Journal of Applied Social Psychology

Journal of Applied Social Psychology 2013, 43, pp. 1200–1210

Situational motivational profiles and performance with elite performers

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doi: 10.1111/jasp.12083

Abstract

In Study 1, a sample of tennis players ranked at the national level ($n = 173$) completed a French version of the Situational Motivation Scale the day before a tennis competition. Results revealed the presence of a three-cluster solution. Differences among clusters on subsequent sport performance were significant. Specifically, athletes with the least self-determined motivational profile obtained the lowest levels of performance. Study 2 ($n = 319$) replicated the findings of Study 1 with a larger sample of national level tennis players. Overall, these results suggest that it is useful to analyze individuals' situational motivational profiles using a cluster analysis to understand the complex link between motivation and performance.

The concept of motivation is one of the most popular constructs in contemporary psychology (see Elliot, 2008; Shah & Gardner, 2008). However, little research has examined the link between motivation and performance. Grounded in self-determination theory (SDT; Deci & Ryan, 1985, 1991; Ryan & Deci, 2002), the purpose of the present research was to identify situational motivational profiles in a real-life situation using cluster analysis, and to relate such profiles to subsequent objective performance.

Deci and Ryan (1985) have proposed a multidimensional conceptualization of motivation embracing three broad motivational concepts, namely, intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation refers to engaging in an activity for the pleasure and satisfaction derived from it. In contrast, behaviors are extrinsically regulated when performed as a means to an end and not for their own sake. Central to SDT is also the distinction between autonomous (or self-determined) and controlled (or nonself-determined) motivation. People are autonomously motivated when they engage in an activity for reasons that are freely chosen and coherent with their value system, while controlled motivation pertains to behaviors that are induced by forces perceived to be external to the self (Deci & Ryan, 2000). Deci and Ryan (1985) proposed the presence of four types of extrinsic motivation that vary in their relative autonomy because people can feel autonomous while being extrinsically motivated. Integrated and identified regulations are autonomous forms of motivation, whereas introjected and external regulations are controlled forms of motivation. Integrated regulation is the most autonomous form of extrinsic motivation and occurs when behaviors are volitional and fully part of one's self and value system. Identified regulation reflects behaviors that are self-initiated even if they are not interesting. With introjected regulation, the underlying motivation of behavior is characterized by the desire to avoid feelings of guilt, shame, and anxiety. Finally, performing an activity to obtain external rewards such as recognition, fame, trophies or money reflects external regulation. A last motivational construct is amotivation. It represents a relative absence of motivation and occurs when one no longer values participating in the activity.

Furthermore, SDT posits that these different forms of motivation lie along a continuum of self-determination ranging from lower (i.e., amotivation, external regulation, introjected regulation) to higher (i.e., identified regulation, integrated regulation, intrinsic motivation) levels of self-determination (Deci & Ryan, 1985). Because self-determination is hypothesized to be beneficial for the growth and psychological well-being of the individual (Deci & Ryan, 1985), the higher the level of autonomous motivation, the more positive the consequences. Thus, SDT posits that autonomous motivation leads to positive motivational consequences, whereas controlled motivation should be associated with negative outcomes. Numerous studies have provided empirical support for these theoretical postulates in various domains (for reviews, see Vallerand, Carbonneau, & Lafrenière, 2009; Vallerand & Miquelon, 2008).

The hierarchical model of intrinsic and extrinsic motivation (Vallerand, 1997; Vallerand et al., 2009) posits that the different types of motivation proposed by SDT exist at contextual and situational levels. Contextual motivation refers to an individual's general motivation in a specific context (e.g., sport, education, work), while situational motivation refers to the motivation individuals experience in a specific activity at a given moment in time. Numerous studies have been conducted at the contextual level, but little research has examined the motivation–performance link at the situational level. Past investigations have shown that intrinsic motivation was positively related to higher levels of performance, learning, and creativity both in education (Amabile, 1985; Grolnick & Ryan, 1987) and physical activity or low-level sport (e.g., Beauchamp, Halliwell, Fournier, & Koestner, 1996; Biddle & Brooke, 1992). No research has looked at the role of situational motivation in the performance of elite performers. Yet, such research is important as it could identify some of the immediate motivational determinants of high-level performance.

Another issue of importance deals with how to construe the motivational constructs used to predict performance. Past research on the role of motivation in outcomes has used one of two strategies: (1) assessing the relationship of each type of motivation (e.g., intrinsic motivation) with outcomes independently or (2) using the self-determination index, which entails giving weights to each construct as a function of placement on the self-determination continuum (e.g., Fortier, Vallerand, & Guay, 1995; Grolnick & Ryan, 1987; Guay & Vallerand, 1997). The first strategy is limited because a number of motives are typically at play in life settings (e.g., Pintrich, 2003). Indeed, SDT posits that people do hold simultaneously all the forms of motivation for any behavior. However, researchers have not taken advantages of this possibility as they mostly combine these various forms of motivation into total motivation indices and examine how these relate to determinants and outcomes through the use of regression analyses and structural equation modeling. While such an approach is technically correct, it does not take into consideration the different motivational configurations that may characterize different individuals in different settings (see Vallerand, 1997 on this issue). One way to identify these different configurations and their role in outcomes is by using person-centered analyses (e.g., cluster analyses; Gore, 2000). Cluster analyses allow researchers to categorize individuals into homogeneous groups whose members share similar motivational characteristics. It is thus possible to examine the combination of the different forms of motivation and determine whether autonomous and controlled forms of motivation may co-occur within motivational profiles and serve an additive function. The second strategy, that of using the self-determination index, may not be optimal either as a high self-determined motivational profile is theoretically posited to be the ideal one. Yet, as Vallerand (1997) suggested, a number of motivational profiles may exist in actual life contexts. It would be important to uncover these and determine which ones are optimal with respect to performance.

Using a person-oriented approach, recent research (e.g., Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Gillet, Vallerand, & Rosnet, 2009; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007) has investigated whether different motivational profiles (or clusters) led to different levels of performance. For instance, Ratelle and colleagues (2007, Study 3) have investigated students' motivational profiles toward education and examined whether profile groups differed on academic persistence and performance. Results showed that the least self-determined profile (i.e., low autonomous motivation—high controlled motivation) was associated with the lowest levels of performance. It is important to note that no significant differences emerged on achievement between students reporting a self-determined profile (i.e., high autonomous motivation-low controlled motivation) and those reporting high levels of both autonomous and controlled motivations.

The present research

It is generally believed that motivation is conducive to performance. Yet, little is known on which types of motivation positively contribute to performance (Baard, Deci, & Ryan, 2004; Gagné & Deci, 2005). Furthermore, in line with new perspectives on motivation (e.g., Pintrich, 2003; Vallerand et al., 2009), it becomes important to consider motivation from a multidimensional perspective and identify the motivational configurations that exist in life settings, and specifically at the situational level. It is also important to adopt a person-oriented approach (e.g., using cluster analyses) rather than a variable-oriented approach (e.g., using the self-determination index) in order to examine how the different forms of motivation posited by SDT combine to generate different motivational profiles (Ratelle et al., 2007). However, researchers have typically used a mix of motivational theories (e.g., achievement goal theory, self-theories of ability beliefs, SDT) to characterize individuals' motivational profiles (e.g., Chian & Wang, 2008; Wang & Biddle, 2001; Wang, Chatzisarantis, Spray, & Biddle, 2002), and a limited number of studies have tested the nature of differences between cluster groups strictly on intrinsic and extrinsic motivational variables (e.g., Boiché et al., 2008; Gillet, Berjot, & Paty, 2009; Matsumoto & Takenaka, 2004). It is thus difficult to identify how the different forms of motivation proposed by SDT uniquely contribute to the situational motivational profiles. Finally, while past research has started to identify various motivational profiles (or clusters) at the contextual level (e.g., Vlachopoulos, Karageorghis, & Terry, 2000), it would appear important to identify motivational profiles at the situational level as well as to relate these with subsequent situational performance. This would allow researchers to determine the motivational factors that are crucial in leading to immediate (or state) performance.

In light of the above, the main purpose of the present research was to identify the situational motivational profiles corresponding to high and low levels of performance in a real-life setting, namely, elite tennis. Two studies were conducted and a two-stage cluster analysis procedure was used (Gore, 2000; Hair, Anderson, Tatham, & Black, 1998). Cluster analysis allows researchers to identify homogeneous groups of individuals who share similar motivational characteristics. More specifically, in cluster analysis, individuals are assigned to groups created by maximizing between-group differences and minimizing within-group variability on the basis of their motivational scores. It is then possible to test the role of motivational configuration inherent in each group in outcomes.

In Study 1, an exploratory cluster analysis (i.e., a hierarchical cluster analysis) was employed to determine which situational motivational profiles would be uncovered the day before a match. Then, in Study 2, a confirmatory cluster analysis (i.e., a *k*-means cluster analysis) was performed on a larger sample, taking the number of clusters emerging in Study 1 as the basis for this confirmatory cluster analysis. Because a hierarchical cluster analysis is exploratory, it is important to confirm the same cluster solution with another independent sample. This cross-validation technique allows one to conclude that the solution has a certain degree of generality if the number of clusters is replicated across two samples from the same population (Aldenderfer & Blashfield, 1984). Although the present research was rather exploratory in nature, we expected certain profiles to emerge. In agreement with past research using cluster analyses (e.g., Boiché et al., 2008; Matsumoto & Takenaka, 2004; Ratelle et al., 2007), it was thus hypothesized that at least three clusters would be uncovered: (1) a low autonomous-high controlled motivation cluster; (2) a high autonomous-high controlled motivation cluster; and (3) a high autonomous-low controlled motivation cluster.

We also examined the link between the motivational profiles and performance in the subsequent tennis match in each of the two studies. Recent investigations (e.g., Gillet, Vallerand, et al., 2009; Ratelle et al., 2007) have shown that the least self-determined profile predicted the lowest levels of performance, while no significant differences emerged on performance between individuals reporting a self-determined profile and those reporting high levels of both autonomous and controlled motivation. SDT would predict that controlled motivation should lead to negative outcomes (see Deci & Ryan, 2008, for a review in different settings). Thus, one might hypothesize that the best performance should be obtained by individuals displaying high levels of autonomous motivation and low levels of controlled motivation. However, results from different studies (e.g., Gillet, Vallerand, et al., 2009; Ratelle et al., 2007) are not completely in accord with the predictions of SDT (Deci & Ryan, 1985) because they suggest that high levels of controlled motivation may not lead to a drop in performance if one also experiences high levels of autonomous motivation. Future research is clearly needed on this issue.

Study 1

In line with the above, there were two purposes of Study 1. First, we sought to identify the situational motivational profiles that characterize top performers. As indicated previously, it was hypothesized that three profiles, reflecting different levels of autonomous and controlled motivations, would be uncovered. A second purpose was to determine how these motivational profiles would relate to performance. In line with past research described above (e.g., Gillet, Vallerand, et al., 2009; Ratelle et al., 2007), it was predicted that a profile characterized by low levels of autonomous motivation and high levels of controlled motivation would lead to the lowest levels of performance. In contrast, the two profiles characterized by high levels of autonomous motivation (i.e., the high autonomous-low controlled motivation and high autonomous-high controlled motivation clusters) should be associated with the best performance.

Method

Participants and procedure

The sample was composed of 173 French tennis players (108 women and 65 men) with a mean age of 24.79 years ($SD = 7.40$). Participants were engaged in a national tennis competition organized by the French Tennis Federation. The day before the match, they completed a scale designed to assess their situational motivation for the upcoming single match. Participants were also asked to complete a questionnaire containing some demographic questions. Participants were informed that there were no right or wrong answers and were encouraged to answer as honestly as possible. Informed consent was obtained and confidentiality was ensured. Athletes' tennis performance for the subsequent single match was obtained via the French Tennis Federation.

Measures

Situational motivation

The Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000) was used to assess individuals' situational (or state) motivation. With the SIMS, participants are asked to rate different reasons for currently engaging in an activity on a 7-point Likert scale ranging from *corresponds not at all* (1) to *corresponds exactly* (7). In the present study, participants were asked to complete the SIMS as pertains to the

Table 1 Means for the Motivational and Performance Variables as a function of Clusters (Study 1)

Cluster	Cluster 1 Mod AU-high C (n = 67)	Cluster 2 High AU-high C (n = 51)	Cluster 3 High AU-low C (n = 47)
Intrinsic motivation	4.98_a	6.42_b	5.95_c
Identified regulation	4.16_a	6.33_b	4.85_c
External regulation	4.48_a	5.31_b	2.07_c
Amotivation	1.40_a	1.29_a	1.18_a
Performance index (z score)	$-.22_a$	$.06_{ab}$	$.22_b$

Note. For each dependent variable, means with different subscripts indicate a significant difference at $p < .05$ using Newman–Keuls post hoc test. AU = autonomous; C = controlled.

upcoming match. On the basis of the work of Standage, Treasure, Duda, and Prusak (2003), we used a 14-item version of the SIMS. This questionnaire measures four types of motivation: intrinsic motivation (four items, e.g., "because I think that playing this tennis match is fun"), identified regulation (three items, e.g., "because I think that playing this tennis match is good for me"), external regulation (three items, e.g., "because I don't have any choice"), and amotivation (four items, e.g., "I don't know; I don't see what playing this match brings me"). Past research in several areas including the sport domain has confirmed the adequate factorial structure and internal consistency of the SIMS (e.g., Guay et al., 2000; Standage et al., 2003). In the present study, all subscales showed satisfactory levels of internal consistency with Cronbach's alphas ranging from .77 to .90.

Performance

Two objective measures of sport performance during the competition were used in the present study. The first represented the match's result (i.e., win was coded as 1 and loss as −1). We obtained another measure of performance based on the method used by the French Tennis Federation. In this method, the higher the level of the opponent, the more points are given for a win, whereas losses against players ranked below one are penalized.[1] Then, these two performance variables were standardized using z scores and summed in one performance index because they were highly correlated ($r = .62, p < .001$).

Results

Preliminary analyses

The univariate distributions of the various variables were examined for normality. All variables were normally distributed (values ranged from −.72 to 1.63 for skewness and from −.77 to 1.69 for kurtosis). Cluster analysis is sensitive to outliers. Therefore, eight multivariate outliers (i.e., 3 standard deviations above or below the mean) were removed from the data set. Thus, 165 participants were retained for the analyses.

Main analyses

A hierarchical cluster analysis using Ward's linkage method with the squared Euclidian distance measure was performed. The clustering variables were intrinsic motivation, identified regulation, external regulation, and amotivation. Following the procedure recommended by Hair and his colleagues (1998), none of these variables were standardized before the analysis because they share the same metric (i.e., a 7-point Likert scale). Inspection of changes in the agglomeration coefficient suggested that a three-cluster solution was the most appropriate. To assess the stability of the three-cluster solution, half of the sample was randomly selected and the hierarchical cluster analysis was again conducted. Eighty-nine percent of the participants remained in the same clusters. The three-cluster solution of these data was thus considered to be an accurate representation of the data. Means of the motivation subscales and the performance indices for the three-cluster solution are reported in Table 1. Figure 1 displays the motivational subscales as a function of clusters.

A one-way multivariate analysis of variance (MANOVA) was conducted with the four forms of motivation as dependent variables and the three clusters as the independent variable in order to identify the motivational content of each

[1]Here are the details of this method: +120 points for a win against a player ranked two levels and above; +80 points for a win against a player ranked one level above; +50 points for a win against a player ranked at the same level; +30 points for a win against a player ranked one level below; +20 points for a win against a player ranked two levels below; +15 points for a win against a player ranked three levels below; +10 points for a win against a player ranked four levels below; +5 points for a win against a player ranked five levels below; 0 point for a win against a player ranked six levels and more below; −60 points for a loss against a player ranked two levels and more below; −40 points for a loss against a player ranked one level and more below; −20 points for a loss against a player ranked at the same level; and 0 point for a loss against a player ranked one grade and more above. For example, a player who won a match against an opponent ranked two levels above his or her ranking would obtain a performance score of 120, while a player who lost against an opponent ranked two levels below his or her ranking would obtain a performance score of −60.

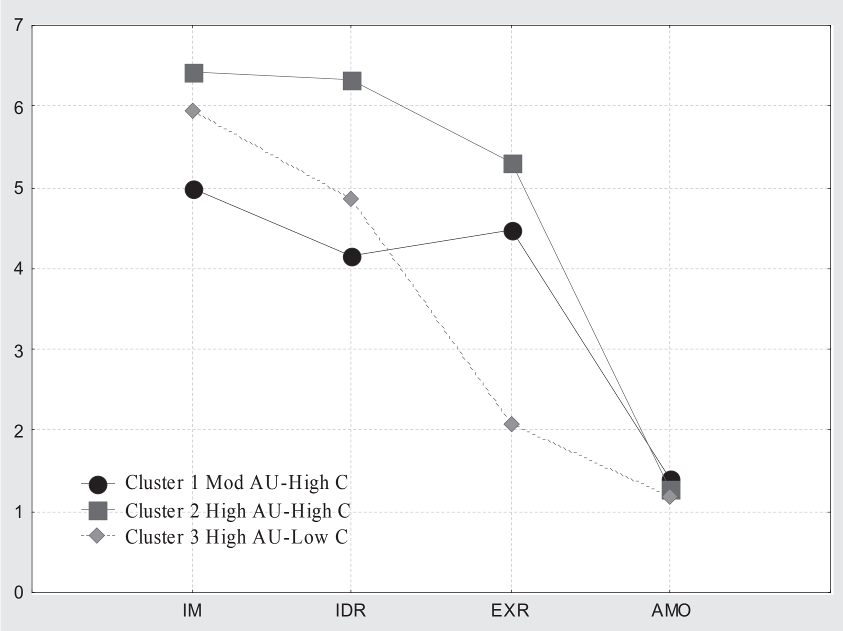

Figure 1 Motivation subscales as a function of clusters (Study 1).
Note. AU = autonomous; C = controlled; IM = intrinsic motivation; IDR = identified regulation; EXR = external regulation; AMO = amotivation.

group. Results revealed significant differences among the three clusters, $F(8, 318) = 58.30, p < .001$. A one-way ANOVA was conducted on each dependent variable as a follow-up to the MANOVA. The ANOVAs were all significant except for the amotivation subscale [for intrinsic motivation, $F(2, 162) = 54.15, p < .001$; identified regulation, $F(2, 162) = 64.83, p < .001$; external regulation, $F(2, 162) = 134.72, p < .001$; and amotivation, $F(2, 162) = 2.97, p = .05$] (see Table 1 for more details). Overall, these differences support the distinction among the three clusters.

Scores on the various motivation subscales allowed us to label the three clusters. Participants in Cluster 1 (40 women and 27 men) were characterized by moderate intrinsic motivation and identified regulation scores, as well as high external regulation and low amotivation scores. Thus, this cluster was labeled the moderate autonomous-high controlled cluster (Mod AU-High C group). Cluster 2 (23 women and 28 men) was low on amotivation, and high on intrinsic motivation, identified regulation and external regulation. This second cluster was thus labeled the high autonomous-high controlled motivation group (High AU-High C group). In Cluster 3 (38 women and 9 men) participants had high scores on intrinsic motivation, moderate scores on identified regulation, as well as low scores on external regulation and amotivation. This third cluster was thus labeled the high autonomous-low controlled motivation group (High AU-Low C Group). Results from chi-square analyses revealed that the proportion of gender in each cluster differed, $\chi 2$ $(df = 2, n = 165) = 13.28, p < .01$. Specifically, men were underrepresented in the High AU-Low C group, but overrepresented in the High AU-High C group. Furthermore, the Mod AU-High C group contained the most participants (40.6% of participants; High AU-High C cluster: 30.9%; High AU-Low C cluster: 28.5%).

A one-way ANOVA was then conducted to assess whether the three motivational profiles differed with respect to the performance variable. Results revealed significant differences, $F(2, 142) = 3.12, p < .05$. Newman–Keuls post hoc comparisons were carried out to determine which of the three groups differed on this variable. Results indicated that individuals in the Mod AU-High C group performed significantly worse ($M = -0.22$) than those in the High AU-Low C ($M = 0.22$) group. There were no differences between the Mod AU-High C and the High AU-High C ($M = 0.06$) clusters, and between the High AU-High C and the High AU-Low C clusters on this performance variable.

Discussion

There were two purposes of Study 1. First, we sought to identify the situational motivational profiles that characterize elite performers. It was hypothesized that three profiles with different levels of autonomous and controlled motivations would be uncovered. A second purpose was to determine which motivational profile was the most conducive to performance. It was predicted that the least self-determined motivational profile would lead to the lowest levels of performance. The findings of Study 1 upheld both hypotheses. Indeed, three motivational profiles were uncovered, namely, a Mod AU-High C group (i.e., Cluster 1), a High AU-High C group (i.e., Cluster 2), and a High AU-Low C group (i.e., Cluster 3). Of interest is that the least self-determined motivational profile (i.e., Mod AU-High C profile) characterized close to 41% of our sample. It is premature to speculate on the reasons for this finding. Clearly, we needed to verify that the motivational profiles observed in Study 1 could be validated in a second sample of top performers before submitting explanations.

The present findings also supported our hypothesis with respect to the performance data. Specifically, in line with past research (e.g., Gillet, Vallerand, et al., 2009; Ratelle et al., 2007), the present results showed that the least self-determined motivational profile (i.e., Mod AU-High C profile) led to the lowest levels of performance during the subsequent tennis match. These findings are in line with SDT and past research on the negative effects of external regulation in performance (Amabile, 1985).

In sum, Study 1 led to a number of important findings on the types of motivational profiles that characterize elite performers and the role of such profiles in performance at the situational level. However, additional research using a similar sample was needed to replicate these findings.

Study 2

The purpose of Study 2 was to replicate the results obtained in Study 1 with a larger sample of elite tennis players. Our second sample was comparable in terms of age and gender with the sample used in Study 1, and included top performers engaged in a similar tennis competition. In line with the results of Study 1, it was thus expected that three motivational profiles would emerge: a Mod AU-High C group, a High AU-High C group, and a High AU-Low C group. In addition, as in Study 1, it was hypothesized that the least self-determined profile would predict the worst performance, while the two other profiles characterized by high levels of autonomous motivation would lead to the highest levels of performance.

Method

Participants were 319 French national tennis players (205 women and 114 men) engaged in a national event with a mean age of 24.93 years ($SD = 7.77$). Participants were all different from those of Study 1. The procedures and method were the same as those of Study 1. The alpha coefficients ranged from .72 to .81 for the four motivational subscales.

Results

Preliminary analyses

Inspection of the skewness and kurtosis indices for study variables proved to be normal (values ranged from −.69 to 1.54 for skewness and from −.82 to 1.31 for kurtosis). Two multivariate outliers with a distance from the mean greater than three times the value of the standard deviation were removed from the data set.

Main analyses

A *k*-means cluster analysis was carried out to confirm the clusters identified in Study 1. The number of clusters emerging in Study 1 was taken as a basis for this confirmatory cluster analysis. The cluster analysis was again conducted with four variables: intrinsic motivation, identified regulation, external regulation, and amotivation. Three distinct clusters similar to those obtained with the hierarchical cluster analysis conducted in Study 1 were identified. To establish the stability of these clusters, half of the observations in the sample were randomly deleted from the data set, and a second *k*-means cluster analysis was performed with the remaining data. Over 91% of participants in this analysis maintained their cluster membership from the full sample analysis, confirming the stability of the three-cluster solution. Table 2 presents the means and standard deviations of the four subscales and the performance index for each cluster. Figure 2 is

Table 2 Means for the Motivational and Performance Variables for the Three-Cluster Solution (Study 2)

Cluster	Cluster 1 Mod AU-high C ($n = 72$)	Cluster 2 High AU-high C ($n = 121$)	Cluster 3 High AU-low C ($n = 124$)
Intrinsic motivation	4.88_a	6.34_b	5.73_c
Identified regulation	4.13_a	6.23_b	4.37_c
External regulation	5.30_a	5.18_a	2.36_b
Amotivation	1.44_a	1.36_a	1.29_a
Performance index (*z* score)	-0.39_a	0.19_b	0.01_b

Note. For each dependent variable, means with different subscripts indicate a significant difference at $p < .05$ using Newman–Keuls post hoc test. AU = autonomous; C = controlled.

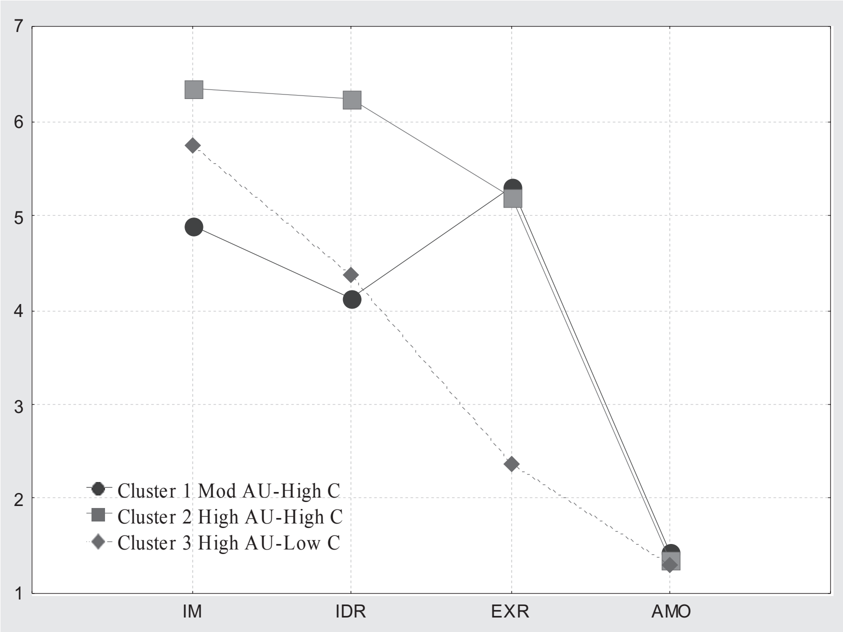

Figure 2 Motivational clusters in Study 2.
Note. AU = autonomous; C = controlled; IM = intrinsic motivation; IDR = identified regulation; EXR = external regulation; AMO = amotivation.

a graphical representation of the three-cluster solution as a function of the SIMS subscales.

A one-way MANOVA was conducted with the four types of motivation as dependent variables and the clusters as the independent variable. Results revealed significant differences among the three groups, $F(8, 622) = 110.94$, $p < .001$. A one-way ANOVA and Newman–Keuls test were carried out on each dependent variable as a follow-up to the MANOVA. As in Study 1, the ANOVAs were all significant except for the amotivation subscale [for intrinsic motivation, $F(2, 314) = 72.08$, $p < .001$; identified regulation, $F(2, 314) = 138.28$, $p < .001$; external regulation, $F(2, 314) = 299.01$, $p < .001$; and amotivation, $F(2, 314) = 2.00$, $p = .14$]. Then, post hoc tests revealed that the three groups were significantly distinct from each other on intrinsic motivation and identified regulation. For external regulation, individuals in the High AU-Low C group (i.e., Cluster 3) displayed the lowest score, while there were no significant differences between those in the two other groups (see Table 2).

The first cluster (44 women and 28 men) had low scores on amotivation, moderate scores on both intrinsic motivation and identified regulation, and high scores on external regulation (Mod AU-High C group). Individuals in the second cluster (70 women and 51 men) were characterized by high levels of intrinsic motivation, identified regulation, and external regulation, and low levels of amotivation (High AU-High C group). Finally, Cluster 3 (90 women and 34 men) was high on intrinsic motivation, moderate identified regulation, as well as low on external regulation and amotivation (High AU-Low C group). Contrary to Study 1, results of Study 2 revealed that the Mod AU-High C group contained the lowest level of participants (22.7% of participants; High AU-High C group: 38.2%; High AU-Low C group: 39.1%). Results from chi-square analyses revealed that the proportion of gender in each cluster differed, $\chi 2$ ($df = 2$, $n = 319$) = 6.22, $p < .05$. Specifically, while the percentage of women to men was in line with the total number of men and women in the sample, men were overrepresented in the High AU-High C group, but underrepresented in the High AU-Low C group.

An ANOVA followed by Newman–Keuls post hoc tests were then conducted to determine whether the motivational profile groups differed significantly with respect to the performance index. Results of the ANOVA revealed a significant main effect for clusters, $F(2, 275) = 7.95$, $p < .001$. Post hoc tests indicated that Cluster 1 (Mod AU-High C group; $M = -0.39$) obtained significantly lower levels of performance than Cluster 2 (High AU-High C group; $M = 0.19$) and Cluster 3 (High AU-Low C; $M = 0.01$). No significant differences emerged between individuals in Clusters 2 and 3.

Discussion

The main goal of Study 2 was to replicate the results obtained in Study 1 with a larger sample. Globally, the present results confirmed those of Study 1. First, the three motivational profiles obtained in Study 1 were also uncovered in Study 2:

a Mod AU-High C motivational profile, a High AU-High C motivational profile, and a High AU-Low C motivational profile. Concerning the links between the three motivational profiles and performance, results from Study 2 were also in line with findings from Study 1. Indeed, results revealed that top performers with the least self-determined profile (i.e., Mod AU-High C profile) obtained significantly lower levels of performance than those in the two other clusters that did not differ between them. The results of Study 2 thus underscore the role of motivation in elite performance.

General discussion

The purpose of the present research was to identify the situational motivational profiles corresponding to high and low levels of performance in a real-life setting. Using cluster analysis, the results of two studies revealed the presence of three clusters: a Mod AU-High C group, a High AU-High C group, and a High AU-Low C group. The results of Study 1 revealed that the Mod AU-High C group contained the most participants (40.6% of participants), while this cluster characterized 22.7% of our sample in Study 2. Nevertheless, in both studies, men were underrepresented in the most self-determined cluster (i.e., the High AU-Low C group), but overrepresented in the High AU-High C group. These results are coherent with past studies that showed that men typically report a less self-determined motivational profile than women in a variety of life domains including education (e.g., Vallerand & Bissonnette, 1992; Vallerand, Blais, Brière, & Pelletier, 1989), sport (e.g., Chantal, Guay, Dobreva-Martinova, & Vallerand, 1996; Pelletier et al., 1995), and several others (see Vallerand & O'Connor, 1991). Although the proportion of individuals in each cluster differed in the two present studies, the three motivational profiles identified appear to be quite robust across samples. Furthermore, our results showed that the least self determined profile (i.e., Mod AU-High C profile) predicted the lowest levels of performance in both studies. These findings lead to a number of conclusions.

A first conclusion is that it appears that we have identified different motivational profiles with which elite performers approach an upcoming situation. Specifically, three different motivational profiles were identified. Of significance is the fact that a sizeable proportion of individuals were found to be in the least self-determined motivational profile (Mod AU-High C cluster) especially in Study 1. These findings are in line with past research that has shown that competition (Reeve & Deci, 1996; Vallerand, Gauvin, & Halliwell, 1986) and continuous participation in high-level competitive sports (Fortier, Vallerand, Brière, & Provencher, 1995) are conducive to the development of lower levels of autonomous motivation. Although we used cluster groups verification procedures to test the stability of the three-cluster solution in the two present studies, it is important to note that cluster analysis is unique to the sample it is performed on (Hair et al., 1998). It is thus possible that cluster analyses with different samples of top performers would reveal somewhat different motivational profiles. Furthermore, as suggested by Ratelle et al. (2007), the nature of the social context could have an impact on the development of one's motivational profile. For instance, it is possible that highly competitive structures foster the development of motivational profiles characterized by high levels of controlled motivation. Accordingly, future work would do well to examine how the environmental factors influence the development of individuals' motivational profiles.

A second conclusion is that situational motivation matters with respect to performance. Specifically, the results of the present research revealed that elite performers who displayed the lowest self-determined motivational profile prior to a competitive situation, subsequently displayed the lowest levels of objective performance. Of major interest is that individuals in this cluster lost significantly more often than those in the other two clusters.[2] Specifically, the low self-determined cluster (Mod AU-High C) lost 19% and 24% more often than the high self-determined cluster (High AU-Low C) in Studies 1 and 2, respectively. This is a significant difference both from statistical and applied standpoints. Indeed, if someone was able to offer top performers a way to boost their performance by 20%, they would jump on it. The present findings suggest that such a tool exists and it is self-determined motivation. While past research has used cluster analysis to look at motivational configurations (or profiles) in sport and physical activity (e.g., Chian & Wang, 2008; Gillet, Berjot, et al., 2009), and education (e.g., Boiché et al., 2008; Ratelle et al., 2007), such research has assessed motivation at the contextual level (or one's general motivational orientation toward a given field such as sport, work, or education). Thus, the present findings are the first to show that approaching an upcoming situation with high versus low levels of autonomous situational motivation (i.e., intrinsic motivation and identified regulation) seems to have an important impact on subsequent objective performance.

A third conclusion of the present findings is that they are in accordance with SDT's predictions. SDT posits that the worst

[2]We calculated the percentage of wins/losses for each cluster in both studies. For example, the percentage of wins for a group of performers who would have won 6 of 10 matches would be equal to 60%. Although the chi-square value was nonsignificant, χ^2 ($df = 2$, $n = 145$) = 3.60, $p = .17$, results of Study 1 revealed the following percentage of wins: Mod AU-High C cluster = 37%; High AU-High C cluster = 42%; High AU-Low C cluster = 56%. In Study 2, results from chi-square analyses revealed that the percentage of wins between the clusters differed, χ^2 ($df = 2$, $n = 278$) = 9.68, $p < .01$. Specifically, the percentages of wins were 32% for the Mod AU-High C group and 56% for the two other groups. Thus, clearly having a low self-determined motivational profile represents a risk factor with respect to performance.

performance should be obtained by individuals whose motivational profile was characterized by low levels of autonomous motivation and high levels of controlled motivation. By showing that the least self-determined motivational profile was negatively related to performance, our results are also in accordance with recent research conducted at the contextual level (e.g., Boiché et al., 2008; Gillet, Vallerand, et al., 2009; Ratelle et al., 2007, Study 3) that has found that a nonself-determined profile characterized by low levels of autonomous motivation and high levels of controlled motivation predicted low levels of performance. Thus, the present findings underscore what previous experimental research has shown: focusing exclusively on extrinsic outcomes is negatively related to performance (Amabile, 1985; McGraw, 1978). However, the present results also suggest that high levels of controlled motivation are not always associated with negative outcomes. Indeed, results from Study 2 revealed that the combination of high levels of autonomous and controlled motivation was conducive to higher levels of performance than a motivational profile characterized by moderate levels of autonomous motivation and high levels of controlled motivation. In addition, there were no significant differences in performance between the High AU-High C and the High AU-Low C groups. These results are not completely in accord with the predictions of SDT (Deci & Ryan, 1985) but replicate what recent studies (Gillet, Vallerand, et al., 2009; Ratelle et al., 2007) have shown at the contextual level: Simultaneously pursuing autonomous and controlled regulations may not lead to low levels of performance. The present results are also in line with those of Judge, Bono, Erez, and Locke (2005) who found that autonomous goal motivation predicted positive outcomes, while controlled goal motivation was unrelated to outcomes (rather than being negatively associated with positive outcomes as posited by SDT). These results suggest that controlled motivation does not necessarily impede performance, especially if people also display high levels of intrinsic motivation and identified regulation (Koestner, 2008). However, these findings may be due to the scale used in the present research to assess situational motivation. The only form of controlled motivation assessed is external regulation, which refers to reasons for participation associated with obtaining extrinsic rewards such as recognition, fame, and trophies. It is thus possible that elite performers aim to obtain such rewards. In order to identify clusters that vary in their degree of controlled regulation (as opposed to external regulation only), authors should also assess introjected regulation because ego involvement is a very common aspect of competitive events. In addition, future research is needed to determine whether a motivational profile characterized by high levels of both autonomous and controlled motivation may lead to positive outcomes other than performance (e.g., well-being, satisfaction, positive affect).

The present research has some limitations. First, our sample only comprised elite (national) performers from one sport (tennis) and one country (France). As a consequence, the present results may not generalize to other activities or countries. Future research in various domains such as work or education is needed to replicate and extend the present findings. Second, a correlational design was used and thus we cannot infer causality from the present findings. Thus, future investigations using prospective and experimental designs are necessary to better understand the relationship between motivation and performance. Third, in the present research, we only focused on the effects of motivation on performance and we did not take into account some variables that could have an impact on athletes' motivation. One such variable that future research should focus on is the autonomy support provided from the supervisor (e.g., Chirkov & Ryan, 2001; Gillet, Vallerand, Amoura, & Baldes, 2010). A final limitation concerns the timing of the situational motivation assessment. Because situational motivation was measured the day before the competition, it may not reflect the actual motives at play during the actual situation. Nevertheless, what is striking is that assessing situational motivation 24 hours before a match allowed us to identify replicable motivational clusters that were associated with objective performance. It is likely that an assessment of situational motivation just before (or if possible, during) the situation would allow us to predict even more precisely the competition outcome. It would thus be important to conduct such research.

In sum, the present findings underscore the fundamental role of situational motivation in performance for a specific situation. In two studies, it was found that engaging in a situation with a low self-determined motivational profile leads to performance that is significantly lower than that of participants with different motivational profiles. Future research is needed, however, in order to extend these preliminary findings and provide a more comprehensive understanding of the motivational processes underlying high-level performance.

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