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Influence of coaches' autonomy support on athletes' motivation and sport performance: A test of the hierarchical model of intrinsic and extrinsic motivation

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ABSTRACT

Objectives: Based on the hierarchical model of intrinsic and extrinsic motivation [Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 271–360). New York: Academic Press], the purpose of this study was to propose and test a model which posits that coaches' autonomy support facilitates athletes' self-determined motivation toward a sport activity (i.e., judo). Self-determined motivation promotes athletes' situational self-determined motivation before a competition, that in turn, predicts their sport performance.
Method: A total of 101 judokas completed questionnaires after the weighting session (i.e., between one and two hours before the beginning of the competitive event). Athletes' objective performance during the competition was obtained via the French Judo Federation.
Results: Results from structural equation modeling analyses provided support for the hypothesized model. These results are in accordance with self-determination theory and the hierarchical model.
Conclusions: By showing that coaches' autonomy support facilitates self-determined motivation and sport performance, the present findings have important implications for a better understanding of the determinants of athletes' performance.

Self-determination theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2002, 2007) is a motivational theory that is useful for understanding individuals' motivation, its causes, and its consequences. Grounded in this framework, several studies over the past 30 years have shown that teachers' behaviors are significant predictors of student's motivation (see Reeve, 2002, for a review), and that motivation is significantly related to academic performance (e.g., Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Guay & Vallerand, 1997; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007). In the sport context, several authors (e.g., Horn, 2002; Mageau & Vallerand, 2003) also consider that coaches' behaviors are relevant determinants of athletes' motivation. However, few studies in this domain have examined the links between motivational variables and sport performance (Vallerand, 2007a; Vallerand & Rousseau, 2001) even if performance represents one of the key outcomes in sport (Gould, Dieffenbach, & Moffett, 2002). Therefore, the purpose of the present study was to test a model that incorporates athletes' perceptions of coach behaviors, motivation, and sport performance in order to better understand the determinants of athletes' performance.

The hierarchical model of intrinsic and extrinsic motivation

Based on SDT, Vallerand (1997, 2007a, 2007b) has proposed a hierarchical model of intrinsic and extrinsic motivation (HMIEM) that allows researchers to analyze and understand the determinants and consequences associated with the different forms of motivation at different levels of generality. The model posits that a complete analysis of motivational processes should consider three important constructs, namely, intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation refers to performing an activity for the pleasure and satisfaction derived from participation. However, athletes may also have many extrinsic reasons for practicing a sport activity. In this case, behavior is regulated through expected outcomes not inherent in the activity itself (i.e., rewards, constraints). According to SDT, there are four types of extrinsic motivation that vary in their relative autonomy: external regulation, introjected regulation, identified regulation, and integrated regulation. *External regulation* is considered to be the least self-determined form of

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extrinsic motivation and refers to behaviors regulated by external sources such as rewards or coercive pressures. An example of an external regulation is when athletes engage in a training session to gain recognition from their coach. Athletes could also be motivated by *introjected regulation* when contingencies from external forces have been internalized without full endorsement by the person. Athletes who engage in a sport activity to avoid feelings of guilt, shame, or anxiety, represent an example of introjected regulation. In contrast to the first two motivational types of extrinsic motivation, *identified regulation* is theorized to represent a self-determined form of motivation because behaviors are performed out of choice even if the activity is not attractive in itself. For example, athletes volitionally choose to engage in a muscular training even if they do not find this activity very interesting, because they believe it will lead to significant benefits for their sport performance. Finally, integrated regulation is the most self-determined form of extrinsic motivation. It also refers to behaviors that are emitted out of choice but, at this stage, they are fully internalized in the individual's self and value system. Thus, an athlete will engage in an activity only if it is in congruence with his values and needs (Ryan & Deci, 2000). SDT also posits the existence of the concept of amotivation which represents a lack of intention and a relative absence of motivation for an activity.

The HMIEM also proposes that intrinsic motivation, extrinsic motivation, and amotivation exist at three levels of generality (i.e., global, contextual, and situational). Global motivation is similar to a personality trait and refers to a general motivational orientation. Motivation at the contextual level refers to an individual's usual motivation in a specific context such as education, work, or sport. Finally, situational motivation pertains to the here and now of motivation and refers to an individuals' motivation for engaging in a particular activity at a given time. According to Vallerand (1997), this hierarchical conceptualization of motivation provides a more refined understanding of motivational processes.

Determinants of athletes' motivation

A third postulate of the HMIEM states that motivation at a given level results from two potential sources: social factors (i.e., interpersonal phenomenon) and top-down effects from motivation at the higher proximal level (i.e., intra-personal phenomenon). First, the HMIEM takes social factors into account because they are posited to have a deep impact on athletes' motivation. More specifically, in line with Deci and Ryan (1985, 1991), it is posited that controlling environmental conditions (e.g., using rewards, deadlines, threats) undermine self-determined motivation, whereas autonomy-supportive contexts should facilitate self-determined motivation. Although many factors in the sport context (e.g., scholarships, sport structures) may have an influence on athletes' motivation, Mageau and Vallerand (2003) consider that coaches' behavior is one of the most important. Thus, research has shown that perceptions of coaching behavior were related to athletes' motivation (for a review, see Amorose, 2007). Researchers using SDT as a guiding framework have mostly been interested in the impact of two interpersonal styles, namely an autonomy-supportive style and a controlling style (Deci & Ryan, 1987). Autonomy-supportive coaches acknowledge athletes' feelings and perspectives and allow them to be involved in the decision making process, while those adopting a controlling style are characterized by a highly directive style of interaction (for a complete list of coaches' autonomy-supportive behaviors, see Mageau & Vallerand, 2003).

Some studies (e.g., Amorose & Anderson-Butcher, 2007; Conroy & Coatsworth, 2007; Gagné, Ryan, & Bargmann, 2003; Pelletier, Fortier, Vallerand, & Brière, 2001; Pelletier et al., 1995) have examined the motivational impact of athletes' perceptions of their coach's interpersonal style. Results reveal that coaches' controlling behaviors undermine athletes' self-determined motivation, while autonomy-supportive behaviors promote it. Many other investigations in the physical education (e.g., Hagger et al., 2007; Standage, Duda, & Ntoumanis, 2006) and exercise (e.g., Edmunds, Ntoumanis, & Duda, 2006; Wilson & Rodgers, 2004) domains have demonstrated the importance of perceived autonomy support in fostering self-determined forms of motivation (i.e., intrinsic motivation and identified regulation).

In addition to the impact of social factors, motivation at one level of the hierarchy also results from motivation at the next higher level (i.e., the top-down effect). Thus, Vallerand (1997) considers that situational motivation can be influenced by contextual motivation. Several studies in sport (Blanchard, Mask, Vallerand, de la Sablonnière, & Provencher, 2007; Gagné et al., 2003), physical education (Ntoumanis & Blaymires, 2003), and education (Guay, Mageau, & Vallerand, 2003) have confirmed the top-down effect especially at situational and contextual levels. For instance, Blanchard et al. (2007, Study 1) found that situational motivation assessed immediately after the first game of a basketball tournament was positively predicted by contextual motivation assessed before the tournament. In addition, contextual motivation assessed immediately after the first game predicted situational motivation assessed after the second game of the tournament. A second study replicated the findings of Study 1 over the course of a complete basketball season. Overall, these two studies provide support for the top-down effect postulated by Vallerand (1997).

Motivational outcomes

Finally, the HMIEM (Vallerand, 1997) posits that motivation leads to affective, cognitive, and behavioral consequences. A considerable amount of research has examined the link between the different forms of motivation and a variety of outcomes in sport including dropout (Pelletier et al., 2001; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002), sportspersonship orientations (Chantal, Robin, Vernat, & Bernache-Assollant, 2005; Donahue et al., 2006), and burnout (Cresswell & Eklund, 2005; Lemyre, Treasure, & Roberts, 2006). In line with SDT, results from these studies reveal that self-determined motivation (i.e., intrinsic motivation and identified regulation) leads to the most positive consequences, while non-self-determined motivation (i.e., external regulation and amotivation) is associated with negative outcomes.

Research reveals that there is also a lot of evidence to support the role of self-determined motivation in academic achievement (e.g., Guay & Vallerand, 1997; Ratelle et al., 2007) and performance on a motor task in physical education (e.g., Biddle & Brooke, 1992; Boiché et al., 2008; Trouilloud & Sarrazin, 2002). However, a paucity of work has examined the link between athletes' motivation and sport performance, especially at the situational level. Recently, Mouratidis, Vansteenkiste, Lens, and Sideridis (2008, Study 2) have examined the links between motivational variables and performance in the sport setting. Participants were 202 competitive athletes mostly at the national (72.6%) level. Contextual self-determined motivation (the average of the intrinsic and identified regulation subscales) and amotivation toward sport were assessed with an adapted version of the Sport Motivation Scale (Pelletier et al., 1995). Results revealed that self-determined motivation was not significantly associated with sport performance, while amotivation negatively predicted performance. The major limitation of this study concerns the evaluation of athletes' performance. Objective levels of performance were not assessed in the Mouratidis et al.'s study. Instead, performance reflected coaches' perceptions of athletes' performance. Clearly, it is preferable to use an objective situational performance measure based on actual results obtained by athletes rather than subjective perceptions provided by the coaches.

In two studies with adolescent elite tennis players (Study 1) and swimmers (Study 2), Gillet, Vallerand, and Rosnet (2009) used cluster analyses to identify athletes' motivational profiles at the

beginning of a competitive season, and then investigated whether these profiles related to objective measures of performance over the course of the season. Results of both studies revealed that the least self-determined motivational profile led to the worst subsequent sport performance. Results from a research conducted by Gillet, Berjot, and Paty (2009) also showed that the motivational profile characterized by the highest levels of non-self-determined motivation and amotivation both at the contextual and situational levels was conducive to the worst performance. Results from these different sport investigations (i.e., Gillet, Berjot, et al., 2009; Gillet, Vallerand, et al., 2009; Mouratidis et al., 2008) provided support for SDT and past research (e.g., Boiché et al., 2008) that showed that non-self-determined extrinsic motivation and amotivation were associated with low levels of performance.

Chantal, Guay, Dobreva-Martinova, and Vallerand (1996) have also analyzed the relationships between sport motivation and performance with a sample of 98 Bulgarian international elite athletes. Results showed that non-self-determined extrinsic motivation and amotivation were positively related to athletes' performance. These results were not in accordance with past studies conducted in sport (e.g., Mouratidis et al., 2008) and educational (e.g., Guay & Vallerand, 1997) contexts. According to Chantal et al. (1996), the specific cultural context, which prevailed in Bulgaria at the time of the study, might have fostered athletes' non-self-determined motivation. It is also possible that the various methods used by the authors to conduct their analyses (e.g., score of self-determined motivation without considering non-self-determined motivation, cluster analyses with the different forms of self-determined and non-self-determined motivation) may explain the contradictory results regarding the motivation–performance relationship in sport. Thus, future research is needed to better understand the role of athletes' motivation in sport performance. Although, findings from the investigations conducted in sport (e.g., Gillet, Vallerand, et al., 2009) and physical education (e.g., Biddle & Brooke, 1992) settings are encouraging, few studies have looked at the role of situational motivation in sport performance. We suggest that it is important to conduct additional research because it could identify some of the immediate motivational determinants of sport performance.

The present research

Based on the HMIEM (Vallerand, 1997) and past studies described above, we propose a motivational model of sport performance. First, athletes' perceptions of coach autonomy support should positively influence their self-determined sport motivation (i.e., at the contextual level). Much research supports the impact of the coach's (or other important individuals') autonomy support on either intrinsic motivation or self-determined motivation (e.g., Amorose & Anderson-Butcher, 2007; Hagger et al., 2007; Pelletier et al., 2001). Second, based on the top-down effect (Vallerand, 1997), athletes' self-determined contextual motivation should positively affect their self-determined situational motivation for a competitive event. In other words, if athletes generally display a self-determined motivation toward their sport activity, they will likely exhibit self-determined motivation during a specific competition relevant to their sport activity. Research has clearly supported the validity of this link (e.g., Blanchard et al., 2007, Studies 1 and 2; Ntoumanis & Blaymires, 2003). Finally, athletes' self-determined motivation at the situational level should predict sport performance during a competition. Much research in sport (e.g., Gillet, Vallerand, et al., 2009) and education (e.g., Boiché et al., 2008; Guay & Vallerand, 1997), has supported the link between self-determined motivation and performance at the contextual level. In addition, other experimental research has shown that inducing motivational states akin to intrinsic motivation and self-determined motivation produced better situational performance and creativity on experimental tasks (e.g., Amabile, 1985; Condry, 1977; McGraw & McCullers, 1979). Although researchers have started to devote empirical attention to the situational motivation–performance relationship in sport settings (e.g., Gillet, Berjot, et al., 2009), no sport research has, however, looked at the direct influence of self-determined motivation on objective performance at the situational level. Finally, no previous sport research has included contextual and situational motivation as well as contextual determinants (e.g., coach autonomy support) and situational consequences (e.g., performance). Thus, while a number of studies have empirically demonstrated the validity of one or more paths of the postulated model, no research has tested the complete model. We believe that this model is novel and could lead to important theoretical and applied benefits. Indeed, such research would allow us to test crucial elements of the HMIEM while at the same time providing a blueprint of steps to take in order to facilitate sport performance. We hypothesized that the proposed motivational model would be supported.

Method

Participants

Participants were 101 French judokas (32 females and 69 males) engaged in a national judo tournament involving 250 athletes. Their age ranged from 14 to 43 years (2 athletes did not specify their age) with a mean age of 18.47 years (SD = 5.13 years).

Procedure

Permission to carry out the study was obtained from the event organizers. Participation was voluntary and required the completion of three questionnaires. The participants were informed that there were no right or wrong answers and that their responses would be kept confidential. They were also offered the option to withdraw from the investigation at any time. Each participant gave informed consent before completing the questionnaires that were administered one to two hours before the beginning of the competition. Questionnaires took approximately 15 min to complete. Motivation and performance were not assessed at the same time. Indeed, motivation was assessed after the weighting session (i.e., before the competition) and performance took place later when the athletes competed. All judokas did not begin their competition at the same time because there were a lot of competitors. Generally, athletes began their competition between one and two hours after the weighting session. Each athlete's sport performance was obtained via the French Judo Federation at the end of the overall competition.

Measures

Perceived autonomy support

Participant's perceptions of autonomy support from their coach were evaluated using the "Échelle des Perceptions du Soutien à l'Autonomie en Sport" (EPSAS; Gillet, Vallerand, Paty, Gobancé, & Berjot, in press) which is a French adaptation of the Perceived Autonomy Support Scale for Exercise Settings (Hagger et al., 2007) to the sport setting. This tool is a 12-item self-report measure assessing the extent to which athletes perceive their coach to be autonomy-supportive. Answers are given on a Likert scale ranging from "*strongly disagree*" (1) to "*strongly agree*" (7). Results from two studies conducted by Gillet et al. (in press) revealed adequate psychometric properties of the EPSAS. Specifically, support for the unidimensional structure, the internal consistency, the test–retest reliability, and the construct validity of the scale was obtained with two samples of competitive athletes ($N = 134$ and $N = 203$). In the present study, the Cronbach alpha for perceived autonomy support was adequate ($\alpha = .91$).

Contextual motivation

Athletes' motivation toward judo was evaluated using the French version of the Sport Motivation Scale (Brière, Vallerand, Blais, & Pelletier, 1995). The response scale has a Likert format ranging from 1 (Does not correspond at all) to 7 (Corresponds exactly). This questionnaire measures seven types of motivation, namely intrinsic motivation to know, intrinsic motivation to accomplish things, intrinsic motivation to experience stimulation, identified regulation, introjected regulation, external regulation, and amotivation. The seven subscales can be combined into a composite index of self-determined motivation (e.g., Ryan & Connell, 1989; Vallerand, 1997). This index reflects the extent to which athletes' motivation is more or less self-determined. It was created by summing each intrinsic motivation item multiplied by +2, each identified regulation item by +1, each introjected and external regulations item by −1, and each amotivation item by −2. Thus, higher scores on this index reflect a more self-determined motivation. Past investigations confirmed the factor structure of the Sport Motivation Scale and revealed adequate levels of internal consistency, satisfactory test–retest reliability, and construct validity (see Pelletier & Sarrazin, 2007, for a review). Internal consistencies for the seven subscales in the present research were all satisfactory: intrinsic motivation to know ($\alpha = .83$), intrinsic motivation to accomplish things ($\alpha = .85$), intrinsic motivation to experience stimulation ($\alpha = .75$), identified regulation ($\alpha = .71$), introjected regulation ($\alpha = .72$), external regulation ($\alpha = .80$), and amotivation ($\alpha = .80$).

Situational motivation

Athletes' situational motivation for the judo competition was assessed with the Situational Motivation Scale (Guay, Vallerand, & Blanchard, 2000). This scale measures four forms of motivation: intrinsic motivation, identified regulation, external regulation, and amotivation. Items are rated on a 7-point Likert scale ranging between 1 (Corresponds not at all) and 7 (Corresponds exactly). Results from past research in the sport domain have shown that this scale displayed adequate factorial structure and internal consistency (e.g., Standage, Treasure, Duda, & Prusak, 2003). The four subscales were also combined into an index of self-determined motivation. Thus, each item was weighted according to the position of the four forms of motivation on the self-determination continuum: +2 for intrinsic motivation items, +1 for identified regulation items, −1 for external regulation items, and −2 for amotivation items. In the present study, all internal consistencies exceeded Nunnally's (1978) criterion of .70 (i.e., alphas ranged from .73 to .85).

Sport performance

The official ranking for the competitive event served as an objective performance score in the present study. For the present judo competition, the system of competition was the elimination system with double "repechage".[1] It means that for all categories, the contestants were divided into two tables (A and B) by means of a draw, and an elimination system was used to produce two finalists. The winner of the final fight was ranked 1st and the loser of the final fight was ranked 2nd. As soon as the four participants of the semi-finals were identified (A1, A2, B1, and B2), all competitors defeated by A1 and A2 (from Table A) as well as by B1 and B2 (from Table B) took part in the repechage of their respective pools (i.e., Repechage A and Repechage B) according to the elimination system. The winner of the Repechage A fought against the loser of the semifinal in Table B (i.e., B1 or B2), and the winner of the Repechage B fought against the loser of the semifinal in Table A (i.e., A1 or A2) in order to avoid repeating a match between the same competitors. The two winners of those fights were placed 3rd and the two losers were placed 5th. The losers of the final repechage fights (A and B) were ranked 7th. Therefore, only the winner and the loser of the final fight (i.e., athletes ranked 1st and 2nd), as well as the competitors ranked 3rd, 5th, and 7th, appeared in the official ranking. We have thus considered that the losers of a fight in the Repechages A and B before the final repechage fights were ranked 9th. All athletes who won at least one fight in Tables A and B (but who did not reach the semi-finals) and who did not take part in the repechages, were ranked 11th. Finally, all athletes who did not win a fight in Tables A and B and who did not take part in the repechages, were ranked 13th.

For clarity purposes, the rankings were reversed so that high values reflected high performance. For instance, an athlete who is ranked 1st in the competition is given a score of 13 in the reversed ranking. Thus, the higher the competitive ranking (once reversed), the better the athletes' performance during the competition.

Data analysis

Because of the relatively small sample size in the present study, we did not test a latent variable model. Thus, the proposed model was tested through a path analysis using LISREL 8.30© (Jöreskog & Sörbom, 1996). It contained one exogenous variable (i.e., coach autonomy support) and three endogenous variables (i.e., contextual self-determined motivation, situational self-determined motivation, and sport performance). We used well established indices to assess model fit of the hypothesized model: the significance of the chi-square value (χ^2), the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), the Goodness of Fit Index (GFI), and the Root Mean Square Error of Approximation (RMSEA). The CFI compares the null model with the observed covariance matrix, to gauge the percent of lack of fit which is accounted for by going from the null model to the hypothesized model. The IFI gives an estimation of the relative improvement of the hypothesized model over a baseline model and is considered appropriate for relatively small sample sizes as in the present study. The GFI indexes the relative amount of the observed variances and covariances explained by the model. Finally, the RMSEA is a measure of error of approximation which estimates of how well the fitted model approximates the sample covariance matrix per degree of freedom. According to Tabachnik and Fidell (2001), the chi-square value should not be significant ($p > .05$), the CFI, IFI, and GFI should be .90 or higher, and the RMSEA should be .05 or lower, for a good model fit.

Results

Preliminary analyses and descriptive statistics

Inspection of the correlations among the contextual motivation subscales provided support for the self-determination continuum. Specifically, all correlations among the subscales revealed a simplex-like pattern, with stronger positive correlations between adjacent factors on the self-determination continuum and weaker correlations between more distal factors (see Table 1, for details). For instance, the correlation between intrinsic motivation and identified regulation ($r = .44$, $p < .001$) is stronger than that between intrinsic motivation and external regulation ($r = .10$, $p = .33$), and that between intrinsic motivation and amotivation ($r = -.13$, $p = .18$). The present results are in agreement with those obtained by Brière et al. (1995) and Pelletier et al. (1995). The correlations among the four situational motivation subscales were also inspected (see Table 1). Once again, it was found that the correlation between intrinsic motivation and identified regulation ($r = .67$, $p < .001$) was positive and higher than the other correlations. The lowest correlation involving intrinsic motivation was obtained with amotivation ($r = -.21$, $p < .05$), while the

[1] The term "repechage" is used by the International Judo Federation.

Table 1
Means, standard deviations, and correlations among the motivation subscales at contextual and situational levels.

Variables	M	SD	1	2	3	4	5	6	7	8
1. Contextual intrinsic motivation	5.19	.86								
2. Contextual identified regulation	4.32	1.11	.44***							
3. Contextual introjected regulation	5.25	1.19	.41***	.53***						
4. Contextual external regulation	3.06	1.39	.10	.32**	.11					
5. Contextual amotivation	1.58	.93	−.13	.11	−.10	.40***				
6. Situational intrinsic motivation	5.06	1.08	.49***	.41***	.31**	.16	.05			
7. Situational identified regulation	5.09	1.10	.44***	.38***	.29**	.19	−.01	.67***		
8. Situational external regulation	3.64	1.29	−.05	.19	.14	.30**	.33**	.15	.09	
9. Situational amotivation	1.75	.96	−.26**	−.12	.03	.18	.40***	−.21*	−.26**	.41***

*$p < .05$, **$p < .01$, ***$p < .001$.

correlation with external regulation ($r = .15$, $p = .14$) was positive and second in order of importance. These results provided support for the self-determination continuum.

The univariate distributions of the study variables were examined for normality (i.e., via skewness and kurtosis values and the Kolmogorov–Smirnov statistic). These variables were normally distributed, except for the performance score (Kolmogorov–Smirnov statistic, $p < .01$; skewness = −.52, kurtosis = −.97). Means and standard deviations, as well as the correlation matrix of the study variables are presented in Table 2. An inspection of the correlations revealed that perceived autonomy support was significantly and positively related to contextual self-determined motivation. In addition, contextual self-determined motivation toward judo was positively associated with situational self-determined motivation for the competitive event, which was also positively correlated to athletes' performance.

Main analyses

Since the performance variable was not normally distributed, the asymptotic covariance matrix (Jöreskog, 1990) was used as input for the LISREL program and analyzed by the generally weighted least squares method of estimate. This method is more robust to deviations from normality compared with the maximum likelihood method (Jöreskog, 1990) because it does not assume multivariate normality. Several authors (e.g., Browne, 1984) have suggested that the use of this method can be problematic, especially when models with a large number of indicators are estimated with small sample sizes. However, Jöreskog and Sörbom (1996) have proposed that a minimum sample size of $(k + 1)(k + 2)/2$, where k is the number of indicators in a model, should be available for estimation of the weight matrix. The minimum sample size for estimation of the weight matrix was attained in the present study, because of the relatively low number of variables in the hypothesized model. Paths were specified according to the hypotheses mentioned above. Results revealed a satisfactory fit of the model to the data. Indeed, the chi-square-value was not significant, χ^2 (df = 3, $N = 101$) = 3.79, $p = .29$, and the other fit indices were also satisfactory: CFI = .96, IFI = .97, GFI = .98, and RMSEA = .05.

As shown in Fig. 1, perceptions of coach autonomy support were significantly and positively related to contextual self-determined motivation ($\gamma = .32$). The path between contextual self-determined motivation and self-determined motivation at the situational level was also significant and positive ($\beta = .55$). Finally, situational self-determined motivation had a positive influence on athletes' performance ($\beta = .22$). In other words, the more the athletes displayed self-determined situational motivation toward the competition, the better their performances were during the subsequent competitive event. Sobel (1982) tests supported a statistically significant indirect effect from coach autonomy support to situational motivation ($\gamma = .13$, $p > .05$) via contextual motivation ($z = 2.83$, $p < .01$). Sobel tests also showed that the indirect effect (via situational motivation) of contextual motivation on sport performance ($\beta = -.14$, $p > .05$) was statistically significant ($z = 2.37$, $p < .05$). These results provide additional support for the hypothesized model.[2]

Table 2
Means, standard deviations, and correlations among the study variables.

Variables	M	SD	1	2	3
1. Perceived coach autonomy support	5.76	.89			
2. Contextual Self-determined motivation	7.40	3.03	.32**		
3. Situational self-determined motivation	8.09	4.26	.29**	.52***	
4. Athletes' performance[a]	8.14	3.90	.09	.00	.20*

*$p < .05$, **$p < .01$, ***$p < .001$.
[a] The higher the score, the more positive the performance.

Discussion

The main purpose of this study was to test a model that posited that coaches' support of their athletes' autonomy positively related to their self-determined motivation toward judo in general (i.e., contextual level). In turn, contextual self-determined motivation was hypothesized to be associated with athletes' self-determined motivation at the situational level prior to a competition that was hypothesized to subsequently predict higher levels of sport performance during the competition. Results from structural equation modeling analyses supported the hypothesized model and revealed that all hypothesized paths were significant. These findings lead to a number of implications.

First, the results from the present study provided support for the HMIEM (Vallerand, 1997) on a number of counts. Thus, results revealed that perceptions of autonomy support were positively associated with contextual self-determined motivation. In other words, the more the athletes perceived their coach to be autonomy-supportive, the more their motivation for practicing their sport activity was self-determined. These results are consistent with previous research in sport (e.g., Conroy & Coatsworth, 2007; Pelletier et al., 2001) and exercise (e.g., Edmunds et al., 2006) settings which have shown that perceived autonomy support was positively linked to self-determined motivation. Second, results from the present study also provided support for the top-down effect proposed by Vallerand (1997) between motivation at the contextual and situational levels. Indeed, results demonstrated that situational self-determined motivation was significantly and positively predicted by athletes' self-determined motivation toward their sport activity. This means that the more self-determined one's motivation in a specific context (i.e., education, work, sport), the more self-determined one's motivation will be in a specific situation relevant to this setting. Finally, by showing that situational self-determined

[2] A total of three alternative models were tested and all yielded lower fit values than the hypothesized model. The results from these analyses can be obtained through the first author.

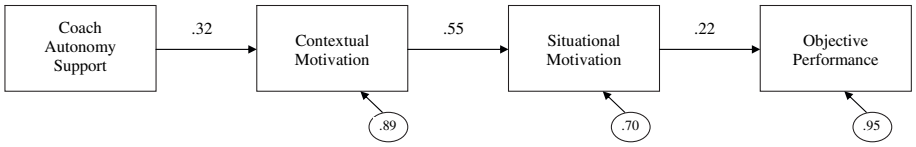

Fig. 1. Results of the structural equation modeling. *Note*. All coefficients were standardized and were significant ($p < .05$).

motivation assessed before the competition positively predicted athletes' performance during the competition, the present findings also supported the HMIEM. These results are in line with our hypotheses and recent research on the role of self-determined motivation in the prediction of performance in the domain of education (e.g., Boiché et al., 2008; Ratelle et al., 2007).

The present results also provided support for SDT postulates and many other investigations in the sport context to the effect that self-determined motivation predicts positive consequences as diversified as sportspersonship orientations, behavioral persistence, and well-being (e.g., Donahue et al., 2006; Pelletier et al., 2001; Sarrazin et al., 2002; for reviews, see Vallerand, 2007a, 2007b).

No research to date has looked at the role of situational motivation in the performance of elite athletes engaged in a national competition. Thus, the present findings have some implications for a better understanding of the determinants of athletes' performance. Indeed, the present results are the first to show that approaching an upcoming competition for reasons that are freely chosen and coherent with one's value system (i.e., in a self-determined way) instead of being regulated by factors external to the self (i.e., in a non-self-determined way) has a positive influence on subsequent objective sport performance. The present results also suggest that adopting an autonomy-supportive coaching style is effective for facilitating athletes' general sport self-determined motivation (i.e., at the contextual level) and thus, indirectly, for fostering athletes' performance in a national competitive event. Therefore, coaches who genuinely consider athletes' opinions toward their sport activity and acknowledge their feelings and perspectives would be more likely to promote athletes' general sport self-determined forms of motivation and, in turn, sport performance in their athletes. It would thus appear that coaches' autonomy support plays a key role in athletes' performance.

In light of these results, we believe that future research is needed regarding how best to promote coaches' autonomy-supportive interpersonal style. Past investigations in education (Reeve, Jang, Carrell, Jeon, & Barch, 2004) and exercise (Edmunds, Ntoumanis, & Duda, 2008) settings have demonstrated that authority figures can be taught how to be more autonomy supportive. For instance, Edmunds et al. (2008) have followed the guidelines of Reeve (2002) to create an autonomy-supportive teaching style in a 10-week exercise program. Results revealed that it is possible to create autonomy-supportive environments that are conducive to self-determined forms of motivation. Further intervention studies in the sport domain are still needed to extend these findings to the coaching context. Such research could lead to the development of effective coach training programs.

There are some limitations with the present research that should be noted. First, the present research did not use an experimental design. Thus, future investigations using experimental designs should be conducted to replicate and confirm the causal role of situational motivation in sport performance. A second limitation of the present study deals with the fact that the present sample was only composed of judokas engaged in a national competition. Future research is needed to replicate the present findings with athletes from different sports and levels of competition (e.g., Olympic and professional levels). Third, it is important to note that the small sample size ($N = 101$) did not allow us to test the invariance of our model across gender. Therefore, future research with larger samples across a variety of sport activities should replicate these findings. Fourth, due to our small sample size, we used the self-determination index both at contextual and situational levels. Future research examining the role of specific behavioral regulations (e.g., intrinsic motivation) on situational performance is thus needed. Fifth, we did not control for athletes' past performance and ability differences. It might have been useful to control for these variables in order to strengthen the validity of our conclusions, especially concerning the influence of situational motivation on performance. Finally, an examination of the amount of variance explained in sport performance by athletes' self-determined motivation at the situational level revealed that the percentage of variance explained was small (i.e., 5%). While these findings are comparable to those obtained in other fields (e.g., Guay & Vallerand, 1997), it should be kept in mind that even a small performance increase in elite sport is meaningful as it may eventually make the difference between victory and defeat.

In sum, we believe that the present findings contribute to our understanding of the psychological processes through which coaches' autonomy support influences self-determined motivation and sport performance. Future research is needed, however, in order to investigate how social factors and motivation can best combine in leading to the highest levels of performance.

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