting the same population provides evidence, but not strong
16 evidence, of the generality of the solution. Aldenderfer and Blashfield (1984) suggested that
17 an external validation procedure is needed to provide strong evidence of the validity of a
18 cluster solution. Specifically, significance tests to compare the clusters on variables that were
19 not used to generate the clusters are required. It should be noted that if the difference between
20 two cluster solutions is not clear by examining the fusion coefficient, the most valid solution
21 is that which discriminates among the greatest number of dependent variables. In the present
22 study, a number of variables representing cognitive, affective, and behavioral outcomes of
23 intrinsic and extrinsic motivation were assessed for external validation.

24 Two independent data sets were used for the present analysis. Sample 1 was used to
25 explore patterns of motives or clusters, while Sample 2 cross-validated the cluster solution
26 derived from Sample 1. The analysis involved five steps. First, inappropriate data were

1 removed. Specifically, participants under the age of 18 years or with missing data were
2 excluded. Also, those classified as multivariate outliers using the Mahalanobis' distance
3 method (see Tabachnick & Fidell, 1996) were removed, as recommended by Breckenridge
4 (1989). Second, hierarchical clustering procedures were applied to Sample 1 using the
5 squared Euclidean distance as the similarity measure. Third, the best cluster solution was
6 identified (i.e., that which was the most externally valid and also made sense theoretically).
7 Fourth, the cluster solution was examined to assess whether cluster membership was related
8 to other categorical variables, such as gender and level of sport involvement, and whether
9 clusters differed according to age and years of sport experience. Fifth, an attempt was made to
10 cross-validate the cluster solution from Sample 1 on Sample 2 using the k-means procedure,
11 an iterative partitioning or structure-imposing method. In summary, the parameters used to
12 select the most representative cluster solution were the degree of external validity of the
13 solution and its theoretical meaningfulness.

14 Results

15 Cronbach's alpha was used to examine the internal consistency of the SMS. All
16 subscales had acceptable internal consistency indexes other than attitude toward sport
17 participation in Sample 1 ($\alpha = .68$) and identified regulation in Sample 2 ($\alpha = .67$), which
18 were marginal. As satisfaction and persistence were measured using a single item, the alpha
19 coefficient could not be estimated for the variables. The alpha coefficients for all remaining
20 dependent variables were (with Sample 1 preceding Sample 2 in each case): amotivation ($\alpha =$
21 $.76 / .78$), external regulation ($\alpha = .74 / .76$), introjection ($\alpha = .74 / .79$), identified regulation
22 ($\alpha = .70 / .67$), intrinsic motivation to accomplish ($\alpha = .78 / .81$), intrinsic motivation to
23 experience stimulation ($\alpha = .76 / .74$), intrinsic motivation to know ($\alpha = .82 / .85$),
24 enjoyment/intrinsic interest ($\alpha = .78 / .83$), effort/importance ($\alpha = .83 / .85$), positive affect (α

1 = .89 / .90), negative affect ($\alpha = .80 / .81$), attitude toward sport participation ($\alpha = .68 / .70$),
2 intention ($\alpha = .94 / .76$), integrated intention ($\alpha = .94 / .87$).

3 Subsequently, 55 multivariate outliers were removed from Sample 1 using the
4 Mahalanobis' distance criterion (Tabachnick & Fidell, 1996), leaving 535 cases to be entered
5 into the cluster analysis. Given that different hierarchical procedures can produce different
6 cluster solutions using the same data set, all procedures available in SPSSWIN were applied
7 to determine which produced the best discrimination between the outcome variables. The
8 hierarchical methods available in the SPSSWIN software are: "between-groups linkage",
9 "within-groups linkage", "nearest neighbor", "furthest neighbor", "centroid clustering",
10 "median clustering", and "Ward's method". For further details of these methods, see Norussis
11 (1994).

12 Analyses of variance (ANOVAs) were calculated to identify the cluster solution with
13 the greatest degree of external validity. One-way ANOVAs were preferred over a multivariate
14 analysis of variance, as the research question focused on whether clusters differed on any of
15 the outcome variables (see Schutz & Gessaroli, 1993). A Bonferroni adjustment was used to
16 guard against Type I error. Therefore, the alpha level was set at $p = .005$. Results showed that
17 the most externally valid cluster solution was produced by the "within-groups linkage" (see
18 Table 1). This solution differentiated significantly across all nine dependent variables. The
19 between-groups linkage and the nearest neighbor solutions were excluded from consideration,
20 because one of their clusters consisted of 3 or fewer participants compared to the other
21 solutions in which participants were almost equally distributed across clusters.

22
23

Insert Table 1 about here

24

1 strength of intention, and satisfaction than participants in Clusters 2 and 3. Participants in
2 Cluster 2 reported significantly higher mean scores for enjoyment, effort, positive affect,
3 integrated intention, satisfaction and persistence than those in Cluster 3. Participants in
4 Cluster 1 reported significantly higher mean scores than Cluster 3 for integrated intention and
5 persistence. Finally, participants in Cluster 3 reported a significantly higher mean score for
6 negative affect than Cluster 2.

7
8

Insert Table 2 about here

10 Possible Confounds

11 The emergence of clusters in Sample 1 may have been confounded by variables such
12 as gender and level of sport involvement. Therefore, chi-square tests of association were
13 calculated to examine the possible association between membership in clusters with gender
14 and level of sport involvement. A 3 x 2 (Cluster x Gender) chi-square analysis showed no
15 association between the categories ($X^2_2 = 1.70, p > .05$). Further, a 3 x 7 (Cluster x Level) chi-
16 square analysis also showed no association between the categories ($X^2_2 = 20.22, p > .05$). The
17 results showed that cluster membership was associated neither with gender nor with level of
18 sport involvement.

19 To determine whether cluster membership could be explained by differences in other
20 variables such as age and years of sport experience, two one-way ANOVAs were performed,
21 with age and years of sport experience as the dependent variables. The alpha level was set at p
22 $< .025$ after Bonferroni adjustment. The results showed that cluster groups did not differ
23 either by age, [$F(2, 529) = 2.93, p > .025$] or years of sport experience [$F(2, 528) = .48, p >$
24 $.025$].

1 It was also judged prudent to examine if differences among cluster groups on
2 motivational outcomes were evident after controlling for differences in age and years of sport
3 experience. Therefore, a series of univariate analyses of covariance were calculated using the
4 clusters as the independent variable and the motivational outcomes as the dependent
5 variables. The variables of age and years of sport experience were used individually as the
6 covariates. The alpha level was set at $p < .005$ after Bonferroni adjustment. Results showed
7 that, after controlling for age and years of sport experience, the relationship between clusters
8 and outcomes remained significant. These findings provide evidence of the statistical
9 independence of cluster membership from gender, level of sport involvement, age, and years
10 of sport experience.

11 *Cross-validation of Clusters*

12 To examine the degree to which the clusters were replicable among adult sport
13 participants, the cluster solution from Sample 1 was tested on Sample 2, and the iterative
14 partitioning method (see Aldenderfer & Blashfield, 1984) was used as a confirmatory
15 procedure in which the researcher specified the number of clusters to emerge.

16 Based on results from Sample 1, a two-cluster solution was requested, using the k-
17 means procedure. Again the squared Euclidean distance was employed as the similarity
18 measure. Prior to analysis, 41 multivariate outliers were removed from Sample 2, leaving 514
19 cases to be entered into the cluster analysis. The default procedure in SPSSWIN was used to
20 estimate cluster centers to assign cases to clusters. This estimates cluster centers in an
21 iterative fashion. To assess the external validity of the two-cluster solution, a series of
22 independent samples t tests were calculated with the alpha level set at $p < .005$ after
23 Bonferroni adjustment. The dependent variables were the same as those used in Sample 1.
24 Results of the external validation process showed that the two groups differed significantly on

Insert Table 3 about here

The same checks for possible confounds applied to Sample 1 were also applied to Sample 2. Results showed that cluster membership in Sample 2 was unrelated to gender, age and years of sport experience. However, a 2 x 7 (Cluster x Level) chi-square analysis showed a significant association ($X^2_6 = 35.44, p < .05$) indicating that cluster membership was associated with levels of sport involvement.

Discussion

The purpose of the present study was twofold: to investigate the motivation profiles that underlie sport participation in adults; and to describe the relationships between these profiles and various motivation consequences.

The results from the present study showed that two motivation profiles emerged. The first was characterized by both high non self-determined and high self-determined motivation. The second was the traditional self-determined profile, characterized by low non self-determined motivation and high self-determined motivation. Two other possible profiles, representing participants dominated by nonself-determined motivation and those who do not endorse any type of motivation either non self-determined or self-determined, did not emerge from the cluster analysis. This is not surprising, given that it is self-determined motivation is likely to lead to prolonged involvement in physical activity (Deci & Ryan, 1985, 1987; Ryan & Deci, 2000). Indeed it is difficult to imagine long-term participation based on non self-determined motives only, at least in non-professional sport. Given the association between cluster membership and levels of sport involvement, further empirical work is required to examine the possible differentiation from motivation profiles of sports participants across

1 professional and nonprofessional levels of sport involvement. Such work may highlight the
2 motivation profiles that are associated with the most desirable consequences for each level of
3 sport participation.

4 *Relationships Between Profiles and Outcomes*

5 Comparison of outcome variables between the two profiles showed significant
6 differences on all measures, except intention and frequency of attendance. However, the
7 significance level for these variables was below .05, and given that the Bonferroni adjustment
8 resulted in significant loss of statistical power, intention and frequency of attendance should
9 be reexamined in future research. The members of the cluster characterized by both self-
10 determined and nonself-determined motivation reported greater enjoyment, effort, positive
11 and negative affect, stronger positive attitude toward sport participation, stronger and more
12 self-determined intentions to continue participating in sport in the long term, and greater
13 satisfaction compared to the group that was characterized by self-determined motivation only.
14 In addition, it is important to note that for half the motivation consequences effect sizes were
15 moderate. This means that motivation profiles are an important source of information
16 regarding likely motivation consequences among adult sports participants. The present
17 findings have important implications for advancing theory as the present typology sheds new
18 light on the processes underlying motivational dynamics in sport.

19 The present data do not allow for firm conclusions to be drawn regarding the exact
20 source of the variation in scores of the dependent variables. Therefore, suggestions will be
21 made based on the theoretical tenets of Self-Determination Theory and previous empirical
22 findings. It is speculated that the more positive consequences reported by the first group are
23 explained by their higher levels of self-determination. There are two plausible explanations
24 for this relationship: (a) the direct influence of self-determination on consequences through its
25 propensity to facilitate enhanced psychological functioning (see Ryan, Deci, & Grolnick,

1 1995; Ryan & Deci, 2000), (b) the possibility that high levels of self-determination elicit a
2 prophylactic effect against the negative influence of nonself-determined motivation on a
3 number of positive consequences such as intrinsic interest, positive affect, attitude toward
4 sport, and integrated intention.

5 The major contribution of the present study is to demonstrate that interpretable
6 patterns of participation motives exist, which are differentially related to various motivational
7 outcomes. The present findings extend past research by showing that various patterns of
8 motives are potentially relevant to the degree various motivational consequences are
9 experienced. That is, past research has examined the independent influences of various
10 motives on relevant consequences but not at how different configurations of motives are
11 associated with these consequences. It is suggested that motivation profiles should be
12 considered as part of the explanation of various motivation-related phenomena such as those
13 examined in the present study (i.e., enjoyment, effort, affect, intentions, persistence) and
14 others which were not presently examined (e.g., absenteeism).

15 These results have implications for the practice of leadership in sport, particularly
16 with respect to effort, persistence, and commitment to training. For example, the present
17 classification can help identify those participants whose motivation profiles have negative
18 implications for the degree to which they derive positive experiences from their sport
19 participation. Such information could then be useful in developing interventions designed to
20 improve the strength and the quality of sports participants' motivation.

21 Several directions for future research can be offered to advance both theory and
22 practice in this area. First, it is important to examine the degree to which the motivational
23 profiles are amenable to change. Second, it would be important for theory development to
24 shed light on issues regarding how particular motivation profiles develop. The present results
25 show that motivation profiles are not associated with gender but are associated with level of

1 sport involvement. Therefore, empirical work is required to examine the nature of the
2 relationship between the sports participants' profiles and the level at which they participate in
3 sport.

4 Third, future research work should explore additional consequences of the motivation
5 profiles. In addition, the fact that the variables of satisfaction and frequency of attendance
6 have been assessed in a unidimensional fashion leaves open questions regarding the accuracy
7 and validity of their assessment. Results based on the way these variables have been assessed
8 should be interpreted with caution and can be used as a starting point for a more thorough and
9 systematic assessment of their relationship with motivation profiles. Hence, future research
10 should examine the ways motivation profiles relate to sport participants' satisfaction with
11 various aspects of their sport environment (e.g., team, coach etc.) and persistence for sport
12 participation using more refined and systematically developed instrumentation. Fourth,
13 empirical work should investigate the sources of variation in motivation consequences
14 attributable to patterns of motives.

15 Finally, future research should examine whether the profiles can be simplified. It is
16 important to find out whether a simplified way to categorize sports participants can explain as
17 much variance as the present taxonomy. To conclude, it seems that adopting a profiling
18 approach in studying participation motives in sport can offer a fresh perspective into the
19 phenomenon of sport motivation. This should aid the development of theory and application.

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1 **Table 1.** Hierarchical clustering solutions and associated degrees of external validity among
 2 Sample 1 (N = 535)

3	<hr/>		
4	Clustering	Number of	External
5	Procedure	Clusters	Validity
6	<hr/>		
7	1. Between-groups linkage	1	—
8	2. Within-groups linkage	3	9/9
9	3. Nearest neighbor	1	—
10	4. Furthest neighbor	4	6/9
11	5. Centroid clustering	2	2/9
12	6. Median clustering	2	3/9
13	7. Ward's method	3	8/9
14	<hr/>		

15 Note. The “external validity” column indicates the number of dependent variables on which
 16 the clusters differed significantly, from a possible nine.

17 The alpha level used for mean comparisons was set at .005 after Bonferroni adjustment.

1 **Table 2.** Comparison of motivation consequences by clusters among Sample 1

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4 Variable	Cluster I	Cluster II	Cluster III	<u>df</u>	<u>F</u>	Results of Tukey's tests
6 Enjoyment/Intrinsic Interest	4.11	3.79	3.57	2, 531	44.37	I > II, III; II > III
7 Effort/Importance	4.40	4.15	3.88	2, 528	28.91	I > II, III; II > III
8 Positive Affect	3.96	3.61	3.37	2, 514	43.05	I > II, III; II > III
9 Negative Affect	1.72	1.60	1.83	2, 510	5.39	III > II
10 Attitude Toward Sport	6.20	5.90	5.71	2, 518	19.05	I > II, III
11 Intention	6.80	6.48	6.23	2, 530	14.65	I > II, III
12 Integrated Intention	6.58	6.37	5.74	2, 525	32.18	I, II > III
13 Satisfaction	5.74	5.33	4.96	2, 520	18.41	I > II, III; II > III
14 Persistence	87.77	86.09	80.09	2, 484	6.47	I, II > III

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16 Note. Clusters I and III are characterized by both self-determined and non self-determined motivation. Cluster II reflects
 17 only self-determined motivation.

18 All F values are significant at $p < .005$ (after Bonferroni adjustment).

19 N = 535

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Table 3. Comparison of motivation consequences by clusters among Sample 2

Variable	Cluster I	Cluster II	<u>df</u>	<u>t</u>	ES
Enjoyment/Intrinsic Interest	4.17	3.73	511	7.73*	.68
Effort/Importance	4.32	3.88	512	6.86*	.60
Positive Affect	4.03	3.54	456	8.13*	.73
Negative Affect	1.78	1.59	507	3.75*	.33
Attitude Toward Sport	6.15	5.78	509	5.91*	.52
Intention	6.39	6.08	512	3.49	.30
Integrated Intention	6.29	5.96	463	3.68*	.32
Satisfaction	6.01	5.54	464	4.18*	.37
Persistence	89.27	85.09	409	2.15	.20

Note. Cluster I is characterized by both self-determined and non self-determined motivation. Cluster II reflects only self-determined motivation.

* $p < .005$ after Bonferroni adjustment.

ES = Effect size

$N = 514$.

Figure Captions

1

2 *Figure 1.* Graphical representation of the cluster solution from Sample 1.

3 AMOT = Amotivation, EXTR = External Regulation, INTROJ = Introjected Regulation,

4 IDENTF = Identified Regulation, IMAC = Intrinsic Motivation to Accomplish, IMES =

5 Intrinsic Motivation to Experience Stimulation, IMKNOW = Intrinsic Motivation to Know.

6

7 *Figure 2.* Graphical representation of the cluster solution from Sample 2.

8 AMOT = Amotivation, EXTR = External Regulation, INTROJ = Introjected Regulation,

9 IDENTF = Identified Regulation, IMAC = Intrinsic Motivation to Accomplish, IMES =

10 Intrinsic Motivation to Experience Stimulation, IMKNOW = Intrinsic Motivation to Know.