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ORIGINAL ARTICLE

Understanding motivation in sport: An experimental test of achievement goal and self determination theories

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Abstract

This paper presents an experimental test of two contemporary motivation theories in the physical domain. The study combined experimentally-induced achievement goal involvement with autonomous and controlling communication styles based on self determination theory to examine young people's enjoyment, free-choice behavior and performance in relation to a golf task. Results showed that those in the autonomous condition, regardless of their goal involvement, reported greater enjoyment, persisted longer at the task and performed better than those in the controlling communication condition. Participants in the task involved condition performed better than those in the ego involved condition. Findings point to the need for further studies that test multiple theories in sport. The motivational impact of goal involvement may be better understood when considered concurrently with the autonomous or controlling nature of the context. Promoting autonomy and task involvement is likely to enhance positive affect and adaptive behaviors in sport among young people.

Keywords: *Goal involvement, motivation, self determination, sport, youth*

Introduction

Motivation has been a central topic in general psychology for several decades (Weiner, 1992) as well as, more recently, in sport and exercise psychology (Roberts, 2001). Equally, great interest has been shown in the physical activity of youth, either from the point of view of sport involvement and performance (Brustad, 1993) or activity for health (Sallis, Prochaska, & Taylor, 2000). Various national surveys are available identifying the reasons children and youth give for participation or non-participation in sport and exercise (Heartbeat Wales, 1987; Mason, 1995) and there appear to be numerous reasons why children and youth might take part or cease their involvement. Descriptive surveys of this type are useful. They provide what appear to be ecologically valid responses from young people reflecting commonsense notions of motivation. However, many researchers advocate the adoption of a theoretical stance to advance understanding beyond descriptive data. Roberts (1992), for instance, says that if we "begin to synthesize our theories and data ... we will better understand the process of motivation in sport and exercise" (p. 28). Similarly, Weiner (1992) believes that by not encompassing theoretical frameworks "insights ... will be missing; there is likely to be prediction without scientific understanding, and making sense without making deep discoveries" (p. 5).

Theoretical perspectives on sport and exercise motivation are numerous. However, when studying youth in physical contexts, a social-cognitive perspective has become dominant in the past two decades. In particular, sport psychologists have enthusiastically embraced the tenets of achievement goal theory (Duda, 2001; Duda & Hall, 2001; Roberts, 2001). At the same time, other theoretical approaches have been advocated that appear to be conceptually related. For example, Deci and Ryan provide an over-arching view of motivation through their self determination theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000a,b). Researchers have

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advocated testing the conceptual convergence of such theories (Biddle, 1999; Roberts, 1992).

A weakness of contemporary research on motivation in sport and exercise, and in sport and exercise psychology more generally, is that too few studies are able to test for causal influence due to the weak nature of research designs (Biddle, 1994, 1997; Morris, 1999). To meet the needs of an evidence-based approach to sport and exercise practice, and to advance understanding of motivational mechanisms, we need more studies where causality is tested. This paper, therefore, provides an experimental test of achievement goal theory and self determination theory.

Achievement goal theory

The goals young people may hold in achievement settings, such as exercise or sport, are important motivational factors (Duda, 2001). Stemming from educational psychology, Nicholls (1989) proposed that people define success and construe ability in different ways. In certain situations, an individual might emphasize task mastery, self-improvement, and effort, and hence depict a 'task' goal. On the other hand, someone may primarily strive to win and demonstrate high normative ability, even with low effort. This reflects an 'ego' goal. Such situational goals are thought to be a reflection of both individual differences and situational factors. Individual differences associated with goals are the 'goal orientations' held by the individual in a specific life domain, such as sport. These tendencies are usually expressed as 'task' and 'ego' goal orientations, and are assessed typically through self-report items referring to when people feel most successful in the domain of interest. Situational factors determine the 'perceived motivational climate'. The climate created by a teacher or coach can reflect task and ego qualities (Ames, 1992a,b; Ntoumanis & Biddle, 1999).

Research predictions typically propose that ego oriented children, focused on normative ability, will be motivationally fragile when they doubt their own competence, but will evidence more adaptive outcomes when confident in their ability. Task oriented children, on the other hand, are interested in self-improvement and thus tend to be motivated regardless of perceived ability or competence. Research has demonstrated, quite clearly, that a high task orientation, either singly or in combination with a high ego orientation, is motivationally adaptive in physical activity for children (Duda, 2001; Duda & Hall, 2001). Whereas goal orientations are assessed at the contextual level of measurement, better prediction of behavior is likely to come from assessing situational goals (Harwood et al., 2000; Harwood & Swain, 1998). Despite this, relatively few studies have adopted this approach.

Self determination theory

Self determination theory extends traditional notions of intrinsic and extrinsic motivation and includes the psychological needs for competence, autonomy and relatedness that are assumed to drive motivated behavior. Deci and Ryan (1985) proposed that a continuum is formed whereby different types of extrinsically regulated behavior can be located. Four types of extrinsic motivation are proposed: external, introjected, identified, and integrated regulations. These reflect behaviors associated with external pressures (external), internal pressures to avoid guilt (introjected), and self determined motivation associated with personal values and goals (identified). Integrated regulation is more abstract and reflects behaviors "fully assimilated to the self, which means they have been evaluated and brought into congruence with one's other values and needs" (Ryan & Deci, 2000, p. 73). Self determination and autonomy increases as one moves from external to integrated regulation. Intrinsic motivation, reflecting enjoyment, interest and inherent satisfaction, is the clearest form of autonomy and reflects true self determination (Ryan & Deci, 2000). Importantly, Deci and Ryan (1985) suggest that when the needs for autonomy, competence and relatedness are satisfied, behaviors that may not have been initially intrinsically motivated are 'taken in' and internalized to become more autonomously regulated. For example, an individual may initially take part in sport because of parental pressure and threat of punishment (external regulation). In time, if the three needs are met, the individual may come to appreciate the value of the activity and want to take part (identified regulation), rather than feel they have to take part.

The self determination continuum has been used to assess children's motivation in physical contexts. Perceptions of autonomy are predictive of intrinsic interest in physical activity (Goudas et al., 1994). In addition, intentions of adolescents to participate in leisure-time exercise have been studied in terms of both 'autonomous' and 'controlling' forms of intention. Intentions predict physical activity when they are autonomous rather than controlling (Chatzisarantis et al., 1997). In a study of over 700 Hungarian youths, more self-determined forms of motivation predicted intentions to be active in the future while extrinsic regulations predicted intentions very weakly and in a negative direction (Biddle et al., 1999). As proposed by Deci and Flaste (1995), the important distinction in human

motivation is between whether a behavior is autonomous or controlled.

There is compelling evidence linking both achievement goal and SDT perspectives to motivated behavior (Duda & Hall, 2001; Vallerand & Rousseau, 2001). However, much of the contemporary research on motivation in physical activity contexts suffers from three major weaknesses. First, despite the conceptual overlap, few studies have addressed these two key theories coherently in the same paper. Goals may be better understood within the framework of autonomous and controlling motivation. Second, scientific knowledge in sport and exercise motivation generally, and goal orientations in particular, is based mainly on cross-sectional research (Biddle, 1994, 1997). Third, motivational research in the physical domain suffers from a lack of data investigating behavioral outcomes. Many studies have assessed only cognitive and affective constructs as dependent variables.

Combining achievement goal and SDT approaches

The present paper, therefore, reports a field-based experiment testing achievement goal theory and SDT with 147 11–16 year olds involved in a golf putting task. According to Nicholls (1989), individuals high in task involvement and ego involved individuals with high perceived competence will not differ in their levels of reported enjoyment and intrinsic motivation. However, goals, like any other event, can have two functions (Deci & Ryan, 1987). A controlling function, termed controlling functional significance, refers to perceptions or processes signifying that stimuli frustrate psychological needs for competence, autonomy, and relatedness. An informational or autonomous function refers to perceptions or processes signifying that stimuli support such psychological needs. How stimuli will be perceived depends on how events in the environment are communicated. An event will be perceived as autonomous when the environment supports psychological needs. In contrast, an event will be perceived as controlling when the context frustrates psychological needs. Whether a stimulus is perceived as autonomous or controlling can be deduced by assessing intrinsic motivation after communicating stimuli in autonomous or controlling ways. Therefore, we examined whether task and ego goals can have an autonomous and a controlling aspect by measuring both affective and behavioral indices after communicating goals in autonomous or controlling ways. We hypothesized that participants in the autonomous condition would report greater enjoyment during the assessment trials and during a free-choice period, as well as greater free-choice behavior, than those in the controlling condition, regardless of goal involvement (Deci et al., 1994; Goudas et al., 1995). We were also interested in exploring the main effects of goal involvement and communication style on performance in golf putting, along with the interactive effects of experimental conditions on enjoyment, free-choice behavior and performance.

Methods

Participants

Participants were 147 secondary school students (80 boys, 67 girls) from two comprehensive schools in the English Midlands. The students ranged in age from 11–16 years ($M = 13.43$, $SD = 1.26$). All the participants were novice golf players.

Procedures

The study was conducted in two sessions. Students' dispositional goal orientations and general perceived physical competence were measured in the first session, and an experimental session was conducted two weeks later during normal physical education (PE) lessons. In the experimental session, participants were randomly assigned to one of four conditions. Participants received either a task-involving induction or an ego-involving induction. In addition, participants received either autonomous communication or controlling communication.

A golf putting task was chosen as the target activity. Participants were given 10 practice trials followed by 10 assessment trials. The aim of the task was to putt the golf ball into the hole from a line 1m away on an artificial grass mat with one putt. Participants were tested individually by two experimenters in a quiet room which contained the golf putting equipment, a chair and a table with some topical magazines (see Free-choice period).

Goal involvement induction. Seventy-nine participants received a task-involving induction whereby they were told that their aim was to learn and master the techniques of golf putting. They were also told not to worry about making mistakes or how others performed and that there would be an assessment of their learning at the end of the session. Sixty-eight participants received the ego-involving induction. Participants were informed that the purpose of the task was to outperform other students in the school in golf putting. The students in this condition were told that they would be considered one of the best in golf putting in the school if they scored more than 2 out of 10 in the assessment trials. The criterion was set at 2 because, in an earlier study (Spray et al., in press), more than 90% of the sample could not score

more than 4 on the same putting task. Those scoring less than 2 were eliminated from further analyses ($n = 7$). Participants were reassured of their *high* competence through positive feedback during the assessment trials.

Manipulation of autonomous and controlling communication. After the participants had been told about the purpose of the task through the appropriate goal involvement induction, they were assigned to one of the two communication conditions. Those assigned to the autonomy condition were given a *rationale*, *acknowledgement*, and *choice* concerning participation (Deci et al., 1994). The *rationale* for participation in the task-involving condition was given as:

> Seeking improvement is very important in daily lives. This is one of the main reasons you attend school. You seek to improve everything you do.

In the ego-involving condition, participants were told that:

> Competition is a fact of life. That is how society moves forward. You always seek to do better than others.

The *acknowledgement* of the participants' possible disinterest in the task was considered through the following statements for each condition:

> I know that you may not like to improve (task involvement condition)/compete (ego involvement condition) in golf putting or even find the task boring. I can perfectly understand and accept that you might not find it very interesting or may not want to improve (task involvement)/compete (ego involvement).

After the rationale and acknowledgement were given, the participants were then given a consent form to sign to indicate their choice to take part. Five participants refused to participate and were withdrawn from the study. In the controlling communication condition, no rationale, acknowledgement or choice were given. Participants were told that "You will be taught exactly how to hold the golf club and how to hit the ball. You should learn the techniques and ought to improve your skills as you practice. You must practice the skills as taught". Throughout the giving of instructions, words such as "should", "must", and "have to" were used, for example "you should learn the techniques" and "you should putt now".

Free-choice period. After the assessment trials, each participant was told that the session had finished. The experimenter then said that he needed a few minutes to fetch another participant from the class. Participants were told that while they waited they were free to do whatever they wanted, including reading magazines or practicing golf putting. Each participant was left alone in the room for four minutes. During this free-choice period, a second experimenter, unaware of the participant's experimental condition, observed the individual through a small glass panel and recorded the amount of time the participant spent putting (free-choice behavior). Caution was taken not to allow the experimenter to be seen by the participant. After the free-choice period, the first experimenter returned to the room. All participants were then carefully debriefed.

Closing procedure. After completion of the final questionnaire, but before returning to their PE class, each participant was told not to inform anyone about the experiment. As a check, participants were invited to take part in a game to guess the correct number of mini golf balls in a jar. They would win a prize for the correct answer. The actual number of golf balls was such that a correct guess would be highly unlikely. Each participant was informed of the correct answer as they left the room. If subsequent participants correctly guessed the number, they may have received information concerning the study. Five participants were eliminated from the experiment based on this procedure (although it is recognized that these pupils may only have been informed of the number of golf balls in the jar and not necessarily about the experiment itself).

Measures

Two weeks before the experiment, the participants' dispositional goal orientations were measured using the Perception of Success Questionnaire (POSQ; Roberts et al., 1998). Satisfactory Cronbach alpha coefficients were reported for both task (0.86) and ego (0.87) subscales. The 6 items from the Sport Competence subscale of the Physical Self-Perception Profile (PSPP-PC; Whitehead, 1995) were used to measure general perceived physical competence, and internal consistency was satisfactory (0.78). Responses were given on 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree) for both the POSQ and PSPP-PC.

After the experimental manipulations but before taking part in the task, participants completed the first questionnaire. This contained manipulation check items to measure goal involvement and perceived autonomy.

Goal involvement. Four items from the POSQ were adapted to assess the goal involvement of the participants. The stem for each question was "I will feel most successful in the golf putting task today in school if . . .". Task involvement included two statements: "I show clear personal improvement" and "I master something I couldn't do before". Ego involvement was also assessed through two statements: "I beat other people" and "I am the best". A 5-point scale was used anchored by strongly disagree (1) and strongly agree (5). These four items were selected because they showed the highest factor loadings in a confirmatory factor analysis of the POSQ (administered prior to the experimental session).

Perceived autonomy. To assess the perceived autonomy of the participants, we asked how much choice and responsibility they perceived in engaging in the task. Specifically, they were asked "To what extent did you feel you have choice over the decision to do the golf putting?" and "To what extent do you feel responsible over the decision to do the golf putting?". Responses were given on 7-point scales ranging from not at all (1) to very much so (7).

The number of successful putts out of 10 assessment trials was recorded as a measure of golf putting performance.

Following the assessment trials, a second questionnaire containing two items was administered. One item was utilized to measure enjoyment experienced in the *putting task* ('task enjoyment') on a 7-point scale from not at all (1) to very much so (7). Following the free-choice period, one item assessed enjoyment experienced in the *free-choice period* ('free-choice enjoyment'), using the same 7-point scale.

Results

Manipulation check

Before the main analyses, two 2×2 (task/ego involvement induction $\times$ autonomous/controlling communication induction) MANCOVAs were calculated to evaluate the success of the induction procedures. First, goal involvement (task/ego) and second, perceived autonomy (choice/responsibility) served as dependent variables with participants' dispositional goal orientation and general perceived physical competence as covariates. This procedure accounted for differences among participants with regard to their achievement goal orientations and perceptions of ability in sport. Table I shows correlations between the covariates and the manipulation check variables. The relationships were weak to moderate, and in both MANCOVAs, there were no significant effects of the covariates.

Table I. Intercorrelations among study variables and covariates.

	Ego orientation	Task orientation	Perceived competence
Task involvement	0.18	0.34**	0.11
Ego involvement	0.46**	0.17	0.24*
Choice	0.10	−0.03	0.05
Responsibility	0.09	−0.00	0.16
Task enjoyment	0.09	0.04	0.17
Free-choice enjoyment	−0.12	−0.15	−0.04
Free-choice behavior	−0.00	−0.03	0.06
Performance	0.08	0.03	0.08

*$p < 0.05$; **$p < 0.01$.

In the first MANCOVA, no main effect for the communication induction on task and ego involvement was found (Wilks' $\lambda = 0.987$, $F(2, 139) = 0.93$, $p > 0.05$, $\eta^2 = 0.01$), but there was a significant effect for the goal involvement induction (Wilks' $\lambda = 0.923$, $F(2, 139) = 5.79$, $p < 0.05$, $\lambda = 0.08$). Follow-up tests indicated that participants in the ego-involving condition scored higher in ego involvement than those in the task-involving condition [$F(1, 140) = 10.74$, $p < 0.05$, $\lambda = 0.07$]. There was no interaction effect (Wilks' $\lambda = 0.986$, $F(2, 139) = 0.96$, $p > 0.05$, $\lambda = 0.01$).

In the second MANCOVA, no main effect for goal involvement induction on perceived choice and responsibility emerged [Wilks' $\lambda = 0.999$, $F(2, 138) = 0.08$, $p > 0.05$, $\lambda = 0.001$]. However, there was a significant multivariate effect for communication induction [Wilks' $\lambda = 0.800$, $F(2, 138) = 17.23$, $p < 0.001$, $\lambda = 0.20$). Participants who received the autonomous induction reported greater perceived choice [$F(1, 139) = 24.41$, $p < 0.001$, $\lambda = 0.15$) and felt more responsible [$F(1, 139) = 27.27$, $p < 0.001$, $\lambda = 0.16$] than participants receiving the controlling induction. No interaction effect was found [Wilks' $\lambda = 0.978$, $F(2, 138) = 1.56$, $p > 0.05$, $\lambda = 0.02$). Descriptive statistics for the manipulation check variables are shown in Table II.

In summary, the results of the manipulation checks showed that participants who received the task-involving induction endorsed high task involvement and low ego involvement, whereas participants in the ego-involving induction were also highly task involved and reported significantly higher ego involvement (although still below the scale midpoint). In addition, the autonomous induction led participants to perceive greater choice and responsibility.

Main analyses

Multivariate analysis of covariance. The means and standard deviations for task enjoyment, free-choice enjoyment, free-choice behavior, and performance

Table II. Descriptive statistics for manipulation check variables.

	Goal involvement						Communication					
	Task-involving $N=79$		Ego-involving $N=68$				Autonomous $N=80$		Controlling $N=67$			
	M	*SD*	*M*	*SD*	*F*	η^2	*M*	*SD*	*M*	*SD*	*F*	η^2
Task involvement	4.41	0.72	4.21	0.89	0.29	0.00	4.32	0.79	4.33	.82	1.18	0.01
Ego involvement	2.33[a]	1.16	2.88[b]	1.30	10.74	0.07	2.45	1.16	2.72	1.36	0.92	0.01
Choice	4.74	1.92	4.70	1.52	0.02	0.00	5.34[a]	1.40	3.82[b]	1.84	24.41	0.15
Responsibility	5.02	1.67	5.05	1.43	0.06	0.00	5.59[a]	1.25	4.21[b]	1.63	27.27	0.16

Note. Means within the same row not sharing the same superscript are significantly different ($p<0.05$).

scores are presented in Table III. Task enjoyment and free-choice enjoyment were entered as dependent variables and were analyzed using a 2×2 (goal involvement $\times$ communication) MANCOVA. A second MANCOVA examined free-choice behavior and performance scores as the dependent variables. Goal orientations and perceived competence again served as covariates in these analyses. However, in both cases, there were no significant effects of the covariates (see Table I for correlations between the covariates and the dependent variables).

In the first analysis, neither a main effect for goal involvement [Wilks' $\lambda=0.976$, $F(2, 133)=1.67$, $p>0.05$, $\eta^2=0.02$] nor an interaction [Wilks' $\lambda=0.975$, $F(2, 133)=1.70$, $p>0.05$, $\eta^2=0.02$] were found. A significant main effect existed, however, for the communication induction [Wilks' $\lambda=0.930$, $F(2, 133)=5.03$, $p<0.01$, $\eta^2=0.07$] for both types of enjoyment. Participants in the autonomous condition reported greater enjoyment than did those in the controlling condition for both task enjoyment [$F(1, 134)=3.79$, $p<0.05$, $\eta^2=0.03$] and free-choice enjoyment [$F(1, 134)=9.82$, $p<0.01$, $\eta^2=0.07$].

With respect to free-choice behavior and performance scores, the results of the second MANCOVA revealed significant main effects for goal involvement [Wilks' $\lambda=0.918$, $F(2, 135)=6.04$, $p<0.01$, $\eta^2=0.08$] and communication (Wilks' $\lambda=0.767$, $F(2, 135)=20.52$, $p<0.01$, $\eta^2=0.23$). Participants in the task-involving condition performed better in the assessment trials than those in the ego-involving condition [$F(1, 136)=11.56$, $p<0.001$, $\eta^2=0.08$]. Those in the autonomous condition also performed better than those in the controlling condition [$F(1, 136)=35.37$, $p<0.001$, $\eta^2=0.21$]. Participants in the autonomous condition spent more time putting golf balls during the free-choice period compared to those in the controlling condition [$F(1, 136)=4.79$, $p<0.05$, $\eta^2=0.03$]. There was no interaction between goal involvement and communication conditions [Wilks' $\lambda=0.966$, $F(2, 135)=2.40$, $p>0.05$, $\eta^2=0.03$] (see Table III).

Discussion

The purpose of this study was to test the motivational impact of communicating achievement goals in autonomy-supportive or controlling ways among young people engaged in a sport task. Researchers have suggested that testing multiple theories of motivation in physical activity contexts can provide a more comprehensive understanding of achievement-relevant phenomena (Biddle, 1999; Roberts, 1992, 2001). To our knowledge, no previous study has paired goal involvement with interpersonal communication style in examining indices of intrinsic motivation and performance. The present investigation sought to examine the independent and interactive effects of goal involvement and commu-

Table III. Descriptive statistics for dependent variables.

	Goal involvement						Communication					
	Task-involving $N=79$		Ego-involving $N=68$				Autonomous $N=80$		Controlling $N=67$			
	M	*SD*	*M*	*SD*	*F*	η^2	*M*	*SD*	*M*	*SD*	*F*	η^2
Task enjoyment	4.11	1.06	3.72	1.29	3.33	0.02	4.21[a]	1.00	3.60[b]	1.30	3.79	0.03
Free-choice enjoyment	3.30	1.66	3.07	2.35	0.97	0.01	3.73[a]	1.52	2.50[b]	2.26	9.82	0.07
Free-choice behavior (seconds)	84.20	97.63	93.08	97.53	0.87	0.01	106.42[a]	101.86	61.74[b]	84.63	4.79	0.03
Performance	5.27[a]	2.36	4.03[b]	1.96	11.56	0.08	5.63[a]	2.30	3.58[b]	1.65	35.37	0.21

Note. Means within the same row not sharing the same superscript are significantly different ($p<0.05$).

nication style. In so doing, we adopted an experimental design rather than the more commonly utilized correlational approach to determine both affective and behavioral outcomes.

The experimental design involved random assignment of participants to task/ego involvement and autonomous/controlling conditions. Checks revealed that the autonomous, controlling and ego involvement manipulations were successful. However, the task involvement manipulation failed to significantly separate low from high task involved groups, even after controlling for participants' task orientation scores i.e., participants in both goal involvement conditions reported similarly high levels of *task orientation* and task involvement. Although the mean scores for task involvement were in the expected direction, this finding highlights the challenges to researchers in creating conditions of low task involvement, even when situational cues are designed to increase the salience of ego involvement. Two contextual factors may account for the difficulty in distinguishing the groups in terms of task involvement in the current study. First, experimental trials occurred within the context of the school physical education lesson. Physical education teachers, and the school environment generally, may be seen to promote working hard, doing one's best and personal improvement irrespective of the task at hand. Although teachers were not present during the experimental trials, the putting task took place during a PE lesson using school facilities. Second, the golf putting activity represented a novel task to the participants, who, consequently, may have been inclined to focus on the 'how' of the activity in both the task involved and ego involved conditions. Despite the difficulties encountered in manipulating levels of task involvement, most of the significant differences in indices of intrinsic motivation and performance were found between the autonomous and controlling conditions i.e., main effects for the communication induction emerged irrespective of goal involvement.

Multivariate analyses showed that, under conditions of positive feedback, communication style affected enjoyment and free-choice behavior such that the autonomous style had a more positive motivational impact. According to SDT, the behavior of significant others can impact on the intrinsic motivation of the individual. For example, teachers can interact with students in a controlling manner such that students feel pressured to think or act in particular ways, or an autonomy-supportive style such that students are encouraged to make their own decisions and choices (Ryan & Deci, 2000a,b). These interpersonal contexts are posited to have an impact on students' motivation through their influence on perceptions of autonomy, competence and relatedness. Empirical research has shown that autonomy-supportive teachers enhance students' intrinsic motivation, curiosity, and challenge-seeking behavior compared to teachers with controlling styles (Deci et al., 1994; Goudas et al., 1995). Contextual events thus play an important role in supporting or inhibiting the internalization process. Deci and colleagues have suggested that the social context supports self determination and internalization when a rationale, acknowledgement of possible disinterest and choice are provided (Deci et al., 1994). Present results lend support to these assertions.

Current findings also showed adaptive performance consequences for those in both the autonomous and task involved conditions. Little previous research has examined performance as a consequence of feeling autonomous or task involved when undertaking sport tasks (Harwood et al., 2000; Vallerand, 2001). Self determination theory holds that social contexts promoting more self-determined forms of motivation, via the satisfaction of innate needs, produce positive consequences, including performance (Deci & Ryan, 1985; Vallerand, 1997). Individuals pursuing tasks with a sense of autonomy are more likely to employ adaptive self-regulatory processes, such as concentration, which result in enhanced performance. Similarly, task involved individuals devote attentional resources to the inherent aspects of the activity, rather than adopt a self-evaluative external perspective, as when ego involved. Focusing on the inherent components of a skill can facilitate performance particularly with respect to novel tasks. High ego involvement and more controlling forms of motivation can detract from attention to process-based factors that lead to mastery of the activity. Clearly, present results require verification in new research studies that seek to identify the mechanisms by which a sense of autonomy and task involvement enhance performance in sport. It has also been suggested that, in the short term at least, less self determined forms of motivation may be associated with enhanced performance (Vallerand, 2001). This notion requires testing in physical activity contexts.

In the present investigation, there were no interaction effects between the goal involvement and communication conditions. This suggests that the effects of one factor operate across levels of the second factor. One explanation for the absence of interactions is that the groups did not differ significantly in terms of task involvement, and therefore, it was not possible to examine the effects of the communication condition when task involvement was 'low' versus when task involvement was 'high'. However, it appears that the beneficial consequences of the autonomous condition were evident

irrespective of low or high ego involvement. Similarly, high task involvement may have 'overridden' feelings of being controlled when undertaking the putting activity to positively affect performance.

The links between controlling / self determined motivation and goal involvement have been articulated in the literature, from both SDT and achievement goal perspectives. According to achievement goal theorists, when an individual is task involved, the attentional focus is on the task and individuals participate in an activity for its own sake, thereby increasing intrinsic motivation. Ego involved individuals engage in the task to demonstrate high normative competence, rather than to engage in the inherent aspects of the task itself, thereby leading to a decrease in intrinsic motivation (Nicholls, 1989). *Self* determination theory also considers task involvement to "bear considerable relation to intrinsic motivation when applied to the achievement domain" (Deci & Ryan, 2000, p. 260). On the other hand, SDT posits that, when ego involved, individuals feel internally controlled and pressured to maintain their self-esteem or prove their competence, which results in an external locus of causality and less self determined motivation (Deci & Ryan, 1987). From the SDT perspective, therefore, ego involvement is viewed as a form of introjected motivation (Deci & Ryan, 2000). Self determination theory also asserts, however, that normatively defined competence goals can be pursued for relatively autonomous reasons and thus produce adaptive motivational and behavioral consequences, or they can be pursued for relatively controlled reasons and thus produce more negative consequences (Deci & Ryan, 2000). In the present investigation, correlations between ego involvement and free-choice enjoyment and behavior were non-significant, but there was a trend toward positive intercorrelations in the autonomous condition but negative associations in the controlling condition. Thus, an autonomy-supportive social context may, under certain circumstances, help to offset potentially maladaptive consequences of ego involvement. However, further experimental studies are necessary to explicate the empirical links between ego involvement and indices of intrinsic motivation in autonomous versus controlling contexts.

In summary, this study suggests that an autonomy-supportive context can enhance intrinsic motivation compared to a controlling context, regardless of goal involvement. Moreover, autonomy and task involvement can help to foster performance on a novel golf putting task. More work is necessary to build on the current investigation and address its limitations. For example, measures of need satisfaction should be included, as needs are viewed as psychological mediators of the social factors → motivation relationships within SDT (Deci & Ryan, 1985, 2000). In addition, the rationale as well as the acknowledgement components of the autonomous condition should be specific to the task at hand rather than generalized. The choice component may be operationalized more effectively if participants are provided with a range of tasks to select rather than being asked for consent to undertake one activity. Finally, manipulation checks should include the perceived controllingness of the locution used in the communication inductions as well as perceived choice and responsibility. However, based on the results reported herein, we invite youth sport leaders to consider the design and delivery of their sessions such that they are more likely to be perceived as facilitators of autonomy and task involvement.

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References

Ames, C. (1992a). Achievement goals, motivational climate, and motivational processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161–176). Champaign, IL: Human Kinetics.

Ames, C. (1992b). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, *84*, 261–271.

Biddle, S. (1994). Motivation and participation in exercise and sport. In S. Serpa, J. Alves, & V. Pataco (Eds.), *International perspectives on sport and exercise psychology* (pp. 103–126). Morgantown, WV: Fitness Information Technology.

Biddle, S. (1997). Current trends in sport and exercise psychology research. *The Psychologist*, *10*, 63–69.

Biddle, S. J. H. (1999). Motivation and perceptions of control: Tracing its development and plotting its future in exercise and sport psychology. *Journal of Sport & Exercise Psychology*, *21*, 1–23.

Biddle, S., Soos, I., & Chatzisarantis, N. (1999). Predicting physical activity intentions using goal perspectives and self-determination theory approaches. *European Psychologist*, *4*, 83–89.

Brustad, R. J. (1993). Youth in sport: psychological considerations. In R. N. Singer, M. Murphey, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 695–717). New York: Macmillan.

Chatzisarantis, N. L. D., Biddle, S. J. H., & Meek, G. A. (1997). A self-determination theory approach to the study of intentions and the intention-behaviour relationship in children's physical activity. *British Journal of Health Psychology*, *2*, 343–360.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, *62*, 119–142.

Deci, E. L., & Flaste, R. (1995). *Why we do what we do: Understanding self-motivation*. New York: Penguin.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, *53*, 1024–1037.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.

Duda, J. L. (2001). Achievement goal research in sport: Pushing the boundaries and clarifying some misunderstandings. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 129–182). Champaign, IL: Human Kinetics.

Duda, J. L., & Hall, H. (2001). Achievement goal theory in sport: Recent extensions and future directions. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology* (pp. 417–443). New York: Wiley.

Goudas, M., Biddle, S., & Fox, K. (1994). Perceived locus of causality, goal orientations, and perceived competence in school physical education classes. *British Journal of Educational Psychology*, *64*, 453–463.

Goudas, M., Biddle, S., Fox, K., & Underwood, M. (1995). It ain't what you do, it's the way that you do it! Teaching style affects children's motivation in track and field lessons. *The Sport Psychologist*, *9*, 254–264.

Harwood, C., Hardy, L., & Swain, A. (2000). Achievement goals in sport: A critique of conceptual and measurement issues. *Journal of Sport & Exercise Psychology*, *22*, 235–255.

Harwood, C. G., & Swain, A. B. J. (1998). Antecedents of pre-competition achievement goals in elite junior tennis players. *Journal of Sports Sciences*, *16*, 357–371.

Heartbeat Wales. (1987). Exercise for health: Health-related fitness in Wales. Heartbeat Report 23. Cardiff: Heartbeat Wales.

Mason, V. (1995). *Young people and sport in England, 1994*. London: Sports Council.

Morris, T. (1999). The message of methods: Developing research methodology in sport psychology. *Journal of Wuhan Institute of Physical Education*, *33*, 20–27.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.

Ntoumanis, N., & Biddle, S. J. H. (1999). A review of motivational climate in physical activity. *Journal of Sports Sciences*, *17*, 643–665.

Roberts, G. C. (1992). Motivation in sport and exercise: Conceptual constraints and convergence. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 3–29). Champaign, IL: Human Kinetics.

Roberts, G. C. (2001). Understanding the dynamics of motivation in physical activity: The influence of achievement goals on motivational processes. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 1–50). Champaign, IL: Human Kinetics.

Roberts, G. C., Treasure, D. C., & Balague, G. (1998). Achievement goals in sport: The development and validation of the perception of success questionnaire. *Journal of Sports Sciences*, *16*, 337–347.

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*, 54–67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports & Exercise*, *32*, 963–975.

Spray, C. M., Wang, C. K. J., Biddle, S. J. H., Chatzisarantis, N. L. D., & Warburton, V. E. (in press). An experimental test of self-theories of ability in youth sport. *Psychology of Sport and Exercise*.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29 (pp. 271–360). New York: Academic Press.

Vallerand, R. J. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise* (pp. 263–319). Champaign, IL: Human Kinetics.

Vallerand, R. J., & Rousseau, F. L. (2001). Intrinsic and extrinsic motivation in sport and exercise: A review using the hierarchical model of intrinsic and extrinsic motivation. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology* (pp. 389–416). New York: Wiley.

Weiner, B. (1992). *Human motivation*. Newbury Park, CA: Sage.

Whitehead, J. R. (1995). A study of children's physical self-perceptions using an adapted physical self-perception profile questionnaire. *Pediatric Exercise Science*, *7*, 132–151.