

- Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, 82, 213-225.
- Russell, G. W. (1993). *The social psychology of sport*. New York: Springer-Verlag.
- Scanlan, T., & Passer, M. (1980). Self-serving biases in the competitive sport setting: An attributional dilemma. *Journal of Sport Psychology*, 2, 124-136.
- Simons, Y., & Taylor, J. (1992). A psychosocial model of fan violence. *International Journal of Sport Psychology*, 23, 207-226.
- Tajfel, H. (1981). *Human groups and social categories*. Cambridge, England: Cambridge University Press.
- Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In W. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks/Cole.
- Wann, D. L. (1993). Aggression among highly identified spectators as a function of their need to maintain a positive social identity. *Journal of Sport and Social Issues*, 17, 134-143.
- Wann, D. L., & Branscombe, N. R. (1990). Die-hard and fair-weather fans: Effects of identification on BIRGing and CORFing tendencies. *Journal of Sport and Social Issues*, 14, 103-117.
- Wann, D. L., & Branscombe, N. R. (1992). Emotional responses to the sports page. *Journal of Sport and Social Issues*, 16, 49-64.
- Wann, D. L., & Branscombe, N. R. (1993). Sports fans: Measuring degree of identification with their team. *International Journal of Sport Psychology*, 24, 1-17.
- Wann, D. L., Dolan, T. J., McGeorge, K. K., & Allison, J. A. (in press). An examination of the relationships between sports spectator identification and spectators' perceptions of influence, spectators' emotions, and competition outcome. *Journal of Sport and Exercise Psychology*.
- Weiner, B. (1982). The emotional consequences of causal attributions. In M. S. Clark & S. T. Fiske (Eds.), *Affect and cognition: The Seventeenth Annual Carnegie Symposium on Cognition* (pp. 185-209). Hillsdale, NJ: Erlbaum.
- Winkler, J. D., & Taylor, S. E. (1979). Preference, expectations, and attributional bias: Two field studies. *Journal of Applied Social Psychology*, 9, 73-81.

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The Temporal Relationship Between Perceived Competence and Self-Determined Motivation

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ABSTRACT. Although perceived competence is generally considered a determinant of motivation, little research has actually studied the relation between the two constructs on a longitudinal basis and in natural settings. This was the purpose of the present study. Canadian male adolescent hockey players ($N = 64$) in their first year at an elite level completed a questionnaire 2 weeks into the hockey season (T1) and at the end of the regular season (T2), assessing perceived competence and self-determined motivation at both times. The results partially support the hypothesis that, over time, perceived competence determines motivation (rather than the reverse) but do not exclude the possibility that, with time, motivation may also influence perceptions of competence.

IN RECENT YEARS, the self has become the object of much research in social and personality psychology, and one aspect that has been of particular concern to researchers is the perception a person has concerning his or her abilities or competence (e.g., Bandura, 1977; Deci & Ryan, 1985; Harter, 1985). An important reason for this interest is that the self in general (Markus & Wurf, 1987), and the perceptions of self-competence in particular (Bandura, 1977; Deci, 1975; Harter, 1985), have both been linked to behavior regulation and motivation.

Research generally shows that perceptions of competence are conducive to higher levels of intrinsic motivation (Bandura & Cervone, 1983; Deci & Ryan, 1985; Harackiewicz & Larson, 1986; Harter & Jackson, 1992; Vallerand, 1983). Vallerand and Reid (1984) looked at the causal effect of perceived competence on intrinsic motivation by providing subjects with verbal performance feedback on an interesting motor task. Positive feedback was associated with an increase in both perceived competence and intrinsic motivation, whereas negative feed-

back was related to a decrease in both. In addition, a path analysis revealed that the effects of the verbal feedback on intrinsic motivation were mediated by the perceptions of competence. Vallerand and Reid thus showed that perceptions of competence affected subsequent intrinsic motivation.

A study by Bandura and Schunk (1981) involved a natural context—the education domain—and was designed to examine (among other things) the role of proximal versus distal goals in the feelings of competence and intrinsic interest of children who demonstrated deficits and lack of interest for mathematics. Under proximal goals, children developed a sense of competence and intrinsic interest for arithmetic activities that did not initially attract them. Perceived self-efficacy was also positively related to intrinsic interest in arithmetic activities. Bandura and Schunk concluded that a temporal lag may exist between acquired competence and the growth of interest, and they argued for future studies on the temporal relationship between perceived competence and motivation.

Although several studies have documented the notion that perceived competence is a determinant of motivation (for reviews, see Bandura, 1986, and Deci & Ryan, 1985), few studies have examined the interplay between the two constructs over time. In natural settings, tasks are often complex, and mastery may come only after sustained effort. In such cases, it is possible that motivation influences perceived competence as well. Persistence at a task is indeed often paramount to the development of competencies, especially when one is trying to master complex skills, particularly in situations involving performance at a new and higher level. An athlete may feel quite confident in his or her ability at an amateur level but less confident at a professional level. Persistence would then be important for the athlete to adjust and acquire the skills necessary to feel competent at the new level of performance.

Motivation may also influence perceived competence, as revealed in an unpublished 2-year longitudinal study by Boggiano, Early, and Barrett (cited in Boggiano et al., 1992). In contrast to theoretical propositions, their results showed that early motivation predicted later perceptions of competence even when early levels of competence were taken into account and that early perceptions of competence did not predict later motivation when early levels of motivation were held

constant. However, because few studies have examined the relation between the two constructs on a longitudinal basis, their respective influence is still unclear. Longitudinal research in natural settings could allow a test of the ecological validity of the hypothesis that perceptions of competence are determinants of motivation and verify whether, over time, motivation can also influence perceived competence.

The purpose of the present study, therefore, was to examine in a natural context the temporal relationship between perceived competence and self-determined motivation. This approach allowed us to move beyond the intrinsic–extrinsic motivation dichotomy and examine motivation in a broader context, that is, in terms of varying degrees of autonomy or in terms of a self-determination continuum (Deci & Ryan, 1985; Rigby, Deci, Patrick, & Ryan, 1992). On the basis of existing theoretical propositions and empirical findings, we anticipated that, over time, perceived competence would have a greater influence on self-determined motivation than motivation would have on perceived competence.

Method

Subjects and Procedure

Questionnaires written in French were completed by 64 French-speaking Canadian male adolescents (mean age = 15.8 years) playing in an elite hockey league (midget AAA) involving seven teams from the central region of the province of Quebec in Canada. The boys had between 4 and 13 years of competitive hockey experience, and all were in their first year at an elite level. They were asked to complete a first questionnaire 2 weeks into the hockey season (T1) and a second one at the end of the regular season (T2), 5 months later. Both questionnaires were completed in the team's locker room after practice. The boys were told that we were interested in knowing more about athletes' personal attitudes concerning their sport and that we would appreciate their collaboration with this project. It was also indicated that participation was voluntary and anonymous and that their responses would remain confidential and be used for research purposes only.

Measures

Perceived competence in hockey was measured with a three-item scale adapted from Harter's (1982) scale of perceived competence: (a) "I don't think that I am very good at hockey" (reverse scored); (b) "I think I could do well in just about anything in hockey"; and (c) "I find that I don't do as well in hockey as other athletes my own age" (reverse scored). The boys were asked to respond to each item, using a 5-point Likert scale that ranged from *do not agree at all* (1) to *agree entirely* (5), with a *moderately agree* (3) midpoint. This scale had moderate levels

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of internal consistency ($\alpha = .52$ and $.48$, respectively, at T1 and T2) and fair temporal stability over 5 months ($r = .46, p < .01$).

An earlier version of the French Sport Motivation Scale (Brière, Vallerand, Blais, & Pelletier, in press) was used to measure self-determined motivation in hockey. This instrument has been shown to be a reliable and valid measure of seven types of motivation toward sport: three forms of intrinsic motivation (i.e., toward accomplishment, to know, and to experience stimulation), three types of extrinsic motivation (i.e., identified, introjected, and external regulation), and amotivation (Brière et al., in press).

Intrinsic motivation refers to doing an activity for its own sake, such as for the fun or satisfaction of accomplishing something or learning new things, or to experience stimulation during participation (Vallerand et al., 1992). Extrinsic motivation refers to performing an activity for reasons other than the activity itself. These reasons can be perceived by the person as freely chosen (i.e., identified regulation), resulting from internal pressures (i.e., introjected regulation), or as being external to the self (i.e., external regulation). Finally, a behavior can be performed for reasons that are neither intrinsic nor extrinsic, which reflect amotivation or a relative absence of motivation (Deci & Ryan, 1985). The Sport Motivation Scale (Brière et al., in press) is based on the self-determination theory (Deci & Ryan, 1985), which posits that the different types of motivation reflect varying degrees of self-determination on a continuum: The intrinsic forms of motivation are considered the most self-determined types of motivation, followed (in order of importance) by the identified, introjected, and externally regulated forms of extrinsic motivation, with amotivation being the least self-determined type of motivation.

To assess the relationship between perceived competence and self-determined motivation, we used a motivation index. Consistent with other research (Blais, Sabourin, Boucher, & Vallerand, 1990; Grolnick & Ryan, 1987; Ryan & Connell, 1989; Vallerand & Bissonnette, 1992; Vallerand & O'Connor, 1989), this index is obtained by weighting each type of motivation according to its position on the self-determination continuum and then summing the products for each of the four items measuring each type of motivation. The three types of intrinsic motivation were averaged so as to yield one score, and this score was given the highest positive weight (2) because intrinsic motivation is the highest self-determined form of motivation. Identified extrinsic motivation, although representing a self-determined type of extrinsic motivation, is lower on the continuum of self-determination than intrinsic motivation (Deci & Ryan, 1985) and therefore received a lower positive weight (1). Conversely, amotivation represents the absence of self-determination and was weighted very negatively (-2). Finally, external regulation received a less negative weight (-1) because it represents a lower form of extrinsic motivation. The introjected type of extrinsic motivation represents a midpoint on the self-determination continuum and consequently was not considered in the calculation of the motivation index.

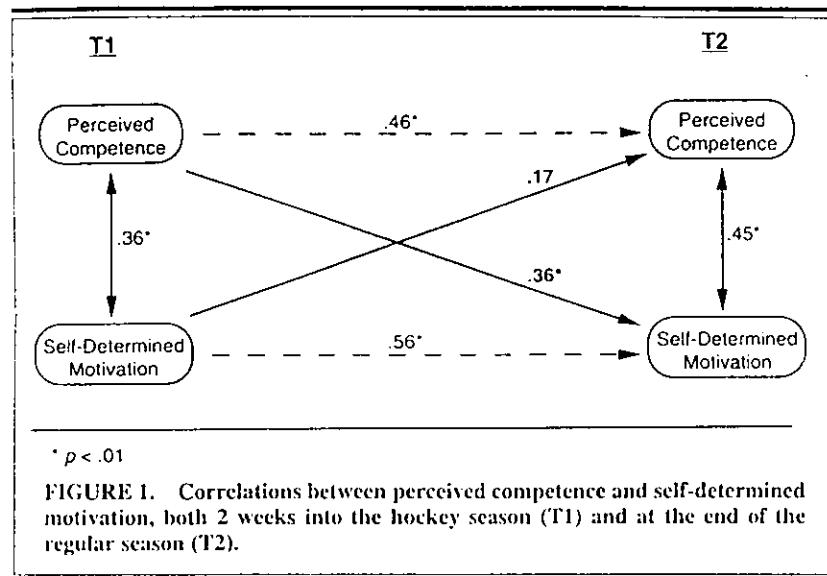
The results of the four multiplications just described were summed to provide a motivation index. High positive scores on this index reflect high levels of self-determined motivation, and high negative scores represent high levels of non-self-determined motivation (Blais et al., 1990; Grolnick & Ryan, 1987; Ryan & Connell, 1989; Vallerand & Bissonnette, 1992; Vallerand & O'Connor, 1989). This measure of self-determined motivation had adequate internal consistency with alphas of $.78$ and $.88$, respectively at T1 and T2, as well as good temporal stability with a significant correlation ($r = .56, p < .01$) between T1 and T2 assessments.

Results

Using a correlational design, we examined the temporal relationship between perceived competence and self-determined motivation. It was anticipated that, over time, perceived competence would have a greater influence on self-determined motivation than motivation would have on competence. Two types of correlational results of interest are presented in Figure 1. A first type concerns the relation between perceived competence and self-determined motivation at the beginning as well as at the end of the regular hockey season. These results revealed a positive association between perceived competence and self-determined motivation, both at T1 ($r = .36, p < .01$) and at T2 ($r = .45, p < .01$); thus, greater perceived competence was related to greater self-determined motivation at the beginning and at the end of the hockey season.

The second type of result deals with the longitudinal relation between perceived competence and self-determined motivation as determined in a cross-lag correlational design. The cross-lag correlations suggest that the main influence over time is that of perceived competence over self-determined motivation, rather than the reverse. Indeed, the correlation between perceived competence (T1) and self-determined motivation (T2) is significant ($r = .36, p < .01$), whereas the correlation between self-determined motivation (T1) and perceived competence (T2) is not ($r = .17$).

Regression analyses were performed to test further the hypothesis that perceived competence influences self-determined motivation more than motivation influences perceived competence. The first regression was conducted with self-determined motivation at T2 serving as the dependent variable, while both perceived competence and self-determined motivation at T1 were used as predictors. These two predictors accounted for 32% of the variance in self-determined motivation at T2. Specifically, self-determined motivation at T2 was significantly predicted by self-determined motivation at T1 ($\beta = .49, p < .001$) and was marginally predicted by perceived competence at T1 ($\beta = .18, p < .11$), with the latter explaining an additional 2.9% of the variance. A second regression analysis revealed that self-determined motivation at T1 did not predict perceived competence at T2 ($\beta = .01, ns$) when perceived competence at T1 was held constant. In



this case, early perceptions of competence by themselves explained 19% of the variance in later perceptions of competence, and early self-determined motivation did not explain additional variance. These regression analyses provide partial support for the hypothesis that, over time, perceived competence influences self-determined motivation rather than the reverse.

Discussion

The purpose of the present study was to examine the temporal relationship between perceived competence and self-determined motivation over a 5-month period in a natural setting. On the basis of existing theoretical propositions and empirical findings, we anticipated that, over time, perceived competence would have a greater influence on self-determined motivation than motivation would have on perceived competence. As predicted, perceived competence measured 2 weeks into the hockey season (T1) was significantly related to self-determined motivation at the end of the regular season (T2), whereas self-determined motivation at T1 was not significantly correlated to perceived competence at T2. Furthermore, and again as anticipated, regression analyses revealed that perceptions of competence at T1 marginally contributed to the explanation of self-determined motivation at T2, even when the initial level of self-determined motivation was taken into account. However, the reverse was not true. Self-determined motivation at T1 did not predict feelings of competence at T2 when early perceptions of competence (T1) were held constant.

These results corroborate other findings and lend partial support to the hypothesis that perceptions of competence are a determinant of self-determined motivation, rather than the latter determining the former. The results also extend previous findings in two respects. First, the present results were observed in a natural context (i.e., sport) rather than in a controlled setting and thus provide greater ecological validity of the causal link between perceptions of competence and motivation. Second, the study supports Bandura and Schunk's (1981) suggestion that a temporal lag exists between newly acquired competencies and motivation. The experience of competing at a new and higher level of competition may lead an athlete to wonder whether he or she is capable of performing at such a level. In turn, the athlete's self-doubt concerning his or her ability to face up to the challenge can have a negative effect on persistence and motivation (Bandura, 1990).

Although much empirical research supports the theoretical notion that perceptions of competence are a determinant of motivation (see Bandura, 1986, and Deci & Ryan, 1985, for reviews), few studies have actually examined the interplay between the two constructs on a longitudinal basis. Here this relation was assessed over 5 months, and partial support was found for the hypothesis that perceptions of competence were determinants of self-determined motivation rather than motivation being a determinant of competence. However, the possibility that motivation influences perceived competence is not entirely ruled out because the results revealed a positive but not significant association between initial levels of self-determined motivation and later perceived competence.

It is possible that a different picture would have emerged had we taken several assessments of the two constructs over a longer time interval. Results from a 2-year longitudinal study (see Boggiano et al., 1992) indicated that motivation was a determinant of perceived competence but that competence did not determine motivation. The longer time interval and different measures of the two constructs may explain the difference in results. Nevertheless, the incongruence between longitudinal results from the present study and the findings reported by Boggiano et al. highlight the need for further studies on the interplay between perceptions of competence and motivation.

In sum, the present results provide partial support for the contention that perceptions of competence are an important determinant of self-determined motivation in a natural setting and over time. In light of the importance of motivated behavior in human activities, the study of the determinants of motivation should be given high consideration in future research.

REFERENCES

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.

- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1990). Perceived self-efficacy in the exercise of personal agency. *Applied Sport Psychology*, 2, 128-163.
- Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology*, 45, 1017-1028.
- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, 41, 586-598.
- Blais, M. R., Sabourin, S., Boucher, C., & Vallerand, R. J. (1990). Toward a motivational model of couple happiness. *Journal of Personality and Social Psychology*, 59, 1021-1031.
- Boggiano, A. K., Shields, A., Barrett, M., Kellam, T., Thompson, E., Simons, J., & Katz, P. (1992). Helplessness deficits in students: The role of motivational orientation. *Motivation and Emotion*, 16, 271-296.
- Brière, N. M., Vallerand, R. J., Blais, M. R., & Pelletier, L. G. (in press). Construction et validation de l'Échelle de Motivation dans les Sports (EMS) [Construction and validation of the Motivation in Sport Scale]. *International Journal of Sport Psychology*.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology*, 52, 890-898.
- Harackiewicz, J. M., & Larson, J. R. (1986). Managing motivation: The impact of supervisor feedback on subordinate task interest. *Journal of Personality and Social Psychology*, 51, 547-556.
- Harter, S. (1982). The Perceived Competence Scale for Children. *Child Development*, 53, 87-97.
- Harter, S. (1985). Competence as a dimension of self-evaluation: Toward a comprehensive model of self-worth. In R. L. Leahy (Ed.), *The development of the self* (pp. 55-121). New York: Academic Press.
- Harter, S., & Jackson, B. K. (1992). Trait vs. nontrait conceptualizations of intrinsic/extrinsic motivational orientation. *Motivation and Emotion*, 16, 209-230.
- Markus, H., & Wurf, E. (1987). The dynamic self-concept: A social-psychological perspective. *Annual Review of Psychology*, 38, 299-337.
- Rigby, S. C., Deci, E. L., Patrick, B. C., & Ryan, R. M. (1992). Beyond the intrinsic-extrinsic dichotomy: Self-determination in motivation and learning. *Motivation and Emotion*, 16, 165-185.
- Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57, 749-761.
- Vallerand, R. J. (1983). Effect of differential amounts of positive verbal feedback on the intrinsic motivation of male hockey players. *Journal of Sport Psychology*, 5, 100-107.
- Vallerand, R. J., & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality*, 60, 599-620.
- Vallerand, R. J., & O'Connor, B. P. (1989). Motivation in the elderly: A theoretical framework and some promising findings. *Canadian Psychology*, 30, 538-550.
- Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Sénécal, C., & Vallières, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52, 1003-1017.
- Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology*, 6, 94-102.

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