

## **Motivation and Perceptions of Control: Tracing Its Development and Plotting Its Future in Exercise and Sport Psychology**

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An analysis of control-related motivation constructs that have been studied in sport and exercise psychology is attempted using Skinner's (1995, 1996) agent-means-ends framework and her "competence system" model. I review and analyze six constructs or approaches that have received a great deal of attention in our field in the past (locus of control and attributions), the present (self-efficacy, achievement goal orientations, and perceived behavioral control), and, I predict, the future (self-determination theory). For each construct or approach, I provide an overview and research summary followed by an analysis of its control-related properties using Skinner's frameworks.

**Key words:** motivation, perceived control, attributions, self-efficacy, achievement goals

I cannot overstate my excitement and pride at having the opportunity of presenting a keynote lecture at NASPSPA. This was my first conference as a master's degree student at Penn State in 1979, where I had the privilege of studying with Dorothy Harris, Dan Landers, Michael Mahoney, Alan Kazdin, and Caroline Sherif. At the conference, in Trois Rivières, I heard for the first time, among others, Carol Dweck, Rainer Martens, and Ron Smith and came away with youthful idealism and enthusiasm. Those of you who have read my occasional criticisms of North American sport psychology should therefore realize I owe a huge debt to the United States and its scholars; they set me on the road and gave me a great start that I shall never forget.

My academic interests have always centered on issues of personal control, even if I didn't really know it at the time! Fueled by early academic failures in school and some teachers who operated anxiety-laden performance climates, I came to believe that effort could sometimes overrule ability. Later, when teaching health-related fitness and exercise, I knew there was something special about the subject that I missed when teaching most sports. Again, I realized it concerned the role of effort over ability. Early research efforts in attribution theory, combined with this practical experience, put me on track to studying the confusing world of perceptions

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of control. In addition to researching attributions, I have published studies on achievement goals, motivational climate, attitudes, motivational orientations, and self-determination. In addition, I have reviewed the evidence on psychological determinants and consequences of physical activity and exercise (Biddle & Mutrie, 1991). Most, if not all, of these topics overlap to a greater or lesser extent with the construct of control. Yet for years I sat back and took each topic as it came, rarely attempting to integrate constructs, despite believing that this was probably necessary. Indeed, in my early years of teaching exercise and sport psychology to undergraduates, I often felt that there was considerable overlap between popular constructs of the time—self-efficacy, attributions, locus of control—yet couldn't quite put my finger on what it was. The purpose of this paper, therefore, is to explore the area of perceptions of control from a motivational perspective. I will draw on some historical points, such as popular approaches in the recent past, and also provide directions and considerations for the future.

### Perceptions of Control: A Complex Answer to a Simple Question

In seeking an integrating framework, I became interested in the work of Skinner—Ellen, not B.F.! Consequently, I will use some of Skinner's theorizing to help provide a framework for analyzing the key theories in exercise and sport psychology that involve some link with perceptions of control. Although Skinner (1995, 1996) makes distinctions along several dimensions of control, such as generality-specificity and objective-subjective, I will focus mainly on her agent-means-ends analysis and her "competence system" model. As Skinner points out, an agent-means-ends framework is not new, but I feel it may prove useful in judging many of the control-oriented theories currently so popular in our field. Such an analysis has not, to my knowledge, been conducted in exercise and sport psychology.<sup>1</sup>

#### *Agent-Means-Ends and Different Belief Systems*

Skinner (1995, 1996) makes the point that one way to conceptualize the vast array of control constructs is to analyze them in relation to their place within the tripartite model of agent, means, and ends. This is illustrated in Figure 1.

*Agent-Means and Capacity Beliefs.* Agent-means connections involve expectations that the agent (self) has the means to produce a response (but not necessarily an outcome). This involves capacity beliefs—beliefs concerning whether the agent has the ability to produce the appropriate cause. For example, if effort is deemed important to produce success in weightlifting, then positive capacity beliefs must involve the belief that "I can try hard in weightlifting." Self-efficacy research has adopted this approach and has become a major force in motivational research in exercise and sport psychology (Bandura, 1997; Schunk, 1995). Similarly, perceived competence approaches adopt the agent-means approach (Harter, 1978).

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<sup>1</sup>At the conclusion of my lecture, Dr. Larry Brawley pointed out that he had also, with colleagues, attempted a similar analysis (DuCharme, Gyurcsik, Culos, and Brawley, in press). However, we arrived at these notions quite independently.

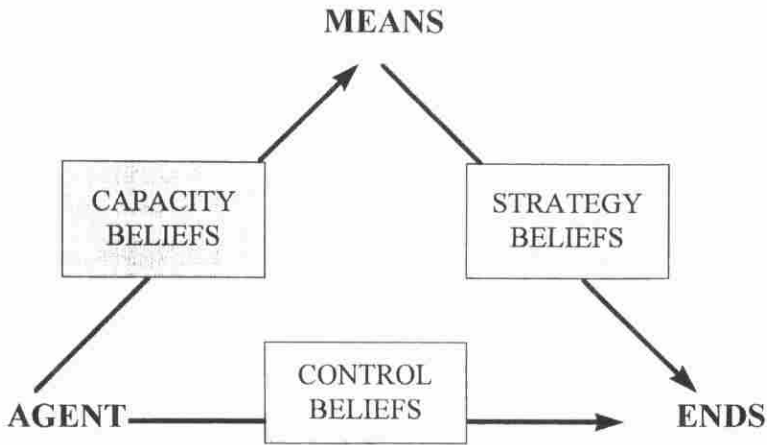


Figure 1 — Agent-means-ends analysis and different types of beliefs (Skinner, 1995).

*Means-Ends and Strategy Beliefs.* Means-ends connections involve beliefs about the link between potential causes and outcomes. This involves strategy beliefs, beliefs concerning the necessary availability of means to produce the desired outcomes. For example, if trying hard is necessary in successful weightlifting, a strategy belief is “I need to try hard to be successful at weightlifting,” thus contrasting with the capacity belief “I can try hard. . . .” Typically, means-ends relations involve attributional approaches (Biddle, 1993; Weiner, 1986, 1995), outcome expectancies (Bandura, 1997), and locus of control (Rotter, 1966, 1975), constructs familiar in exercise and sport psychology.

*Agent-Ends and Control Beliefs.* As Skinner (1995) put it, “connections between people and outcomes prescribe the prototypical definitions of control” (p. 554); hence this connection involves control beliefs. These involve the belief by the agent that a desirable outcome is within their capability: “I can be successful at weightlifting if I want to.” This has to involve both capacity and strategy beliefs. Bandura (1997) fails to recognize this and criticizes Skinner’s tripartite model on this and other grounds: “How can an agent stripped of all means exercise control over outcomes?” (Bandura, 1997, p. 28). However, although Skinner (1995) recognizes that “the functional relationships among the belief sets is an open empirical question” (p. 32), she suggests that control beliefs can be considered a function of capacity and strategy beliefs.

Agent-ends connections are less easy to recognize in exercise and sport psychology. Some of Bandura’s later writings (e.g., Bandura, 1989, 1997) suggest that self-efficacy can have an agent-ends connection, as well as the more traditional agent-means connection. For example, Bandura (1989) says that “Self-beliefs of efficacy influence how people feel, think, and act [*italics added*]” (p. 3). Equally, the subtitle of Schwarzer’s (1989) book *Self-Efficacy: Thought Control of Action* emphasizes action, suggesting an agent-ends connection. Similarly, outcome expectancies can involve agent-ends, as well as means-ends. Behavioral regulations, as depicted in self-determination theory (Deci & Ryan, 1985), and becoming popular

in exercise (Chatzisarantis & Biddle, 1998; Mullan, Markland, & Ingledew, 1997) and sport (Vallerand, 1997) may suit an agent-ends analysis. This will be discussed later.

### *Plotting Beliefs in a Competence System*

Skinner (1995) proposes that humans have a need to seek competence (Deci & Ryan, 1985). If this is the case, we can analyze control-related beliefs within a system of competence seeking, or what Skinner (1995) refers to as the "competence system" (Figure 2). Figure 2 shows that action is regulated by initial control beliefs. Action, in turn, produces some form of outcome that is evaluated and interpreted in respect to other beliefs (self, causes); these can lead to further control beliefs. The place of beliefs within this system may be important in analyzing the contributions of control-related constructs in exercise and sport. For example, locus of control beliefs precede performance and are proximal to behavior; attributions are beliefs interpreting past behavior and are likely to be less proximal or even quite distal to future actions.

The history of sport psychology shows that topics vary in their popularity over the years. However, the study of control perceptions, in whatever form, has been prominent for the past 30 years. Starting with research into locus of control, sport (and exercise) psychology research has embraced attribution theory, self-efficacy, and related perspectives as key constructs. Indeed, my own analysis of current trends in the field (Biddle, 1997b) showed that motivation was the most popular topic in two key journals over the 10 years between 1985 and 1994. A similar analysis showed that attributions, self-confidence, and achievement motivation were the three most popular motivational topics between 1979 and 1991 (Biddle, 1994). Papers on self-confidence included a great deal on self-efficacy, and the area of achievement motivation became increasingly dominated by the achievement goals approach. The rest of this paper, therefore, will focus on exercise and sport psychology research that has used a control perspective. This will

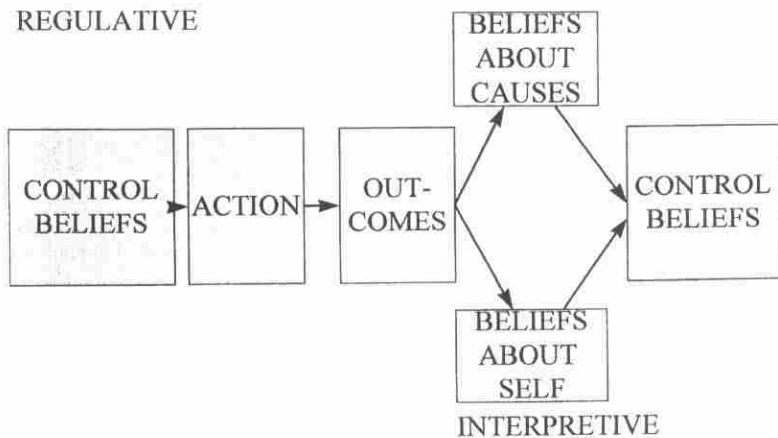


Figure 2 — Beliefs within the framework of the competence system (Skinner, 1995).

include locus of control, attributions, self-efficacy, achievement goals, and self-determination. A brief comment will also be made concerning the perceived behavioral control variable in Ajzen's (1985) theory of planned behavior. Skinner's tripartite model will be used to provide an integrating framework throughout. A summary is provided in Table 1. Specifically, for each construct or approach I will provide an overview and research summary, followed by an analysis of its control-related properties using Skinner's framework.

## **Locus of Control**

### *Construct Overview and Research Summary*

Locus of control of reinforcements refers to the extent to which people perceive that reinforcements are within their own control, are controlled by others, or are due to chance. It is a means-ends (contingency) approach according to Skinner's (1995, 1996) model. The locus of control (LOC) construct stems from a social learning theory approach to personality (Rotter, 1954), wherein general beliefs are thought to develop from expectations based on prior reinforcements. When the value attached to such reinforcements is added, it becomes an expectancy-value approach to motivation. In Rotter's (1966) seminal monograph, he formalized the construct of LOC and suggested that a generalized belief existed for internal versus external control of reinforcement.

It should be noted, however, that Rotter (1966) stated that his psychometric measure of LOC (the Internal-External, or I-E, scale) was a measure of generalized expectancy and therefore was likely to have a relatively low behavioral prediction but across a wide variety of situations. It was also likely to have greater predictive powers in novel or ambiguous situations, since in specific well-known contexts more situation-specific expectancies will be used. These might be outcome expectancies in a means-ends analysis or efficacy expectations in an agent-means analysis. This raises the issue of measurement specificity.

A well-known typology in our field is to categorize constructs within a hierarchy ranging from global levels of measurement (e.g., global self-esteem) through contextual, or domain-related, perceptions (e.g., "in sport") to situation-specific perceptions (e.g., "right now"). Such typologies have been used to good effect in physical self-perception measurement (see Fox, 1997) and intrinsic motivation (Vallerand, 1997). Research investigating the link between perceived control (LOC) scales and physical activity has mainly been in the area of participation in exercise and has taken three routes: Some researchers have tried to identify links between generalized LOC and exercise, some have used domain-related (health) LOC, and others have used exercise- and fitness-specific measures.

My appraisal of research on LOC and exercise (Biddle & Mutrie, 1991, 1998) is that collectively it provides rather weak support for LOC in predicting fitness and exercise behaviors. The extent to which this could be a reflection of the inadequacies of the fitness/activity or LOC measures remains to be seen. At best, these studies suggest that some group differences may exist between exercisers and nonexercisers at a cross-sectional level on LOC. However, one cannot ascertain whether such differences developed as a result of involvement or whether they were influential in initial decisions to become active.

**Table 1 Differentiating Control-Related Theories Prominent in Exercise and Sport Psychology Using Constructs From Skinner (1995, 1996)**

Theory	Beliefs			Function			Global (G) Contextual (C) Specific (S) measures
	Capacity	Strategy	Control	Agent (A) Means (M) Ends (E)	Regulative	Interpretive	
LOC		✓		M-E	✓		G (C)
Attribution	(✓) <sup>a</sup>	✓	✓	M-E A-E		✓	S
Self-efficacy	✓ <sup>b</sup>			A-M (A-E) <sup>b</sup>	✓	(✓)	S
Achievement goals	✓	✓	(✓) <sup>c</sup>	A-M M-E	✓		C
Self- determination	✓ <sup>d</sup>	(✓) <sup>d</sup>	✓ <sup>d</sup>	A-M A-E	✓		G (S)
Perceived behavioral control	✓			A-M	✓		S

<sup>a</sup>Since attributional thinking can also involve agent-ends connections, and hence control beliefs, capacity beliefs are also included here. <sup>b</sup>The definition of self-efficacy, according to Bandura (1997), concerns agent-means connections. However, the influence of efficacy expectations may also make it viable to classify self-efficacy as agent-ends. <sup>c</sup>Analysis of achievement goals suggests that they function with both capacity beliefs (agent-means) and strategy beliefs (means-ends). Control beliefs are therefore also implicated. <sup>d</sup>Although Skinner (1995, 1996) claims that autonomy is outside the domain of control, feelings of choice and free will could be construed as agent-means connections and involving capacity beliefs. However, behavioral regulations could be seen as ends-means connections, as they describe people's reasons for involvement in certain actions. Since agent-ends involve control beliefs, strategy beliefs are implicated in addition to the capacity beliefs already identified for the agent-means connection.

### *Analysis of Control-Related Properties*

The conclusion from these studies appears to be that LOC/health LOC does not strongly relate to exercise behavior. Such a conclusion has prompted researchers to ask why this is the case. Four main possibilities exist. First, the theory could be wrong or not applicable to exercise; second, the measuring tools are not sensitive or appropriate enough to demonstrate a relationship between LOC and exercise participation; third, fitness/exercise "externals" are rare people, thus making it difficult from a research perspective to demonstrate relationships or discriminate between groups.

The final possible reason requires us to return to Skinner's model and her notion of the "competence system." Plotting LOC onto the competence system in Figure 2, we can conceptualize LOC as a set of regulative beliefs preceding action and outcome; thus we would expect LOC to have a strong impact on behavior. So why are the data weak or inconsistent? Given the potential for regulative beliefs to impact behavior, it suggests that LOC has been inadequately assessed or poorly operationalized. Rotter (1966) said that generalized LOC beliefs should have a wide range of application but lack predictive strength. Given the weak research designs in much of the LOC literature in exercise and sport psychology, perhaps it is not surprising that the strength of relations between LOC and behavior is weak. There are also too few studies testing physical activity-related LOC measures to come to meaningful conclusions.

A good illustration of the importance of the specificity of beliefs is the study by McAuley and Gill (1983). Gymnastics performance was rather poorly correlated with generalized beliefs concerning physical ability, whereas performance was strongly related to event-specific efficacy expectations. However, it would be wrong to conclude that LOC or generalized competency beliefs are similar to efficacy expectations but simply measured at a different level of specificity (see Bandura, 1997). Using our integrative framework to clarify, LOC is means-ends whereas self-efficacy is agent-means.

Given that we seem to allocate greater importance to studies demonstrating strength of relationships rather than stability and width of application, we may be applying LOC in a less than optimal way. In addition, if LOC primarily involves means-ends relations, and hence strategy beliefs, it is concerned with thoughts about what is required for success (contingency) rather than beliefs about whether one actually possesses such requirements (competence). This may weaken the predictive power of LOC on behavior. By using Skinner's (1995) competence system and tripartite models, we may have some explanations for why LOC has not been particularly successful in predicting motivated behavior in sport or exercise.

### **Attributions**

If achievement goal orientation is the "hot topic" of sport psychology in the late 1990s, attribution theory was certainly the equivalent in the 1980s. However, the frequency of publications in the *Journal of Sport & Exercise Psychology* and the *International Journal of Sport Psychology* featuring attributions as the main topic for analysis declined as the 1990s approached (Biddle, 1994). As we know, perceptions of control and causality are at the center of attributional approaches, so why has this area declined in popularity? Does it reflect a

wane in the perceived utility of the area? If it does, I believe we are flawed in our thinking. I will reiterate some points I made at the World Congress of Sport Psychology in Israel (Biddle, 1997a).

### *Construct Overview and Research Summary*

Attribution research in sport has been myopic. I said this nearly 10 years ago and have no reason to change my mind now. This can partly explain the decline in the frequency of attribution studies in sport psychology. Observation of the more varied and thoughtful approaches to attributional thinking in social psychology reveals that we have not exploited this to the full (see Fiske & Taylor, 1991; Graham & Folkes, 1990). We have never broken out of the early Weinerian models (useful though they are) applied to causal thinking related to sporting outcomes (Biddle, 1993). Consequently, although attribution approaches have added significantly to our understanding of motivational processes in sport, I would like to see more of the following:

- Studies on “other-person” perception, such as coach-athlete attributions.
- Data on attributional conflict through analyzing sporting conversations (see Biddle & Hanrahan, 1998).
- Attribution change programs in sport, particularly in settings where emotional or motivational deficits are likely, such as school PE programs (Orbach, Singer, & Murphey, 1997; Sinnott & Biddle, 1998).
- Work on responsibility judgments in sport and how these impact on decision making by, for example, officials and spectators (Weiner, 1995).
- Research on the role of attributions in emotional processing, particularly states related to failure and low motivation. Attribution-emotion studies have shown some weak trends (Biddle, 1993), but maybe we need to study these proposed links in more powerful contexts of failure.
- Attention paid to conceptual convergence between attribution and related constructs. If we look at popular motivational topics in general or in sport psychology, we see many studies on perceived control, feelings of autonomy, competence motivation, beliefs about ability, and intrinsic motivation (including assessment of perceived effort). More recently, self-presentation has become a topic of interest in our field (e.g., social physique anxiety). All of these have some conceptual overlap or convergence with attributional theories. I encourage greater consideration of this in the future.

As I said at the time, let’s reopen the file on attributions and go back to the future! Even if you’re not ready for it, your kids will love it! But where do attributions fit into a wider framework of control and competence? Let us return to Skinner’s framework.

### *Analysis of Control-Related Properties*

Attributional thinking, placed within the competence system shown in Figure 2, is, as we know, primarily about interpretation of outcomes, the consequences of which may have an impact on future regulative beliefs and actions (Weiner, 1986). They are, therefore, more distant from (future) actions and outcomes than most regulative beliefs such as LOC. This may explain the difficulty researchers have had in demonstrating strong relationships between attributions and behavior



in sport. Only prospective studies can test this, and these are sparse. It also assumes that little will change between making the attributions and subsequent behavior, yet we have not tested the longevity or consistency of attributions over time. To make matters worse, we have nearly always assessed attributions immediately after performance. At the anecdotal level, though, coaches, athletes, and sport psychologists tell us that attributions are an important part of the sport experience; are reflected in subsequent thoughts, feelings, and actions; and change with time.

If attributional processing reflects means-ends connections (Skinner, 1995), the same criticism leveled at LOC can be made of attributions. Means-ends connections involve strategy, not capacity, beliefs. According to this, therefore, attributional thinking looks to identify causes of outcomes (e.g., ability, effort, and luck) rather than appraising whether the agent has access to these causes (e.g., effort). In reality, one could argue that true attributional thinking, while primarily being about identification of causes, is also a response to questions such as "Why did I fail at this task?" thus necessitating control beliefs (i.e., strategy and capacity beliefs). I cannot see that athletes, for example, will be interested in whether a particular game strategy caused success unless they are also thinking about whether they can produce that strategy. If so, attributions are more central to control beliefs and will also involve agent-ends connections. True perceptions of control, through control beliefs, require a combination of competence and contingency. Attributions, but not LOC, include both. Attributional processing involves, as I have just argued, both means-ends (contingency) and agent-ends (competence); LOC, however, is primarily concerned with means-ends.

Although attributions traditionally are seen as means-ends connections, further support for attributions involving agent-ends processes comes from matching attributions against other agent-ends constructs. For example, outcome expectancies involve agent-ends connections, and attributions have been linked, mainly via the stability dimension, to beliefs concerning outcome expectancies.

In conclusion, attribution research in exercise and sport psychology has declined in popularity in recent years. This could be due to a lack of appreciation of the wider applications that attributions may have in physical activity. Indeed, while attributions may not predict behaviors particularly well, due to their distal location from subsequent behavior in the competence system, they may act as both means-ends and agent-ends connections, thus embracing control beliefs and both competence and contingency—a "true" sense of (perceived) control.

Further study is required to tease out the relative importance of these beliefs. Given that effort and ability are central constructs both to the beliefs in Skinner's tripartite model and within attribution theories, continued linkage in research seems prudent.

## **Self-Efficacy**

### *Construct Overview and Research Summary*

Bandura (1997) has defined perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). It concerns judgments of what one can do with personal skills rather than the skills themselves. The key phrase here is "capabilities to organize and execute the courses of action," since Bandura has always differentiated between

efficacy expectations (agent-means) and outcome expectations (means-ends or agent-ends).

Research on self-efficacy has been successful in demonstrating clear links between efficacy expectations and a number of motivational indices. Studies on medical patients in exercise rehabilitation, for example, suggest that self-efficacy judgments can generalize but will be strongest for activities similar to the activity experienced, self-efficacy in "dissimilar" activities can be enhanced through counseling, and self-efficacy better predicts changes in exercise behavior than generalized expectancies of LOC (Biddle & Mutrie, 1991).

McAuley and colleagues have studied self-efficacy responses of older adults, a population previously underrepresented in the exercise and sport psychology literature (for reviews, see McAuley, 1992, and McAuley & Courneya, 1993). These studies have shown that exercise self-efficacy can be increased for older adults through intervention; will predict participation, particularly in the early stages of an exercise program; declines after a period of inactivity; and is associated with positive exercise emotion.

### *Analysis of Control-Related Properties*

Self-efficacy is agent-means in its orientation and therefore involves capacity beliefs. However, Bandura (1997) has also argued that efficacy beliefs are powerful predictors of several motivational indicators. He states,

People's beliefs in their efficacy have diverse effects. Such beliefs influence the courses of action people choose to pursue, how much effort they put forth, . . . how long they will persevere in the face of obstacles and failures, their resilience to adversity, . . . and the level of accomplishments they realize. (p. 3)

This takes self-efficacy beyond the narrow conception of agent-means efficacy expectations and suggests that agent-ends connections are present, too, and hence control beliefs. However, this may be taking self-efficacy beyond its originally intended scope.

Self-efficacy is believed to develop from four main sources. Ewart (1989) summarized the application of these in the context of promoting exercise in a rehabilitation situation:

The most effective way to encourage patients to adopt exercise activities for which they lack self-efficacy is to expose them to the recommended activity in gradually increasing doses [performance]; arrange for them to see others similar to themselves performing the activity [modeling]; have respected health care providers offer encouragement by providing reassurance and emphasizing the patient's accomplishments [persuasion]; and arrange the setting of the activity so as to induce a relaxed but "upbeat" mood [arousal; physiological state]. (p. 684)

Although self-efficacy can be placed in Skinner's (1995) competence system as regulative beliefs proximal and prior to behavior, interestingly, the sources of self-efficacy widely cited are diverse. These involve feedback from prior behavior (interpretive beliefs), observational learning (learning what is required to produce

a successful outcome, i.e., means-ends), and physiological control (an agent-ends connection as it concerns the link between the individual and responses). Self-efficacy, therefore, is not clearly identified simply as an agent-means construct involving capacity beliefs. It seems more than this, which is a point Bandura (1997) seems keen to make. One explanation may be that agent-means connections are only meaningful when they operate alongside positive beliefs linking means and ends. I will return to this point in my conclusion.

## **Achievement Goal Perspectives**

The study of achievement goal orientations has become very popular in the contemporary sport psychology literature (see Duda, 1993; Duda & Whitehead, 1998; Roberts, in press). Much of the increase in interest in achievement motivation over the past decade or so can be attributed to the investigation of achievement goals (Biddle, 1994).

### *Construct Overview and Research Summary*

Studies in this field have involved the investigation of people's beliefs about the definition of success, usually in task and ego terms. Task-oriented individuals use self-referenced criteria for judging success such as task mastery or improvement, whereas ego-oriented people use normative criteria such as superior performance to others' or winning.

It should be noted that most work has been conducted on achievement goal orientations—that is to say, a generalized tendency to define success in sport in terms of task and/or ego. The role of goal involvement states in specific sport situations has been researched less. Nevertheless, the study of goal involvement is important, and likely to be increasingly so, as we seek more situation-specific predictors of motivation (see Harwood & Swain, 1998; Vallerand, 1997).

The study of achievement goals, originally in education and now in sport, is based on the differentiation of ability and effort. Those holding a task orientation have a less-differentiated conception of ability, since to them "effort is ability." Those who are ego oriented, however, differentiate ability and effort, sometimes by operating a strategy of low effort to demonstrate their high ability, or shunning effort so as not to expose a lack of ability. Children from about the age of 11 or 12 years are able to differentiate ability from effort, and they view ability as "current capacity" (Nicholls, 1992). This is where effort is seen to affect performance up to the limits of one's current capacity; that is, ability will limit the effectiveness of effort.

In this field, research has provided knowledge around several themes, including goals and their relation to beliefs about sport success and beliefs concerning the nature of sport ability, and motivational, affective, and behavioral correlates of goals. Results have shown, quite consistently, that a high task orientation, either singly or in combination with a high ego orientation, is motivationally positive (Biddle, in press; Duda, 1993).

### *Analysis of Control-Related Properties*

Goal orientations appear to fit both agent-means and means-end connections. Goals reflect different conceptions of ability and thus are consistent with Skinner's (1996) capacity beliefs (agent-means). Consequently, they are also

regulative beliefs proximal to action within Skinner's competence system and, in this regard, have similar properties to self-efficacy (see Table 1). Indeed, the link between self-efficacy and goal orientations has been suggested before (Schunk, 1995). Holding a particular goal orientation will influence how an individual approaches a task, since he or she will attach different meanings to achievement and hence efficacy in meeting such a challenge.

However, in addition to goals' reflecting agent-means connections through conception of ability beliefs, they also reflect means-ends connections and strategy beliefs. Such beliefs are associated with the link between behaviors and outcomes and thus require knowing what factors will produce "success." Task-oriented individuals in sport will define success in self-referenced terms. Research has been quite clear in showing that such people believe strongly in the role of effort in producing sport success. Those who are primarily ego oriented will define success with reference to their performance relative to others, and research has supported the view that they believe that ability causes sport success (e.g., Biddle, Akande, Vlachopoulos, & Fox, 1996; Duda, Fox, Biddle, and Armstrong, 1992).

The differentiation in beliefs about the causes of sport success demonstrated by task- and ego-oriented individuals provides support for the view that a task orientation creates stronger perceptions of control. For example, control is more likely to be enhanced when both capacity and strategy beliefs concern effort rather than ability, thus giving task-oriented athletes a better chance to perceive control. Since effort itself is more controllable than ability (at least in the "natural ability" sense, discussed later), then belief that effort is important can be acted on. This is not always the case when ability is important.

The notion of "ability" is central to goal orientations theory and research. However, it is not at all clear what we really mean by ability. Given the centrality of ability and effort in constructs of control, it is recommended we look further into ability beliefs. Beliefs concerning ability, however, are multidimensional. For example, in the educational domain, Dweck and Leggett (1988) and Elliott and Dweck (1988) have discussed conceptions of ability in terms of beliefs about the nature of intelligence. They distinguish between intelligence believed to be relatively fixed and intelligence thought to be changeable. Children believing in a more fixed notion of intelligence (an "entity theory" of intelligence) were found to be more likely to adopt an ego-oriented achievement goal. Conversely, children believing that intelligence is changeable (an "incremental theory" of intelligence) were more likely to adopt a task goal. There is also evidence showing that self-efficacy and perceptual-motor performance are more positively affected by conceptions of ability associated with acquirable skill than when ability is viewed as inherent aptitude (Jourden, Bandura, & Banfield, 1991).

Nicholls (1992) has suggested that there may be parallels between "intellectual" and "athletic" activities in terms of the "nature and growth of skills" (p. 33). We tested whether beliefs concerning the fixed or incremental nature of sport ability were related to achievement goal orientations in 11- to 12-year-olds (Sarrazin et al., 1996) and found that children choosing a task goal were more likely to believe that sport ability was changeable.

The conception of sport ability, however, is likely to be broader than that suggested by either Dweck and Leggett (1988) or Nicholls (1992). Consequently, we have revisited the work of Fleishman (1964) in motor behavior by looking at his "scientific" conception of motor performance factors. He distinguished abilities from skills in relation to their determinants (inheritance/learning), specificity

(specific/general), and malleability (stable/changeable). Skills were seen as evolving from learning and being specific to a task or group of tasks. Abilities were viewed as quite stable, sometimes genetically determined, rather general, and limiting the effect of learning on performance. In addition to Fleishman's scientific view, one can identify a "lay view" of sport ability as expressed by sport spectators, parents, or journalists. Such notions include beliefs that sport ability is a gift—i.e., "God-given" or natural.

Using both scientific and lay conceptions, Sarrazin et al. (1996) developed a questionnaire to assess such beliefs and tested it with French adolescents. Specifically, we assessed beliefs in the following properties of sport ability: learning (sport ability is the product of learning), incremental (sport ability can change), specific ability (sport ability is specific to certain sports or types of sports), general ability (sport ability generalizes across many sports), stable ability (sport ability is stable across time), and gift-induced (sport ability is a "gift," i.e., "God-given"). The results showed correlations in the predicted directions with a task orientation correlating with beliefs that sport ability is incremental, the product of learning, and unstable. Beliefs that sport ability is a gift and general were associated with an ego goal orientation. When analyzing beliefs by goal profiles, the highest scores on the incremental and learning scales were reported by those in the high-task/high-ego and high-task/low-ego groups, whereas the lowest scores for gift beliefs were reported by those in the high-task/low-ego group.

In summary, goal orientations reflect important differences in the way we think about ability, thus fitting with the agent-means analysis. However, athletes, in addition to considering whether they have the requirements to successfully initiate the task (capacity beliefs), will also think about whether they have the requisite skills, abilities, and effort (means-ends strategy beliefs). Consequently, goal orientations may operate in both ways and thus be an important part of the development of control beliefs (see Table 1).

## **Self-Determination Theory**

### *Construct Overview and Research Summary*

Intrinsic and extrinsic motivation are well-known constructs in psychology and are thought to be central to any discussion on control and motivation. Deci and Ryan (1985) proposed that three key psychological needs are related to intrinsically motivated behavior. These are the needs for competence, autonomy, and relatedness. Competence refers to striving to control outcomes and to experience mastery and effectiveness. Humans seek to understand how to produce desired outcomes. Autonomy is related to self-determination. It is similar to deCharms' (1968) notion of being the "origin" rather than the "pawn," and to feel that actions emanate from the self. Finally, relatedness refers to striving to relate to, and care for, others; to feel that others can relate to oneself; and "to feel a satisfying and coherent involvement with the social world more generally" (Deci & Ryan, 1991, p. 345).

Sport psychologists are familiar with the basic tenets of cognitive evaluation theory (CET), itself a "minitheory" within self-determination theory (Deci & Ryan, 1985). CET states that rewards are best understood in terms of their impact on control and motivation by looking at the functions that rewards may have. If the reward provides information about the individual's competence, then it is quite

likely that intrinsic motivation can be enhanced with appropriate rewards (information function). If the rewards are seen to be controlling behavior (i.e., the goal is to obtain the reward), then withdrawal of the reward is likely to lead to subsequent deterioration in intrinsic motivation (controlling function).

It is important to note that informational events are those events that are perceived to convey feedback about one's competence within the context of autonomy. Events during which positive feedback occurs under pressure may be less powerful in influencing intrinsic motivation. Choice and positive feedback are perceived as informational, while rewards, deadlines, and surveillance tend to be controlling. Negative feedback is seen to undermine motivation and is therefore referred to as "amotivating."

**Behavioral Regulation.** CET involves the processing of information concerning reward structures. Extending this perspective, and including the psychological needs for competence, autonomy, and relatedness, Deci and Ryan (1985, 1991) have proposed a self-determination theory (SDT) approach to motivation. The nature of motivated behavior, according to Deci and Ryan, is based on striving to satisfy these three basic needs. This, they say, leads to a process of "internalization"—"taking in" behaviors not initially intrinsically motivating.

Deci and Ryan (1985) have linked the internalization concept to that of extrinsic and intrinsic motivation. In contrast to their earlier formulations in which these two motivational types were regarded as mutually exclusive, they proposed that they form a continuum on which different types of extrinsically regulated behavior can be located. Later, Deci and Ryan (1991) refer to the continuum as one representing "the degree to which the regulation of a nonintrinsically motivated behavior has been internalized" (p. 254).

The four main types of extrinsic motivation are external, introjected, identified, and integrated regulation, as shown in Figure 3. External regulation might be illustrated by someone saying, "OK, I'll go to the exercise class if I really must." This is an example of behavior being controlled by rewards and threats, such as in the case of coercion of children in school or pressure from your doctor to be more physically active.

Introjected regulation might be when one says, "I feel guilty if I don't exercise regularly." This is more internal in the sense that the individual internalizes the reasons for acting but is not truly self-determined. The individual is acting out of avoidance of negative feelings, such as guilt, or to seek approval from others for their performance or behavior. The term *introjection* has been used a great deal in different areas of psychology over the years and refers to someone "taking in" a value but, at the same time, not really identifying with it. It is not accepted as one's own and is reflected in feelings of "ought" rather than "want."



**Figure 3 — A continuum of self-determination.**

Identified regulation might be illustrated by the feeling of "I must exercise to look better." This lies farther toward the self-determined end of the motivation continuum, where action is motivated by an appreciation of the outcomes of participation, such as disease prevention or fitness improvement. Although this is a more internalized perspective and is moderately correlated with future intentions, it is still focused on a product or outcome. In physical activity it can be the most strongly endorsed reason for exercising (Chatzisarantis & Biddle, 1998) and has been identified by Whitehead (1993) as the "threshold of autonomy." It is behavior acted out of choice, where the behavior is highly valued and important to the individual. It reflects feelings of "want" rather than "ought." The values associated with the behavior are now accepted.

Whitehead (1993) reflects integrated regulation through the phrase, "I exercise because it is important to me and it symbolizes who and what I am" (p. 6). Integrated regulation is the most self-determined form of behavioral regulation, and the behavior is volitional "because of its utility or importance for one's personal goals" (Deci, Eghrari, Patrick, & Leone, 1994, p. 121). The behavior is "integrated" into one's self or identity. However, it is important to note that even though the behavior may be fully integrated, it can still be extrinsically motivated to some degree. This is because it may be an instrumental action, performed to achieve personal goals rather than for the pure joy of the activity itself (Deci & Ryan, 1991).

In contrast to these forms of external behavioral regulation, intrinsic motivation is shown when the individual participates for fun and for the activity itself. Clearly moving toward intrinsically, or integrated, motivated forms of behavioral regulation is advised for higher levels of intention and sustained adherence in sport and exercise, since they are likely to involve stronger feelings of personal investment, autonomy, and self-identity. Three types of intrinsic motivation have also been proposed: intrinsic motivation "to know," "to accomplish," and "to experience stimulation" (Vallerand, 1997), as shown in Figure 3.

Ryan and Connell (1989) proposed that

The constructs described in internalization theories can be related to several distinct classes of REASONS for acting that in turn have a lawful internal ordering. That is, these classes of reasons can be meaningfully placed along a continuum of autonomy, or of self-causality. (p. 750)

They suggested that the continuum should be demonstrable through a simplexlike or ordered correlation structure where variables are ordered "such that those deemed more similar correlate more highly than those that are hypothetically more discrepant" (p. 750). This has been demonstrated in physical activity research by Goudas, Biddle, and Fox (1994) and Mullan et al. (1997). Similarly, by weighting each subscale, an overall relative autonomy index (RAI) can be computed, with higher scores indicating higher autonomy.

In addition, it has been suggested that the state of "amotivation" exists where the individual has little or no motivation to attempt the behavior. Whitehead (1993) describes the move from amotivation to external regulation as crossing the "threshold of motivation." Vallerand (1997) has likened amotivation to a feeling of learned helplessness, although, as shown in Figure 3, there may be several types of amotivation involving not just beliefs of helplessness but also feelings that one has inadequate ability, effort, and strategies.

In a study of 11-to-15-year-olds in England, we assessed intentions to participate in leisure-time exercise in terms of both "autonomous" and "controlling" forms (Chatzisarantis, Biddle, & Meek, 1997). Specifically, we asked the children to rate the degree to which they intended to exercise because they "have to" (controlling) or because they "want to" (autonomous). Results showed that intentions predict physical activity when they are autonomous rather than controlling, lending support to SDT.

We have also studied the relationship between participation motivation, self-determination, and physical activity with 160 British and American students using a prospective design (Chatzisarantis, Biddle, & Frederick, 1998). Specifically, motives for exercising, measures of self-determination, and both autonomous and controlling intentions were assessed, and physical activity was assessed both 4 and 8 weeks later.

Results showed that physical activity is predicted by autonomous, but not controlling, intentions, and that fitness and social motives act as more autonomous and self-determining forms of motivation than the motive for appearance. This is shown to be associated with external and introjected behavioral regulation. The construct of autonomy, therefore, appears to be important in the study of adherence and the prediction of physical activity behaviors.

### *Analysis of Control-Related Properties*

Skinner (1996) has stated that "constructs related to autonomy are outside the proper domain of control" (p. 557). This reflects the distinction made by Deci and Ryan (1985), who distinguished between a need for competence and a need for autonomy. In addition, Deci and Ryan have stated that autonomy concerns freedom in initiating behaviors, whereas control is concerned with perceiving a contingency between action and outcome. In this regard, autonomy is agent-means (competence) and control is agent-ends (competence and contingency). But where does this leave the self-determination continuum (Figure 3) in terms of perceived control? Although the continuum uses language similar to that of control—intrinsic, external—it is essentially about reasons for acting, or what has been termed behavioral regulations. These vary by degrees of self-determination (autonomy) but not necessarily control or competence. Deci (1992) says that in his own work with Richard Ryan he has "proposed that intentional (i.e., motivated, personally caused) behaviors differ in the extent to which they are self-determined versus controlled" (p. 168). He goes on to say that "there is a great advantage to specifying different regulatory processes (or motivational orientations); namely, it provides a motivational means of explaining different qualitative aspects of human functioning" (p. 168).

As Deci and Ryan (1985) stated,

The need for self-determination is an important motivator that is involved with intrinsic motivation and is closely intertwined with the need for competence. . . . It is important to emphasize that it is not the need for competence alone that underlies intrinsic motivation; it is the need for self-determined competence. (pp. 31–32)

In other words, intrinsically motivated states must involve competence and autonomy. To use the well-known example of slaves, they have perfect competence



in rowing the ship but no autonomy. Therefore, although they have perceived control, they have no intrinsic motivation. Given freedom of choice, in all likelihood they would not choose to row the boat. The study by Chatzisarantis et al. (1998) demonstrated this point by showing that the correlation between intentions and physical activity was high only when intentions were seen as autonomous.

Competence and autonomy, therefore, are part of the wider picture of control, but we should be aware of the differences between the major constructs involved. If intrinsically motivated behavior, or behavior regulated by integrated means, is what we strive for in our athletes, exercisers, students, children, and so on, we need both competence and autonomy. Each is "necessary but not sufficient," since controlling competence or autonomous incompetence will not lead to self-determination. But with integrated regulation of behavior almost certainly come heightened feelings of competence and control. Internalized reasons for acting come to be experienced as self-regulated.

### **Perceived Behavioral Control in the Theory of Planned Behavior**

Finally, I will discuss briefly a single control variable that has received attention in recent exercise and sport psychology research, that of perceived behavioral control (PBC) within the theory of planned behavior (TPB) (Ajzen, 1985). Although there have been exceptions, research in physical activity settings has shown the utility of TPB in predicting intentions or behavior from attitudes, subjective norms, and PBC (Godin, 1993; Hausenblaus, Carron, & Mack, 1997).

PBC has been defined as "the perceived ease or difficulty of performing the behavior" (Ajzen, 1988, p. 132) and is thought to reflect predicted barriers, as well as past experience. For these reasons, PBC is best described as agent-means, hence involving capacity beliefs, and serves a regulative function proximal to behavior. This makes it conceptually similar to self-efficacy, as suggested by Ajzen (1985). However, studies incorporating self-efficacy and PBC often find that they make independent contributions to the prediction of intentions or behavior. For example, Terry and O'Leary (1995) found items reflecting self-efficacy and PBC to be factorially distinct. Moreover, they found that self-efficacy predicted intentions to be physically active but not activity itself, whereas PBC predicted physical activity but not intention. The two constructs require further testing in this regard. As stated, PBC seems to include beliefs built on past experience, as well as external barriers, whereas self-efficacy refers to beliefs concerning agent-means connections without necessarily distinguishing types of constraints. One of the problems, however, is probably less in the exact definitions of the two constructs—which, at least according to Skinner's model, are similar—but has more to do with the operationalization of the variables as questionnaire items.

### **Integrating Framework: Clarity or Confusion?**

I have attempted to summarize key issues in each of the areas of locus of control, attributions, self-efficacy, achievement goals, self-determination, and perceived behavioral control. Each has been analyzed in terms of Skinner's (1995, 1996) competence system and integrating framework in an effort to clarify the obvious similarities between these approaches. Such an analysis is, in my opinion,

overdue and should help researchers at least consider the constructs that they might investigate more closely. I will use the data in Table 1 to summarize the constructs. This will allow me to reach some form of closure yet stimulate ideas for future work.

It is noteworthy that all but attributions have a clear regulative function in the competence system, thus operating in close proximity to behavior. This should help make these theories successful in the prediction of behaviors, or at least intentions. However, we also need to consider whether studies have assessed the construct in a global, contextual, or specific way. For example, LOC beliefs have typically been assessed as either global (e.g., Rotter's I-E scale) or contextual (e.g., health-related) constructs, rather than in relation to specific situations. This could account for why they have been rather unsuccessful in behavioral prediction. Self-efficacy, on the other hand, probably the single most predictive variable of the set discussed, while also regulative, by definition is assessed in relation to a specific situation. Perceived behavioral control also involves a regulative function in the competence system and, in accord with recommendations from Ajzen (1988) concerning TPB, is assessed in relation to the specific target behavior. PBC has also been quite successful in predicting behaviors and intentions (Hausenblas et al., 1997).

It appears, therefore, that behavioral prediction is enhanced for proximal regulative control constructs when assessed in a situation-specific way. This is not a particularly insightful or novel conclusion, although it does highlight the issue of measurement specificity. However, Skinner (1996) rightfully points out that this should not necessarily affect the way we define the control construct. In other words, any of the constructs could be assessed at any level—global, contextual, or situation-specific—although self-efficacy has been defined in a way that does not easily allow global assessment. Self-efficacy, however, although primarily an agent-means construct used to predict future actions, could also be used in a retrospective way. For example, an athlete's confidence to train hard for a specific event will be influenced by prior experiences of training and training efficacy.

### *Are Agent-Means Connections Really Separate From Means-Ends?*

In using the agent-means-ends framework, it soon becomes clear that few of the constructs fit easily into one of the connections. For example, while classical self-efficacy work involves agent-means, it is not unreasonable—and has been implicated in a great deal of the work on self-efficacy—that efficacy beliefs can also be agent-ends. Similarly, the reality of making attributions should involve both means-ends (what is the cause of this outcome?) and agent-ends (did I cause this outcome?). Likewise, you could argue that feelings of autonomy are agent-means, yet behavioral regulations infer agent-ends connections. This apparent confusion is not dispelled by self-determination being seen as an “autonomy continuum”!

My conclusion from this analysis is that agent-means and means-ends connections may be separable at a theoretical level but are often closely related in practice. Agent-means connections refer to perceived competence, whereas means-ends are essentially about contingency (Skinner, 1996). True control must involve both. Early theories of “control,” such as LOC, were only contingency based, and this may account for weak or insignificant results in predicting behavior and for why competence-based approaches have proved more successful. In reality, beliefs concerning competence also include an element of assessing contingency.

Why should someone who feels confident about initiating a behavior but not confident of a successful outcome feel “in control”? Skinner (1996) argues that when agent-means connections are assessed, it is at a time when means-ends connections are already strong. For these reasons, many of the theories appearing to be either agent-means or means-ends often are both.

## Conclusions

Clear conclusions are not obvious from this analysis in terms of deriving a rank order of “good” to “bad” control-related constructs used in exercise and sport psychology. What we can conclude is the following:

- Behavioral prediction is enhanced for proximal regulative control constructs when assessed in a situation-specific way.
- Agent-means connections are often combined with means-ends beliefs in practical contexts, although the two are separable at a theoretical level.
- True perceived control must involve both perceived competence and contingency; thus control involves both agent-means and means-ends, or simply the direct agent-ends connection.

I propose that future work on control should at least consider constructs in terms of the following:

- Agent-means-ends connections and associated capacity, strategy, and control beliefs
- Whether they function as regulative (prospective), interpretive (retrospective), or both in the competence system
- Being proximal or distal to action
- Whether they are assessed in global, contextual, or situation-specific ways

Other issues that may need consideration are

- The empirical relationships between agent-means (competence) and means-ends (contingency).
- Links between autonomy and control.
- Different contexts in which one link in the agent-means-ends model is more influential than other links; contexts could include groups differing in age or other individual differences.

The centrality of control-related constructs in contemporary exercise and sport psychology demands that we investigate this area with greater precision and thoroughness. I cannot claim to have added unique insight to the field or achieved a satisfactory closure on all issues, but I hope I have raised issues that take us forward in the vital field of human motivation and control.

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