

## The role of self-determination in the relationship between social support and physical activity intentions

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### Abstract

Using the hierarchical model of intrinsic and extrinsic motivation (HMIEM) and self-determination theory as theoretical frameworks, the purpose of the present study was to assess the role of motivation-related variables in the relationship between perceptions of social support and intentions to be physically active. Undergraduate students completed surveys assessing perceptions of social support, psychological needs satisfaction, self-determination, and future exercise intentions. Model fit with the data was examined and was considered acceptable, indicating that social support was positively related to the satisfaction of psychological needs, which, in turn, was related positively to self-determination and then to physical activity intentions.

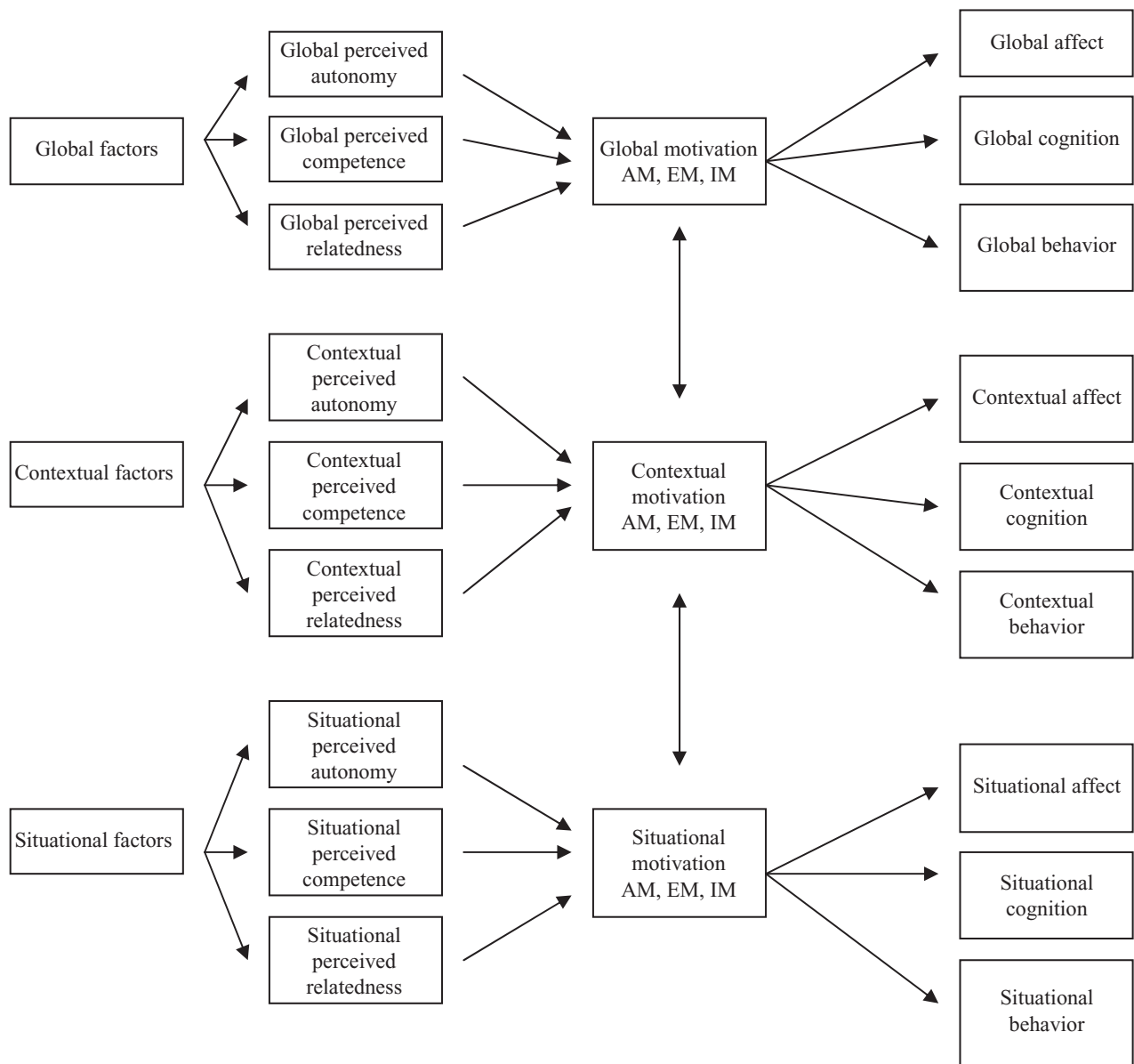
According to Lox, Martin Ginis, and Petruzzello (2006), social support represents “the most important type of social influence in exercise and other physical activity settings” (p. 106), and it plays a vital role with respect to other health behaviors (e.g., medical adherence, diet; also see Cohen, Gottlieb, & Underwood, 2000; Holt & Hoar, 2006). Definitions of social support are wide-ranging and multidimensional. For example, as Holt and Hoar summarized, the examination of social support can focus on structural (e.g., social support networks), functional (e.g., degree of support actually received), and perceptual (e.g., degree of support perceived by an individual) components. Overall, an individual’s perception about the availability of support appears to be the most potent social support variable with respect to health behaviors (Cohen et al., 2000).

A review of the literature pertaining to perceptions of social support and physical activity demonstrates that these two constructs are inextricably and, for the most part, positively linked. For example, Holt and Hoar (2006) depicted physical activity as an instrumental outcome influenced by the social support process. More recently, researchers provided further evidence supporting this positive relationship in a variety of populations spanning youth through older adults (King, Tergerson, & Wilson, 2008; Orsega-Smith, Payne, Mowen, Ho, & Godbey, 2007; Sharma et al., 2009).

Beyond this, other researchers have encouraged moving toward a greater understanding of the underlying mechanisms linking social support to health outcomes (Cohen et al., 2000).

A useful model to examine potential mechanisms linking social support and physical activity is the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 1997, 2001; see Figure 1). In essence, Vallerand (1997) proposed that motivational processes mediate relationships between social factors and a range of cognitive/affective/behavioral outcomes. In the present study, the variables of interest include perceptions of social support (i.e., a social factor) and physical activity intentions (i.e., a cognitive outcome).

At its core, the HMIEM is based on the principles of self-determination theory (SDT; Deci & Ryan, 1985, 2000). In SDT, Deci and Ryan contend that the assessment of motivation requires consideration of amotivation (i.e., a lack of motivation), extrinsic motivation, and intrinsic motivation. Extrinsic motivation (i.e., participating in a behavior for reasons other than pleasure or satisfaction) can be further subdivided into four regulatory perceptions, including external regulation (i.e., participating in physical activity to obtain a tangible reward), introjected regulation (i.e., feeling obliged to participate in physical activity), identified regulation (i.e.,



**Figure 1** Hierarchical model of intrinsic and extrinsic motivation. Adapted from Vallerand (2001), p. 266. Used with permission from Human Kinetics (Champaign, IL).

being physically active to achieve a specific objective), and integrated regulation (i.e., exercising because it is part of one's identity or who he or she is). Likewise, intrinsic motivation (i.e., participating in a behavior because it is enjoyed or provides satisfaction) is further considered in terms of the degree to which an individual derives enjoyment from learning, accomplishing, or deriving stimulation from the activity (Vallerand, 2007).

Vallerand (2007) proposed that the degree of perceived intrinsic self-determination leads directly to the experience of positive outcomes. In the context of the current study, this

translates into the hypothesis that individuals will be likely to indicate strong intentions to be physically active when motivation is more self-determined. This positive connection between the degree of self-determination and intention to be physically active is supported by previous research with both youth (e.g., Standage, Duda, & Ntoumanis, 2003) and adult populations (e.g., Thøgersen-Ntoumani & Ntoumanis, 2006; Wilson & Rodgers, 2004).

Vallerand (2007) also postulated that motivation is impacted by social factors (e.g., social support) and that the social-factor/motivation relationship is mediated by

psychological needs identified by Deci and Ryan (1985, 2000). These include the need for relatedness (i.e., need to belong), competence (i.e., need to be capable to obtain a desired outcome), and autonomy (i.e., need for personal control over behaviors).

Previous investigations of Deci and Ryan's (1985, 2000) propositions and Vallerand's (1997) model centered on the role of autonomy support (Edmunds, Ntoumanis, & Duda, 2006; Wilson & Rodgers, 2004). An environment supportive of autonomy is one in which more self-determined regulations are promoted (i.e., intrinsic motivation, identified regulation) and include behaviors that allow greater control for the individual (Deci & Ryan, 1985). Wilson and Rodgers demonstrated that the perception that friends support one's autonomy was positively related to identified regulation for exercise, which was subsequently related to greater intention to engage in physical activity. Edmunds et al., including an additional step in their study, found that the relationship between perceptions of autonomy support and intrinsic motivation was mediated by the degree to which the need for competence was satisfied.

We briefly summarize the extant literature through four points, leading to the purpose of the present study. First, there is strong evidence to suggest a positive relationship between perceptions of social support and exercise cognitions, although the underlying mechanisms of this relationship have yet to be fully elucidated. Second, the HMIEM (Vallerand, 1997) allows for a specific prediction that motivational processes may mediate the links between social support and exercise cognitions. Third, a specific form of support (i.e., autonomy support) has previously been shown to be relevant in the exercise setting with respect to the variables examined in the present study. Fourth, however, this type of support is representative of only a subset of potential supportive behaviors relevant to the exercise setting.

Consequently, using the HMIEM (Vallerand, 1997) and SDT (Deci & Ryan, 1985) as theoretical frameworks, the purpose of the present study is to assess the role of motivation-related variables in the relationship between perceptions of social support and intentions to be physically active. Although the major focus of the present study is to evaluate relationships hypothesized as part of the HMIEM (Vallerand, 1997), it should be noted that there are complexities in that model we will not be able to address. Notably, multiple levels of generality are not taken into account (see Figure 1). Vallerand (2007) encouraged consideration of global ("a general motivational orientation to interact with the environment," p. 260), contextual ("an individual's usual motivational orientation toward a specific context," p. 260), and situational-level perceptions (motivation experienced "when engaging in a specific activity at a given moment in time," p. 260). Within the present study, concern was placed on perceptions of physical activity on a contextual level.

A second clarification pertains to the measurement of perceived social support, which was carried out in the present study through the use of the Social Provisions Scale (SPS; Cutrona & Russell, 1987). The SPS assesses six social functions originally proposed by Weiss (1974), including reliable alliance, reassurance of worth, opportunities for nurturance, social integration, attachment, and guidance. However, following the work of Rhodes, Jones, and Courneya (2002), we included only three dimensions from the SPS thought to be most relevant to the physical activity context (i.e., reliable alliance, social integration, and guidance).

Within the limits of our methods and conceptual framework, we assess the empirical fit of models relating social support and physical activity intentions. As such, we provide an indirect test of the HMIEM and SDT in addition to adding to the extant evidence on the role and importance of social support.

## Method

### Participants

A total of 391 undergraduate students (265 females, 122 males, 4 did not self-identify) from a Canadian university took part in the current research study. Participants were recruited from classes in the departments of human kinetics, psychology, and science. Participants ranged in age from 18 to 48 years ( $M = 20.0$  years). Only those individuals who participated in physical activity during their leisure time in the 4-month period prior to data collection were included in the sample.

### Measures

#### Social support

Perceived social support was measured using an adapted version of the Social Provisions Scale (SPS; Cutrona & Russell, 1987). The dimensions of guidance (4 items), social integration (4 items), and reliable alliance (4 items) were included, per Rhodes et al. (2002). This permitted scoring on subscales oriented toward perceptions of being provided advice/information (guidance); feeling assurance that others can be counted on during times of need (reliable alliance); and feeling a sense of belonging to a group of others (social integration).

Participants provided their responses on a 4-point Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach's (1951) alpha values for the individual social support subscales are presented in the Preliminary Analyses section of the Results. The written prompt/instruction that was presented to participants at the

beginning of the SPS measure was adapted for the physical activity context.

### Psychological need satisfaction

Psychological need satisfaction was assessed in the current study by nine items derived from research by Sheldon, Elliot, Youngmee, and Kasser (2001). These items were used previously in research examining relationships within the HMIEM (e.g., Hagger, Chatzisarantis, & Harris, 2006). We utilized three items for each of the three basic psychological needs, as proposed within SDT (i.e., autonomy, competence, relatedness). Cronbach's alpha values for the subscales are also presented in the Preliminary Analyses section of the Results. A sample item from the relatedness subscale is "I feel close and connected with other people who are important to me." A sample item from the autonomy subscale is "My choices are based on my true interests and values." Finally, a sample item from the perceived competence subscale is "I am successful at completing difficult tasks." The items were rated on a 7-point scale ranging from 1 (*not true at all*) to 7 (*very true*). Similar to the measurement of social support, a written prompt was developed specifically to measure psychological need satisfaction at the contextual level (i.e., with reference to the physical activity context). Specifically, slight modifications were made to the items to include the words "physical activity."

### Motivation

The degree of self-determined motivation was assessed using the Behavioral Regulation in Exercise Questionnaire II (BREQ II; Markland & Tobin, 2004). Again, slight modifications were made to the items to reflect the physical activity context. The questionnaire contains 19 items within five subscales that include amotivation, external regulation, introjected regulation, identified regulation, and intrinsic motivation. Responses were provided on a 4-point scale ranging from 1 (*not true at all*) to 4 (*very true*). The data were combined into a single value (e.g., Relative Autonomy Index [RAI]; see Vallerand, 2007) through the following equation:

$$(-2 \times \text{amotivation}_{\text{BREQ2}}) + [(\text{introjected}_{\text{BREQ2}} + \text{external}_{\text{BREQ2}}) / 2 \times -1] + (1 \times \text{identified}_{\text{BREQ2}}) + (2 \times \text{intrinsic}_{\text{BREQ2}})$$

The RAI score provides the degree of self-determination one perceives for physical activity in general, with a main advantage being a reduction in the number of variables. There are different equations available to calculate RAI values. The equation presented previously was utilized based on suggestions by Vallerand (2007) and as a result of the BREQ II not assessing perceptions of integrated regulation. A score less than 0 reflects a relatively non-self-determined individual with respect to physical activity, while a score

above 0 indicates a relatively self-determined individual with respect to physical activity.

### Behavioral intentions

We used three items that were developed by Wilson and Rodgers (2004), following the recommendations of Courneya and McAuley (1993), to measure physical activity intentions. Participants responded to the items on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample behavioral intention item is "I intend to participate in physical activity as much as I can every week during the next 4 months."

### Procedure

After approval was granted by the lead author's Institutional Research Ethics Board, potential participants were approached and were provided a verbal explanation of the research project. They were assured the confidentiality of their responses to the survey questions, they were provided with contact information for both the investigator and the research office, and the overall benefits of the study were conveyed to them. In some cases, assessment took place at the time of recruitment (i.e., during class time); while in other cases, it took place at an arranged time outside of class.

On the day of testing, prospective participants were presented with an informational letter that included the study's purpose, the benefits of the study, and confidentiality information. It also included contact information, should the participants have any questions. Students expressing interest received a consent form that they read and signed. Once their consent was obtained, the participants were presented with the questionnaire package. The package included all of the measures described previously, in addition to demographic questions.

### Data analysis

The data were screened before modeling was conducted. Structural equation modeling (through AMOS 17.0) was used to assess the fit between hypothesized models and the obtained data. Model fit was examined using a number of indicators. First, the chi-square value was considered to assess the generalized likelihood ratio. When the ratio between the chi-square value and its degrees of freedom is less than 3, the fit of the model is considered satisfactory (Kline, 2005). In addition, two incremental fit indices (Tucker–Lewis Index [TLI] and Comparative Fit Index [CFI]) were taken into account. Models with values equal to or greater than .90 are considered to have acceptable fit (Schumacker & Lomax, 1996). Finally, we considered the root mean square error of approximation (RMSEA). Values less than .07 represent

acceptable fit and satisfactory errors of approximation of the model (Steiger, 2007).

## Results

### Preliminary analyses

The information entered from 20 randomly selected questionnaire packages was examined for data-entry errors. An individual external to the authors identified 2 errors out of 2900 entered values, which is below a 0.1% error rate and was viewed as acceptable. The next step in data screening involved checking for missing values and minimum/maximum feasible scores. In cases where single missing scores were found, the researcher inserted mean values in place of the missing score (Tabachnick & Fidell, 2007). In cases where a full measure/survey was omitted, these individuals were removed from further analysis. Of the 391 recruited participants, 384 were retained for analysis.

### Scale reliabilities and descriptive statistics

#### Social support

All three social support dimensions (i.e., reliable alliance, guidance, social integration) were found to have acceptable alpha coefficients (as ranging from .73 to .79). A unified social support score was used in the present study to (a) report its relationship with other variables in a similar fashion to Rhodes et al. (2002); (b) acknowledge moderate to high statistically significant correlations among social support dimensions ( $.51 \leq r \leq .68, ps < .001$ ); and (c) present a parsimonious model of relationships among study variables. In further support, we used a confirmatory factor analysis to establish the adequacy of a unidimensional structure before acting on a unified social support score. The fit was examined and was found to be acceptable,  $\chi^2(51) = 145.51, p < .001; \chi^2/df = 2.70$  (CFI = .95, TLI = .93, RMSEA = .07). Consequently, the research model included a single combined perceived social support score as the social factor variable (bivariate relationships among study variables can be found in Table 1). Response values ranged from 2.00 to 4.00, with a mean of  $3.53 \pm 0.43$ , indicating moderate to high perceptions of social support (see Table 2).

#### Psychological needs satisfaction

The three dimensions of psychological needs satisfaction were found to have acceptable reliability (autonomy,  $\alpha = .72$ ; competence,  $\alpha = .87$ ; relatedness,  $\alpha = .89$ ). Responses for autonomy (range = 1–7;  $M = 5.98 \pm 0.89$ ), competence (range = 1.33–7;  $M = 5.90 \pm 1.05$ ), and relatedness

(range = 1–7;  $M = 5.10 \pm 1.47$ ) generally indicated positive perceptions of these constructs.

### Physical activity intentions

To calculate scores of future physical activity intentions, we calculated an average score from three items. The items used to measure physical activity intentions were internally consistent ( $\alpha = .83$ ). Similar to the previous variables, responses indicated high perceptions for this scale (range = 1–7;  $M = 6.13 \pm 1.04$ ).

### Tests of the hypothesized models

The primary model represents the structural links between social support, psychological needs satisfaction, self-determination, and physical activity intentions (see Figure 2). Model fit with the data was then examined and was considered acceptable,  $\chi^2(222) = 579.70, p < .001; \chi^2/df = 2.60$  (CFI = .91; TLI = .90; RMSEA = .07). Social support made significant non-zero contributions to each structural variable loading onto physical activity intentions (all  $ps < .05$ ).

To specifically test the centrality of social support, a comparable model was created without the presence of social support (see Figure 3). The fit for this model was not acceptable,  $\chi^2(42) = 282.78, p < .001; \chi^2/df = 6.70$  (CFI = .88; TLI = .85; RMSEA = .12).

## Discussion

The HMIEM (Vallerand, 1997) and SDT (Deci & Ryan, 1985, 2000) provide conceptual frameworks for understanding

**Table 1** Intercorrelations of Major Variables

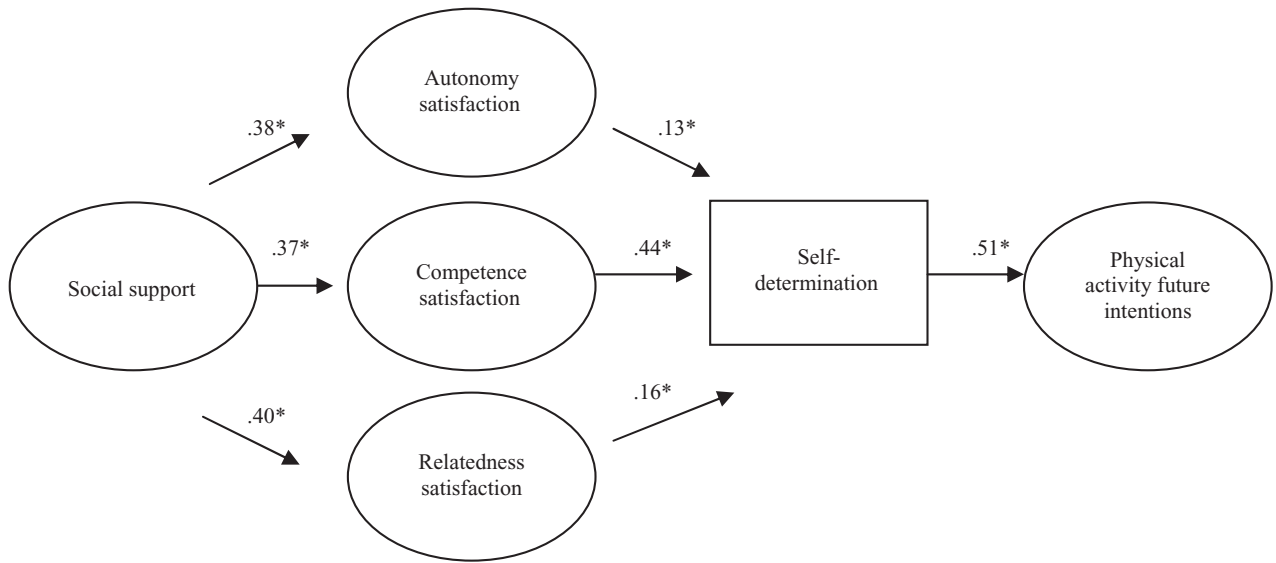
Variable	1	2	3	4	5
1. Social support	—				
2. Autonomy	.22	—			
3. Competence	.27	.52	—		
4. Relatedness	.33	.35	.31	—	
5. Relative autonomy index	.44	.35	.50	.32	—
6. Physical activity intentions	.23	.33	.43	.20	.52

Note. All values were significant at  $p < .001$  (two-tailed).

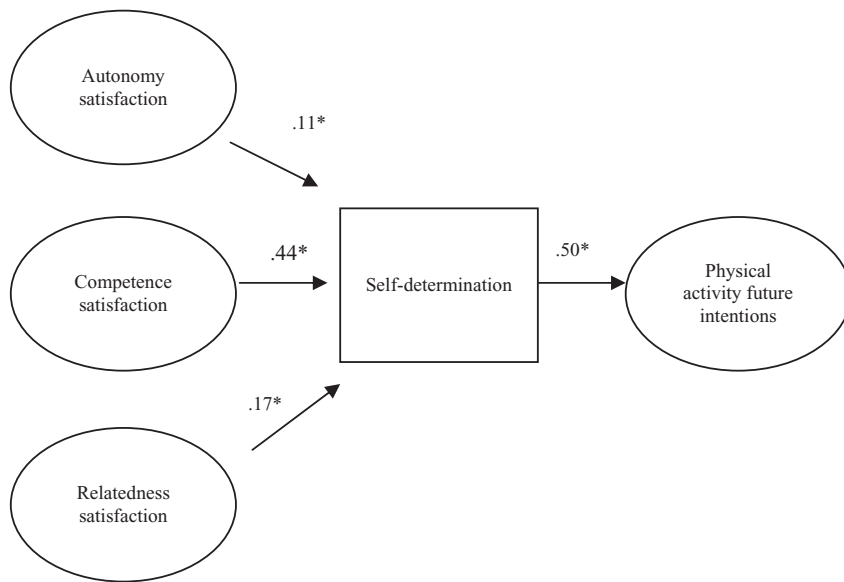
**Table 2** Descriptive Statistics for Study Variables

Variable	Minimum	Maximum	<i>M</i>	<i>SD</i>
Social support	2.00	4.00	3.53	0.43
Autonomy	1.00	7.00	5.98	0.89
Competence	1.33	7.00	5.90	1.05
Relatedness	1.00	7.00	5.10	1.47
Relative autonomy index	–1.58	9.00	6.24	1.96
Physical activity intentions	1.00	7.00	6.13	1.04

Note.  $N = 384$ .



**Figure 2** Model of the full contextual hierarchical model of intrinsic and extrinsic motivation sequence. \* $p < .05$ .



**Figure 3** Hierarchical model of intrinsic and extrinsic motivation sequence without the presence of social support. \* $p < .05$ .

how motivation-related variables could be underlying mechanisms linking perceptions of social support with intention to be physically active. The present results support these theoretical explanations. We find that a model relating motivation-related variables (i.e., psychological need satisfaction and degree of self-determination) to physical activity intention fits the observed data only if social support is incorporated.

In essence, social support is positively related to the satisfaction of psychological needs (i.e., relatedness, competence, autonomy), which, in turn, is related positively to perceptions

of self-determination and then physical activity intention. From a very general standpoint, the present study's results provide partial insight into how perceptions of social relationships influence health outcomes (i.e., via motivation), which was a research avenue encouraged by Cohen et al. (2000) as a response to their review of the social support literature. However, several specific points with respect to how social support operates through the pathways examined in the present study can also be made in relation to previous literature.



First, based on the bivariate correlations and path estimates within the model (see Figure 2), it is reasonable to conclude that individuals' general perceptions of social support (i.e., measured through the amalgamation of guidance, social integration, and reliable alliance social functions) are positively related to all three psychological needs. This is consistent with previous findings from Edmunds et al. (2006) in their examination of a more specific form of support (i.e., perceived autonomy support). Second, and perhaps more interesting, is the prominent role that competence need satisfaction seems to play in the overall pathway examined. An examination of the path estimates in Figure 2 leads to the suggestion that the link between competence need satisfaction and perceptions of self-determination is much stronger than for the remaining two psychological needs (i.e., relatedness and autonomy). There is no generally accepted way to evaluate these relative path strengths in this context. However, an informal estimate of the difference in strength can be generated by considering the total product of path weights. The difference in *z*-transformed path weights would then be significant at the .05 level. This result is also consistent with the findings of Edmunds and colleagues. When Edmunds et al. extended their analyses, they found that only competence need satisfaction mediated the relationship between perceived autonomy support and perceptions of intrinsic motivation.

With respect to the present study, the types of social support examined lend well to the development of perceptions of competence. For example, perceiving greater support with respect to guidance as well as having strong social resources on which to draw (i.e., social integration and reliable alliance) are likely to aid in an individual's satisfaction of competence needs. While the previous statement does not explain why competence beliefs appear to relate more strongly to perceptions of self-determination from a theoretical standpoint, both studies (i.e., Edmunds et al. and the present study) point to the development of competence need satisfaction for intervention, an issue that is discussed later in this section.

The present results also extend previous research on SDT and the HMIEM. Standage et al. (2003), Thøgersen-Ntoumani and Ntoumanis (2006), and Wilson and Rodgers (2004) all found strong connections between perceptions of self-determination and future intentions to be physically active or to exercise. Other researchers have demonstrated links between support perceptions (i.e., autonomy support) and both psychological need satisfaction (e.g., Edmunds et al., 2006) and self-determination (e.g., Edmunds et al., 2006; Wilson & Rodgers, 2004). The present study offers significant extensions to this previous research in that the full contextual pathway proposed by Vallerand (1997) was examined, with the inclusion of more general social functions pertinent to the physical activity context.

The present work falls under the contextual level of generality that was proposed by Vallerand (1997) in the HMIEM. However, it is likely that the contributions of social support received generally (i.e., global social support), as well as specific to a particular activity at defined moments of time (i.e., situation social support) represent important variables to consider in the overall understanding of outcomes related to this health behavior. For those interested in additional information pertaining to the levels of generality, Vallerand (2007) offers a comprehensive discussion, in addition to a number of postulates that are beyond the scope of the present discussion. Our conclusions have also been limited by the use of a cross-sectional approach. The restriction of the temporal dimension means that causative statements cannot be made. A further limitation of the cross-sectional approach is that we did not follow up with participants as to whether their actual physical activity patterns matched their intentions, although we can infer from previous research (e.g., Rhodes et al., 2002) that there is a moderate link between these two variables.

Other limitations follow from the restriction of using a convenience sample of university students. While care was taken to obtain a diverse group of students in terms of age, program of study, and gender, there is clearly opportunity for researchers to extend this study to other populations. Finally, decisions were made in the interest of providing a parsimonious model. In the case of social support, a rationale and statistical evidence for creating one variable were provided and briefly communicated herein. However, while previous research, statistical caution, and the preliminary nature of the question under examination dictated the decision to examine social support from a unidimensional perspective, future researchers could examine the construct more fully through (a) the inclusion of the full range of social provisions (i.e., guidance, reliable alliance, social integration, reassurance of worth, opportunities for nurturance, attachment; Weiss, 1974); and (b) testing specific propositions between social support dimensions and satisfaction of the three psychological needs.

In the case of derivation of the relative autonomy index, we relied on an equation communicated in previous research (Vallerand, 2007) to produce scores indicating individuals' degree of self-determination in a physical activity context. This approach is well accepted and utilized in the self-determination literature, and appears to originate from procedures undertaken by Grolnick and Ryan (1987) with the Self-Regulation Questionnaire. It is unknown if the data in the present study support such an approach and, given the rather arbitrary weights (+2, +1, -1, -2) assigned to the various self-determination dimensions, researchers may want to revisit the assumptions and statistical properties underlying the relative autonomy index in the future.

The interpretation of results of the present study in conjunction with findings from previous research allow for the

communication of possible implications on an applied level. The satisfaction of competence needs appears to be central in the development of self-determination. Given the current findings and those of Edmunds et al. (2006), ensuring competence need satisfaction should be a priority target for applied practitioners. In fact, Edmunds and colleagues noted that "It seems prudent for exercise interventions to focus on increasing feelings of competence within participants so that there is an increased probability that self-determined motivation and adaptive behavioral outcomes will ensue" (p. 2258). The tested model suggests that social support functions including the provision of guidance, social integration, and reliable alliance are important antecedents to competence needs and require further investigation.

Our results speak to the need of directing intervention toward enhancing social support perceptions. However,

developing social support in a physical activity environment does not just benefit the satisfaction of psychological needs or uniquely fit within the HMIEM and SDT. Researchers have integrated social support into other theories, including the theory of planned behavior (e.g., Rhodes et al., 2002), which highlights its direct and indirect effects on exercise behavior in addition to its relationships with concepts such as an individual's perceived behavioral control, subjective norms, and attitudes toward physical activity. Overall, the development of an advantageous social environment including the provision of appropriate social resources will aid in an individual's ability to be physically active. The results of the present study provide additional support to Lox et al.'s (2006) and Cohen et al.'s (2000) summary of the importance of social support with respect to physical activity and other health behaviors.

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