

Cohesiveness, coach's interpersonal style and psychological needs: Their effects on self-determination and athletes' subjective well-being

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ARTICLE INFO

Article history:

Received 12 December 2007

Received in revised form

10 December 2008

Accepted 8 February 2009

Available online 20 February 2009

Keywords:

Cohesiveness

Controlling interpersonal style

Psychological mediators

Self-determination in team sports

Subjective well-being

ABSTRACT

Goal: The goal of this study was to test the impact of cohesiveness and coaches' controlling interpersonal style on athletes' perceptions of autonomy, competence and relatedness. A contextual motivation sequence [Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 29 (pp. 271–360). New York: Academic Press.] was tested whereby social factors supporting the satisfaction of basic needs would increase the level of sport self-determination, which in turn, should predict subjective well-being in athletes.

Method: The proposed sequence was tested with 197 basketball players using structural equation modeling. The hypothesized model was supported.

Results: Perceptions of cohesiveness positively predicted the satisfaction of the basic needs. Perceptions of coaches' controlling interpersonal style negatively impacted feelings of autonomy. In turn, psychological needs predicted self-determination in sports ensuing greater sport satisfaction and positive emotions in sports. Tests of indirect effects also supported the mediating role of psychological needs and self-determination.

Conclusion: Results are discussed in light of the different types of motivational antecedents and their influence on the psychological needs.

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Participating in sports has been found to provide a number of opportunities ranging from physical activity, personal and social development, as well as psychological well-being (Moore & Werch, 2005). Different social factors susceptible to encourage the motivation to participate in sports activities have been identified. Parents have been shown to play an important role. As well, the coach's approach has a direct impact on athletes' motivation. A social factor that has been less studied pertains to the team dimension. With respect to team sport, an athlete's feeling that he and his team are aiming to reach the same goals, and the feeling that they are united and cohesive in this endeavour would appear to be an important determinant of motivation. Thus, the main purpose of this study will be to test a new motivational determinant, namely, team cohesiveness, and its role in the sequence whereby social factors impact psychological need satisfaction, self-determination, and subjective well-being (Vallerand, 1997). More

specifically, the role of cohesiveness and the coach's interpersonal style were tested to predict the three psychological needs in a sample of basketball players. Fulfillment of the psychological needs should lead to more self-determination in sports, which in turn should predict subjective well-being in the sport domain.

Motivational determinants

Research indicates that when social factors are respectful of one's autonomy, self-determination ensues. When social factors undermine autonomy, lower levels of self-determination are expected. More specifically, it has been shown that individuals in supervisory positions (e.g. teachers, coaches, parents) can affect their subordinates' self-determined motivation (Deci & Ryan, 1987; Grolnick, 2003; Reeves, 2002).

In the context of sports, one important social factor pertains to the coach's interpersonal relationship with the athlete (Vallerand & Losier, 1999; Vallerand & Rousseau, 2001). According to Cognitive Evaluation Theory (Deci & Ryan, 1987), coaches' behaviors can be perceived in light of two interacting styles: a controlling style and

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an autonomy-supportive style. Coaches who use a controlling style will interact with their athletes in a highly directive manner and will tend to coerce their athletes to behave in a way that they think is right. By contrast, coaches who value and exhibit autonomy-supportive behaviors value the players' input and will allow their athletes to make choices within reasonable limits. Research in the sport domain reveals that athletes who feel that their coaches are controlling tend to report less intrinsic motivation and identified regulation, and more external regulation and amotivation than those who feel that their coaches are autonomy-supportive (Pelletier, Fortier, Vallerand, & Brière, 2001; Pelletier et al., 1995). Thus, the impact of coaches' interpersonal behaviors on athletes' motivation is well supported by research results. However, the impact of social factors, and more particularly, the interpersonal style on all three needs measured simultaneously is still scarce.

Another social factor which shows promise within a motivational contextual sequence is the intra group dynamic, and more specifically, team cohesiveness. Recent work from Ntoumanis et al. show that the peer motivational climate within sports activities does play an important role on affective and behavioral responses in these young athletes (Ntoumanis & Vazou, 2005; Ntoumanis, Vazou, & Duda, 2007; Vazou, Ntoumanis, & Duda, 2006). Moreover, team cohesiveness has been largely used as a sport-related concept to study intra group dynamic. It has been defined as "the dynamic process reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of members' affective needs" (Carron, Brawley, & Widmeyer, 1998, p. 213). In the context of sports, high levels of team cohesiveness have been associated with more favorable attitudes toward exercise and positive affect (Courneya, 1995), better performance (Carron, Colman, Wheeler, & Stevens, 2002), and greater persistence and attendance (Spink, 1995). Williams and Widmeyer (1991) further showed that high levels of task cohesion amongst teams of elite national collegiate female golfers predicted enhanced motivation. However, no study has empirically examined the role of intra group dynamic in predicting perceptions of autonomy, competence, and importantly, relatedness. Given that peer relationships within a team is instrumental in allowing a team to attain important goals while satisfying the team members' affective needs, it is anticipated to act as a key predictor in the proposed motivational sequence.

Psychological needs

Based on self-determination theory, three basic psychological needs appear relevant: autonomy, competence, and relatedness (Deci & Ryan, 1985, 1991; Ryan & Deci, 2002). The need for autonomy refers to the desire to be self-initiating in the regulation of one's actions and to be the origin of one's behaviors (de Charms, 1968; Deci & Ryan, 1985). The need for competence implies that individuals want to interact effectively with their environment in order to feel competent in producing desired outcomes and preventing undesired ones (Connell & Wellbourn, 1991). Finally, the need for relatedness pertains to the desire to feel connected with significant others (Baumeister & Leary, 1995; Richer & Vallerand, 1998). This particular need has received increasing attention over the past few years. Theorists propose that individuals develop most optimally within an environment that fosters a friendly and warm atmosphere (Deci & Ryan, 1991; Grolnick, 2003). Satisfaction of this need has been shown to be essential in ensuring psychological well-being (Sheldon, Elliot, Kim, & Kasser, 2001). To the extent that social factors foster perceptions of competence, autonomy, and relatedness in individuals, self-determined forms of motivation (i.e., intrinsic motivation as well as identified and integrated regulations) tend to be enhanced, whereas non-self-determined

types of motivation (i.e., introjected and external regulation, and amotivation) tend to be diminished (see Vallerand, 1997). A number of studies have provided support for the relationship between social factors and self-determination in sports (see Vallerand, 1997, for a review). As well, research results support the link between social factors, psychological needs, and self-determined motivation in sports, and more specifically with respect to perceptions of autonomy (Thompson & Wankel, 1980) and competence (Vallerand & Reid, 1984; Williams & Gill, 1995).

To this date, only a handful of studies have simultaneously tested the complete motivational sequence described in Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation. These studies have investigated how social factors predicted all three psychological needs, which in turn predicted self-determination, ensuring a number of outcomes (Hollembeak & Amorose, 2005; Ntoumanis, 2001; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Results from these recent studies support the mediating role of the three psychological needs between social factors and self-determination (Ntoumanis, 2001; Sarrazin et al., 2002). For instance, a study from Sarrazin et al. (2002) revealed that a task-involving climate (i.e., one in which the goal emphasized by the instructor is to master tasks, to solve problems, or to make progress accomplishing a task), in contrast to an ego-involved climate (i.e., one that encourages accomplishing a task to demonstrate one's ability), was the best predictor of perceptions of relatedness. Perceptions of autonomy and competence were also accounted for by a task-involving climate but to a lesser degree. Together, these findings support the link between a coach's interpersonal approach and the three psychological needs. Yet, social factors such as team cohesiveness, which pertain to the intra group and interpersonal dynamics taking place among athletes, have received less attention. While results from some studies support the link between team cohesion and motivation (Williams & Widmeyer, 1991), none have tested the link between team cohesiveness and basic need satisfaction and self-determined motivation.

Notwithstanding the importance of past findings, research investigating the impact of intra group dynamic on the psychological needs is warranted. Similarly, there is a need to further understand the social factors that predict perceptions of relatedness (Deci & Ryan, 1991; Grolnick, 2003). Therefore, its role within team sports should be understood more thoroughly.

Subjective well-being in sports

Several authors posit that self-determined motivation plays a crucial role in the well-being of individuals (Ryan & Deci, 2001; Vallerand, 1997; Vallerand & Losier, 1999). According to Ryan and Deci (2001), hedonic well-being refers to happiness, pleasure, and positive affect. In the sports domain, hedonic well-being can be viewed as an immediate consequence, and one that is easily reported and identified by athletes. In the present study, a measure of positive affect and satisfaction in sports was chosen to assess athletes' general affective feeling of well-being.

The present study

The main objective of this study was to examine the link between team cohesiveness, the coach's interpersonal style, and the three basic psychological needs. Second, a test of a full contextual motivation sequence was conducted as proposed in the hierarchical model (Vallerand, 1997). Accordingly, we tested the impact of social factors on perceptions of need satisfaction, which in turn, will affect self-determined motivation, ensuring various psychological consequences (i.e., positive emotions and satisfaction in sports). Within this sequence, need satisfaction and self-

determined motivation were expected to act as mediators in the associations between social factors and the consequences.

It was hypothesized that cohesiveness would be an important predictor of the need for relatedness. We anticipated that the more athletes feel that the team is united and working together to reach their goals, the more they would experience a sense of belongingness and closeness with their team members. In contrast, coaches' controlling interpersonal behaviors would hinder basic need satisfaction, evidenced by a negative link between perceptions of a controlling coaching style and perceptions of competence, autonomy, and relatedness. In turn, all three psychological mediators were hypothesized to predict self-determined motivation, ensuring a positive link with positive emotions and sport satisfaction.

Method

Participants

Two-hundred-and-seven participants (76 females, 122 males, 9 participants did not report their gender) ranging from 16 to 22 years of age ($M = 18$, $SD = 1.17$) participated in this study. Athletes were playing in an inter-cegep (i.e., equivalent of grade 12) basketball league in the Province of Québec, Canada. Their average number of years at playing basketball in a team was approximately 6 years, ranging from 3 months to 12 years.

Design and procedure

Participants were recruited during a basketball practice held within the first month of the game season. The athletes were informed that the purpose of the study was to investigate athletes' attitudes toward basketball. Those wishing to participate were invited to complete a questionnaire and to answer all questions as accurately and as honestly possible as there were no wrong or right answers. They were assured that their answers would be kept confidential and would serve for research purposes only.

Measuring instruments

Coach's controlling interpersonal style

Based on the work of Grolnick, Ryan, and Deci (1991), three items assessing the extent to which athletes perceive their coach as controlling (i.e., not supporting their autonomy) was used. An example of an item is "My coach acts in a controlling manner toward me". Participants were asked to rate how each of the items represented their coach's behavior on a 7-point Likert scale ranging from 1 (Disagree Completely) to 7 (Agree Completely). The Cronbach alpha obtained for this 3-item scale was .66.

Cohesiveness

It was assessed using the group integration-task subscale from the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985). Thus, four items assessing "group integration-task" and a fifth item, notably, "I think our team cohesion is poor" (reversed scoring) were included in the questionnaire. The group integration-task subscale assesses the extent to which the team is united in reaching the same goal. Amongst the four subscales of the GEQ, it was decided that the 'group integration-task' was most appropriate and relevant for a number of reasons. First, a very limited window of time was allowed for the athletes to participate in the study. Thus, based on this criterion, decisions had to be made to make the questionnaire as short as possible. The point in time at which this study was taking place thus became determinant. Early in a basketball season, emphasis is placed by the coaching staff on defining roles, developing team play, and conditioning. The

emphasis is on trying to win as many games as possible and less on developing social cohesion by having players participate in social outings. Second, the group-integration task subscale was deemed more relevant because of its specificity to other measured constructs. In short, since all of the variables presented in our model measured constructs in the basketball domain, we decided to focus on task cohesion because of its specificity with these constructs. In other words, social cohesion as it is measured in the GEQ would most likely predict relatedness in the social realm to a greater extent than to the sport domain.

Based on the following, it was deemed more appropriate to assess the task component of cohesion. However, task cohesion can be indexed with member's personal attraction to the group (the "I") as well as with member's perceptions as a whole (the "we"; Widmeyer, Brawley, & Carron, 1985). Since no games had been played at that point in time, to ask basketball players if they were happy with the playing time they were getting (item found in ATG-task subscale) seemed incorrect. More importantly, our interest was on how the group ("we") was fulfilling personal needs (Widmeyer, Brawley, & Carron, 1985, p. 15). Given this situation, we opted to measure task cohesion with the group-integration Task subscale of the GEQ.

When completing this scale, participants were asked to rate the extent to which each item concerned their team using a 7-point Likert scale ranging from 1 (Disagree Completely) to 7 (Agree Completely). A sample item is as follows: "Our team is united in trying to reach its goals for performance". Previous research supports the internal consistency of the GEQ (Carron, Prapavessis, & Grove, 1994; Carron et al., 1985). The internal reliability of this 5-item scale in the present study was acceptable (Cronbach alpha coefficient = .82).

Perception of need satisfaction

In line with SDT's framework and similar to past work (Deci et al., 2001; Gagné, Ryan, & Bargmann, 2003), perceptions of autonomy, competence and relatedness were assessed. Following the stem "Usually, when I play basketball", athletes were asked to respond to a 7-point Likert scale ranging from 1 (Disagree Completely) to 7 (Agree Completely) for eight items. An example of item measuring autonomy is: "I feel obligated to play" (reverse coded). A sample item for the perception of competence is "I feel that I am good". A sample item for the perceptions of relatedness is "Usually, when I play basketball, I feel appreciated by other players". The reliability coefficient for the three needs are .25 (correlation coefficient for autonomy), .76 for competence and .87 for relatedness.

The sport motivation scale (SMS; adapted from Pelletier et al., 1995 and Vallerand & O'Connor, 1991)

The scale was comprised of 16 items (the same four items repeated for each four questions) designed to assess an individual's level of motivation toward basketball. Four questions pertaining to: 1) the reasons why you play basketball in general, 2) why you play basketball games, 3) why you train by yourself and 4) why you train with your teammates. A 7-point Likert scale ranging from 1 (Disagree Completely) to 7 (Agree Completely) was used. Based on the motivation constructs identified by Deci and Ryan (1991, 2002), the four same types of motivation were measured for each question. The correlations observed between these four subscales reproduced a simplex pattern (Pelletier et al., 1995). A self-determined motivation index was derived by computing four separate autonomy indices using individual items of the subscales (Pelletier et al., 1995; Vallerand & Bissonnette, 1992). These four indices served as multiple indicators of the latent construct of self-determined motivation toward basketball. A self-determined motivation index consists of a summation of specifically weighted scores and is used to integrate the information from the different motivational subscales under one score of self-determination. In line with previous studies using the

index, weights were assigned to the motivational items according to their respective placement on the self-determination continuum (Ryan & Connell, 1989). There were four items for each of the motivational subscales, thus four indices were computed using the following formula: $[(2 \times \text{intrinsic motivation} + \text{identified regulation}) - (\text{external regulation} + 2 \times \text{amotivation})]$ (see Vallerand, 1997, for detailed information). Higher scores on the indices are reflective of more self-determined sports motivation. The mean alpha for the four self-determined indices is .81.

Subjective well-being

Subjective well-being in sports was assessed using two subscales, both comprised of three items each. The first subscale assessed the athletes' positive emotions experienced when playing basketball, while the second subscale assessed their degree of satisfaction with their sport (see Vallerand, 1997). When completing these subscales, participants were asked to indicate the extent to which each item corresponds to what they experience when playing basketball. Sample items from each subscale include: "I feel happy" (positive emotions) and "In general, I am very satisfied about what I experience in basketball" (sport satisfaction). Internal consistency estimates for both subscales were satisfactory (Cronbach alpha positive emotions = .85; Cronbach alpha sport satisfaction = .70). Both subscales were assessed using a 7-point Likert scale ranging from 1 (Disagree Completely) to 7 (Agree Completely).

Results

Data screening and preparation

All variables were examined for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis (Tabachnick & Fidell, 2001). Table 1 displays normality indices of skewness and kurtosis for all constructs. Inspection of univariate normality proved to be satisfactory, although the kurtosis value for relatedness was high but acceptable at 2.73. Altogether, 207 participants completed the questionnaire. Ten participants were excluded from the analyses because more than 20% of their data was missing, leaving 197 participants for the main analyses. A regression imputation procedure was used to replace the missing data (representing 0.4% of the total data file). Confirmatory factor analyses were performed on the measurement part of the model and showed adequate fit indices.

Main analyses

The adequacy of the hypothesized model was assessed through structural equation modeling using the EQS program (Bentler, 1990). The covariance matrix was used as input, and the parameter estimates were generated based on maximum likelihood (ML) estimation. The ML estimation procedure assumes normality of the data. Because of the normalized estimates of multivariate kurtosis

of 19.54, corrections for non-normality were used and robust statistics are reported.

To evaluate the overall fit of the model, we examined the Satorra-Bentler chi-square statistic, which should be non-significant. We also examined incremental fit indices such as the non-normed fit index (NNFI) and the comparative fit index (CFI), for which the conventional lower cut-off of acceptable fit of the model to the data is .90. The residual mean square of approximation (RMSEA) and its confidence interval (CI) were also used. Values smaller than .08 on the RMSEA indicate an acceptable fit of the model to the data, whereas values smaller than .05 represent good fit. Finally, the Lagrange Multiplier Test (LM Test) was used as a guide in identifying parameters initially constrained to zero that would contribute most to a significantly better fitting model should these parameters be freely estimated. The Wald Test was used to identify non-significant parameters in the model. Consistent with the caveats outlined by Byrne (1994), post-hoc model fitting was considered appropriate only when there was sound statistical, theoretical, and empirical justification to do so.

The variables representing the latent variables of the SEM model were computed by averaging the items (manifest variables) composing each latent variable. Inspection of the pattern of correlations among these computes provided preliminary support for the hypothesized associations. Table 1 presents the descriptive statistics and the correlations between the latent variables of the model. Fig. 1 displays the path coefficients of the full model. The S-B chi-square for the overall model was: $\chi^2 (288, N = 197) 441.15, p < .001$. Although the chi-square was significant, the other measures provided support for the hypothesized model. The CFI, adjusted CFI, and NNFI were, respectively, .891, .904, and .877 and the RMSEA was .061 (CI = .052–.070). Although the LM Test suggested other parameters to be added, no further parameters were added to the model. In fact, the addition of non-anticipated parameters in the model leads to an exploratory approach to model testing rather than to a confirmatory approach and diminishes the model's parsimony (Byrne, 1994; Jöreskog, 1993). Furthermore, the fit of the final model was considered adequate in the present context, in which sample size was not very large ($N < 500$) and the model tested was highly complex (Hu & Bentler, 1995). Moreover, the restricted RMSEA confidence interval obtained suggests that we can be very confident that the acceptable RMSEA value observed is a precise indicator of the fit in the population (MacCallum, Browne, & Sugawara, 1996).

As predicted, results showed that cohesiveness predicted perceptions of autonomy ($\beta = .29$), competence ($\beta = .22$), and relatedness ($\beta = .58$). Coaches' controlling interpersonal behaviors negatively predicted perceptions of autonomy ($\beta = -.30$), while it did not significantly predict perceptions of competence ($\beta = .01$), nor perceptions of relatedness ($\beta = -.06$). Results also revealed that perceptions of autonomy, competence, and relatedness all predicted self-determined sport motivation ($\beta = .64, \beta = .20$, and $\beta = .26$, respectively). Finally, self-determined motivation predicted both positive emotions ($\beta = .54$) and satisfaction ($\beta = .44$)

Table 1
Descriptive statistics and correlations between the latent constructs of the model.

	M	SD	SK	KU	1	2	3	4	5	6	7
1. Team Cohesion	5.10	1.22	-.034	-0.68	-						
2. Coach's Interpersonal Style	3.76	1.34	0.12	-0.59	.02	-					
3. Autonomy	5.72	1.26	-1.03	0.80	.15*	-.14	-				
4. Competence	4.63	1.35	-0.30	-0.41	.13	.04	.13	-			
5. Relatedness	5.70	1.12	-1.32	2.73	.48***	-.01	.18	.36***	-		
6. Motivation	10.84	4.06	-0.71	0.61	.25**	-.17	.40***	.24**	.39***	-	
7. Positive emotions	5.62	1.13	-0.73	0.17	.20**	.03	.23**	.26**	.38***	.43***	-
8. Satisfaction	5.20	1.14	-0.28	-0.55	.33***	-.07	.20**	.42***	.38***	.26***	.29***

Notes. M = Mean, SD = Standard deviation, SK = Skewness, KU = Kurtosis. * $p < .05$, ** $p < .01$, *** $p < .001$. All instruments were completed using 7-point Likert scales (1 = "do not agree at all", 7 = "very strongly agree").

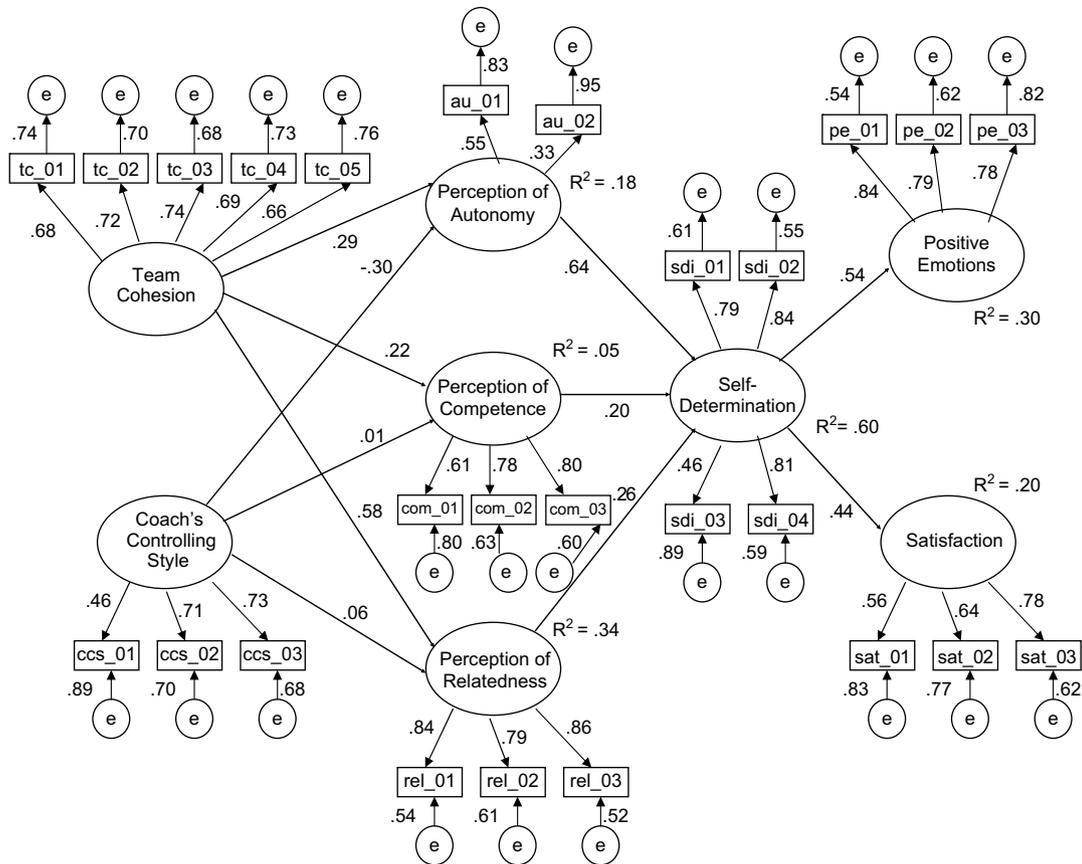


Fig. 1. Final model including the social factors, the psychological needs, self-determination and subjective well-being in sports.

experienced when playing basketball. Because of the non-significant associations between coach's controlling style and perceptions of competence and relatedness, a second model, which did not include these two relationships, was tested. A chi-square difference test indicated that the model did not significantly change after removing these associations ($\chi^2 \Delta (2) = 1.10, p = 0.557$).

Indirect effects

Indirect effects were investigated to further test the mediating role of needs and self-determination. Results of the indirect tests indicated that each of the three needs significantly mediated the impact of the two social variables on self-determination (cohesiveness: $\beta = .38, p < .05$; coach's controlling style: $\beta = -.21, p < .05$). Then, self-determination significantly mediated the effect of each of the three needs on positive emotions (autonomy: $\beta = .36, p < .05$; competence: $\beta = .11, p < .05$; relatedness: $\beta = .14, p < .05$) and satisfaction (autonomy: $\beta = .28, p < .05$; competence: $\beta = .09, p < .05$; relatedness: $\beta = .12, p < .05$). Finally, our three needs and self-determination were significant mediators in the associations between cohesiveness and the two consequences (positive emotions: $\beta = .21, p < .05$; satisfaction: $\beta = .17, p < .05$) and in the associations between the coach's controlling style and these two consequences (positive emotions: $\beta = -.11, p < .05$; satisfaction: $\beta = .09, p < .05$). Overall, these results support the role of needs and of self-determination in mediating the associations between the social factors and the two consequences

Discussion

The purpose of this study was to test the impact of cohesiveness and the coach's controlling style on perceptions of relatedness,

competence, and autonomy. Cohesiveness positively predicted all three mediators, but most strongly predicted perceptions of relatedness, followed by perceptions of autonomy then competence, although this last link was non-significant. Coaches' controlling interpersonal style was negatively associated with perceptions of autonomy. However, analyses yielded non-significant links between the coaches' controlling style and the two other psychological needs. Moreover, analyses revealed significant relationships with respect to all three psychological mediators and their link with self-determined motivation, which in turn, positively predicted positive emotions and satisfaction in sports. Results of the indirect tests also confirmed that psychological needs significantly mediated the impact of the social variables on self-determined motivation and on both consequences, whereas self-determination significantly mediated the impact of these social variables and of the needs on both consequences.

A closer examination of the relationship between cohesiveness and perceptions of relatedness is warranted since very few studies have examined how social factors predict perceptions of relatedness, specifically. Among the few that have, results from Sarrazin et al. (2002) revealed that a task-involving climate was an important predictor of perceptions of relatedness, whereas in the Ntoumanis (2001) study, results indicated that cooperative learning was an important predictor of this perception of social belonging. Recently, Buton, Fontayne, Heuzé, Bosselut, and Raimbault (2007) reported a strong link between the four subscales of team cohesiveness, but most importantly between group-integration task and relatedness. It is important to note that since most previous studies have investigated social factors pertaining to interpersonal relations or specific social agents (i.e., coaches' interactions with their athletes), this study aimed to investigate intra group influences on

motivational variables in the context of sport. Interestingly, task cohesiveness was a predictor of autonomy and competence as well. Research based on self-determination theory could further develop this issue in order to better capture the nature of the link between cohesiveness and one's feeling of competence and autonomy. As well, future research investigating the "social" dimension of sports and the dynamic nature of social cohesion across a season appear to be two promising lines of research in order to better understand the motivational orientation athletes develop toward their sport (Allen, 2003; Buton et al., 2007).

With respect to the coaches' controlling interpersonal style, it appears worthy to first underline that results yielded a significant relationship between coaches' controlling behaviors and perceptions of autonomy. Based on this association, it seems that athletes' perceptions of controlling behaviors undermined their feelings of autonomy. These results are in line with a number of experimental studies (Deci, Nezlek, & Sheinman, 1981; Grolnick & Ryan, 1987). Second, it is also important to note that although coaches' controlling interpersonal style predicted lower perceptions of autonomy, it did not predict lower levels of competence and relatedness. It would appear worthy to further investigate these links at different times during the season since it is possible that because the participants were tested at the beginning of the season, the impact of a controlling style on perceptions of competence and relatedness may not have been perceived by the athletes yet. However, the association with perceptions of autonomy does seem to make sense since the coach is aiming to build structure in the team at this early point in the season.

It would also seem plausible to test the role of potential moderators of this relationship. Age, maturity, as well as the level of general motivation could potentially moderate the impact of more controlling approaches on the psychological mediators and hence the motivation in sports. Perhaps, individuals who display high levels of global self-determined motivation (i.e., high self-determination in their life in general and greater levels of satisfied global needs), may be less influenced by a controlling approach since they may have freely chosen the activity and strongly believe that the activity is something they want to do in order to become the person they aim to be. In a sense, they may have the psychological resources necessary to block information and feedback that are not coherent with their view of themselves. More research is needed to test these hypotheses.

In line with the hierarchical model (Vallerand, 1997), all three psychological needs predicted self-determined motivation. More specifically, findings revealed that perceptions of autonomy represented the most important predictor of self-determined motivation in sports. This result is in line with those of previous studies where perceptions of autonomy were found to be the most important predictor of self-determination (Sarrazin et al., 2002). With respect to the relationship between perceptions of relatedness and self-determined motivation, the Sarrazin et al. (2002) study yielded no significant relationship between the two constructs, while the Ntoumanis (2001) study revealed moderate relationships (ranging from .11 to .18) for intrinsic, identified, and introjected regulations. In the present study, perception of relatedness was the second most important predictor of self-determined motivation. As for the link between perceptions of competence and self-determined motivation, it was strong and consistent in all three studies, including the present one (Ntoumanis, 2001; Sarrazin et al., 2002). In sum, it definitely appears that all three psychological needs are related to self-determined motivation. In most studies, moderate to strong links are reported. However, since the strength of the relationships varies from one study to the other, it is difficult to draw definite conclusions on the exact role that can be attributed to each one of the three

needs. It is possible that in some contexts, autonomy and competence may be more important (e.g., individual sports), whereas in other social situations, competence or relatedness may take more prominent roles in the prediction of self-determination (e.g., team sports). Therefore, future research should examine whether the specificity of the context is responsible for the variations in the strength of the relationships between the three needs and self-determination as was noted in the different studies reported herein.

The present investigation also included an indicator of subjective well-being. Self-determination predicted emotions and satisfaction in sport. Conditions within sports activities that lead to positive emotions and satisfaction should be among the researchers', coaches', and parents' priorities. An important percentage of our youth population is not engaging in sports activities and thus we need to better grasp the factors that will attract them to sports activities and encourage their long term involvement (Finn, Johannsen, & Speck, 2002; Moore & Werch, 2005). The motivational sequence proposed in the hierarchical model (Vallerand, 1997) is informative in that respect, one for which we found support in the present study. It thus represents a valuable tool to guide future research.

Future research and conceptual integration

This study provided evidence for the complete motivational sequence proposed in the hierarchical model. Interesting directions for future studies can be drawn on the basis of the present research. First, all variables were measured using self-reported instruments in a cross-sectional design. Undeniably, a longitudinal design to test the motivational sequence is warranted. Second, reliability analyses revealed low indices for two scales, notably perceptions of autonomy and coach's controlling interpersonal style. Therefore caution in interpreting associations for these two scales is warranted. In that sense, it is important to underline that a low reliability estimate can attenuate the relationship between the variables (Schmitt, 1996). Nevertheless, prior research, which confirmed the association between coaches' behaviors and perceptions of autonomy (Deci et al., 1981; Grolnick & Ryan, 1987), reassures us on the reliability of the associations observed in the present study. Nonetheless, the field of research would benefit from further exploration of these questions since similar low coefficients have been obtained in the past (see Gagné et al., 2003). In view of future research, one should consider using the recent validated Need Satisfaction in Exercise Scale (Wilson, Rogers, Rodgers, & Wild, 2006). Finally, one of the key contributions of the present study involves bringing together the self-determination literature with the study of a specific intra group process, namely cohesiveness. To pursue in this vein, future research could further investigate the group-level correlates that predict need satisfaction and self-determination. For instance, group research has revealed that feeling valued and respected within the group predicts an enhanced identification with the group, which in turn leads to self-motivated and intrinsic behavior to do well for this group (e.g., greater extra-role behaviors; Tyler & Blader, 2003). On the basis of these findings, it appears particularly interesting to investigate, in the context of team sports, the impact of these intra group variables on self-determination more specifically.

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