Journal of Leisure Research
2015, Vol. 47, No. 4, pp. 401–424

The Stage-Based Development of Behavioral Regulation within the Context of Physically Active Leisure

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Abstract

This study empirically tested the development of motivation within the Psychological Continuum Model (PCM) in the context of running. Different types of behavioral regulation and future exercise intentions were examined within the framework's distinct stages. Data were collected through an online survey of participants in a mass-participation running event (n = 1,083). Participants were placed into stages according to their level of running involvement using a three-step staging algorithm. MANOVA revealed significant positive relationships between stage of involvement and autonomous types of behavioral regulation and future exercise intentions. The results indicate that the PCM framework is able to account for the development of behavioral regulation. This contribution answers calls to empirically test theoretical frameworks for physically active leisure that help recreation and health professionals to understand maintenance of physically active behaviors.

Keywords: involvement, motivation, activity maintenance, stage-based framework

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Introduction

A considerable body of evidence suggests that engaging in regular physical activity decreases the risk of developing a number of chronic cardiovascular and metabolic diseases and mental health disorders (e.g., Miilunpalo, 2001; Paluska & Schwenk, 2000). Despite this knowledge, almost two thirds of the world's population fails to engage in enough physical activity to experience health benefits (World Health Organization, 2010). Numerous theories have been integrated into physical activity interventions that have been implemented with some reported success (Müller-Riemenschneider, Reinhold, Nocon, & Willich, 2008), yet no consistent progress in overall activity has been observed within the past decade (Centers for Disease Control and Prevention, 2010). Increasing levels of participation remains one of the biggest challenges facing recreation and health professionals. Due to disappointing results of interventions based on existing theory the development and empirical testing of frameworks for active participation is vital (Jackson, Howes, Gupta, Doyle, & Waters, 2005), and should be seen as a fundamental responsibility of scholars in this area.

To this end, Funk and James (2001) proposed the Psychological Continuum Model (PCM), a four-stage model of attitude formation and change that accounts for the sociological and psychological processes that determine an individual's psychological connection to an object, issue, or activity. Previous literature has indicated that the PCM framework can differentiate between participants in physically active leisure based upon attitudinal and behavioral characteristics (Funk, Beaton, & Pritchard, 2011); however, no studies have explicitly examined how the framework's stages account for motivation. Beaton, Funk, and Alexandris (2009) provided a conceptual description of how motivation develops within the PCM, but differences between individuals within the different PCM stages have not been empirically tested.

To explore the relationship between psychological connection and motivation, Self-determination Theory (SDT) (Deci & Ryan, 1985, 1991) is integrated into the PCM framework. SDT is a beneficial perspective, as it differentiates between types of autonomous (e.g., intrinsic motivation) and nonautonomous (e.g., amotivation) types of behavioral regulation. Autonomous regulation of behavior has been identified as a key aspect of long-term behavior change (Williams, Niemiec, Patrick, Ryan, & Deci, 2009), and is therefore an important aspect of maintaining participation in active leisure.

Baumann et al. (2002) suggested that participation in physical activity might be too complex a behavior to be addressed using a single theory; thus, putting complementary theories and conceptual frameworks in conversation with one another could provide a more comprehensive understanding. As such, the purpose of this study is to examine the development of different types of behavioral regulation within the PCM stages to empirically test the framework's ability account for participants' motivation. Furthermore, the study provides discussion of how the PCM framework can expand our understanding of motivation through behavioral regulation.

Literature Review

A number of prominent theories and conceptual frameworks have been used to investigate the adoption and maintenance of physical activity. Theories such as the Health Belief Model (Rosenstock, 1974), the Theory of Planned Behavior (Ajzen, 1991), Social Cognitive Theory (Bandura, 1986, 1991), and the Transtheoretical Model (Prochaska & DiClemente, 1982, 1986) have all contributed greatly to the current understanding of physically active behavior. These theories have resulted in the formulation of multi-component intervention programs, and im-

portant advances in public health promotion, in addition to generating productive conversation between scholars and practitioners. Yet despite the enormous contribution of this scholarship, our understanding of physically active behavior is far from complete.

In the late 1990s, in an oft-cited study, Baranowski, Anderson, and Carmack (1998) noted that the ability of theory to accurately predict physical activity participation was limited, but the theoretical frameworks under consideration has not changed considerably (e.g., Nigg et al., 2011; Rhodes & Nigg, 2011). Furthermore, in a study of correlates of physical activity behaviors, Bauman, Sallis, Dzewaltowski, and Owen (2002) found that none of the aforementioned theories —either individually or in combination—accounted for 15 variables associated with participation in physical activity. It should be noted that those theories did account for 10 variables that have been strongly associated with physical activity, and a further four that have demonstrated some (weaker or mixed) associations; however, the authors deemed that existing theories "seem to be an inadequate basis for understanding the behavior and guiding intervention design. They do provide much of the current framework for understanding physical activity, but theories need to evolve to incorporate emerging empirical data" (p. 10).

This assertion appears to be supported by the lack of efficacy demonstrated by studies of interventions based on these theories. A Cochrane Review of physical activity interventions by Jackson et al. (2005) could not locate a single citation that merited detailed review, while similar limitations were highlighted by Hutchison, Breckon, and Johnston (2009). A number of possible reasons for the reported lack of intervention efficacy have been offered, including the failure to accurately represent theory through programming (Adams & White, 2005), and mediating and moderating variables that were not taken into account by evaluations (Bauman et al., 2012; Bauman et al., 2002). These factors ought to be taken into consideration when interpreting results, and further research on these issues is required; yet, the development of new and existing theories should equally not be neglected. Theoretical development that can both expand our understanding of participation in physical activity, and form the basis of interventions should be seen as a primary responsibility of public health and leisure scholars.

To this end, Beaton and Funk (2008) conducted a review of six theoretical frameworks for studying physically active leisure: the Health Belief Model, the PCM (Funk & James, 2001), the Transtheoretical Model, the Theory of Planned Behavior, Schema Theory (Kendzierski, 1994), and the Sport Continuum Model (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993). Of the frameworks assessed, the authors concluded that the PCM was the framework that best satisfied their evaluative criteria.

In their review, Beaton and Funk deemed the PCM to be particularly promising in that it describes inputs, processes and outputs relating to behavior change. Additionally, the existence of a validated staging algorithm (Beaton et al., 2009) offers considerable appeal in terms of the framework's practical application. However, Beaton and Funk's (2008) review also notes that certain aspects of the framework required additional rigorous testing and evaluation. Although subsequent research (e.g., Beaton et al., 2009; Funk, Beaton, et al., 2011) has gone some way to addressing this, certain discrete aspects (e.g., the development of motivation) require further examination.

Psychological Continuum Model

The PCM was originally conceived to examine how an individual's psychological connection to a sport or leisure object develops (Funk & James, 2001), placing individuals into one of four hierarchical sequential stages: *Awareness* (e.g., "I know about running"), *Attraction* (e.g., "I like running"), *Attachment* (e.g., "I am a runner") and *Allegiance* (e.g., "I live to run"). The frame-

work has been validated in a number of active leisure contexts, such as golf (Funk, Beaton, et al., 2011), rugby and skiing (Beaton et al., 2009), and running (Beaton, Funk, Ridinger, & Jordan, 2011). These studies demonstrate that individuals in each PCM stage can be differentiated based on attitudinal and behavioral characteristics relating to the respective activities. Other studies using the PCM framework have focused on the segmentation of sport spectators (Doyle, Kunkel, & Funk, 2013), online exposure of niche sports (Mahoney, Hambrick, Svensson, & Zimmerman, 2013), and people's connection to charity sport events (Filo, Funk, & O'Brien, 2014).

Stage-based frameworks acknowledge that participation in leisure activities will be subject to various processes that impact the development of a psychological connection, and that different forces of equal magnitude may be enacted at different stages (Iwasaki & Havitz, 2004). Therefore, if physically active leisure is viewed as a progressive development, the reasons for maintaining or ceasing participation can be discussed in greater detail. Existing literature supports this, indicating that stage-based frameworks can be useful for examining concepts related to physical activity (e.g., constraints and negotiation strategies: Wilhelm Stanis, Schneider, & Pereira, 2010). Additionally, Brug et al. (2005, p. 247) suggest that "stage-targeted activity promotion interventions are more likely to induce changes in motivation as well as short-term behavior changes," which is particularly pertinent in the present context. Segmenting participants in this way can help public health interventions target attitudes that are salient during different stages of their relationships with physically active leisure. Nonetheless, evaluations of existing stage-based frameworks used for examining active participation (e.g., Adams & White, 2005; Brug et al., 2005) have indicated that there is much room for development, and that more empirical support is needed.

Progression through the PCM framework is based on a series of inputs that are internally processed, leading to attitudinal and behavioral outcomes (see Figure 1). Outcomes then become inputs for the next stage as an individual transitions through the framework. Person-specific inputs (e.g., gender, race, income, lifecycle), personal characteristics (e.g., height, weight, physical ability) remain important during internal processing, as do environmental factors such as constraints to participation (Carroll & Alexandris, 1997). Internal processing at each stage of the PCM framework will now be discussed in greater detail.

Awareness

An individual is classified as being in the Awareness stage when they become conscious of a leisure activity (e.g., "I know about running"). At this point they gain related knowledge and begin to identify opportunities to participate. This is prompted by socialization from external agents such as parents, peers, family, mass media, school, community-based programs, and cultural beliefs (McDonough & Crocker, 2005), which operate as Awareness inputs in Figure 1. At this point, actual participation has not yet begun or is unplanned, thus no positive affect has occurred. This decision is likely influenced by factors such as perceived ability (Netz & Raviv, 2004) and perceived or actual barriers to participation (Carroll & Alexandris, 1997). The attitudes that begin to form around the activity then become inputs for processing at the Attraction stage (Beaton et al., 2009).

Attraction

In the attraction stage, personal, psychological and environmental determinants interact with Awareness outcomes and lead to volition and emotional responses (e.g., "I like running"). Personal determinants include such factors as gender, race, and socioeconomic status, which may initiate participation (i.e., the first instance in which the individual actually engages in par-

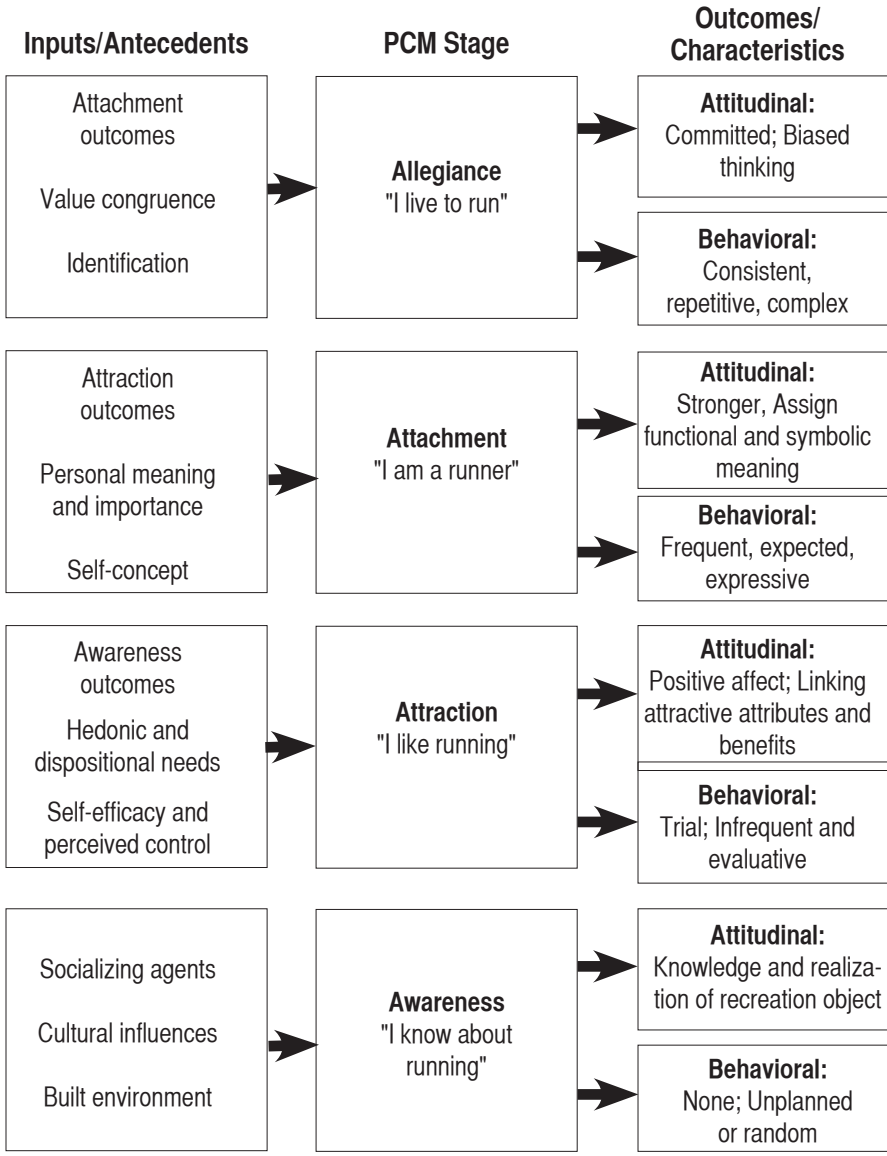

Figure 1. *Psychological Continuum Model stages and Processing*

ticipation). Psychological determinants refer to those that are assessed as potentially satisfying a need or providing a benefit (e.g., fulfillment of hedonic or dispositional needs). Environmental determinants explain why an individual may be attracted to activities that offer particular experiences (e.g., social situational contexts) (Crompton & McKay, 1997). Positive affect is extracted, while the decision to participate in the activity signifies an increased psychological connection. Factors such as self-efficacy, perceived constraints, enjoyment, and past behavior are introduced.

As participation continues, psychological connection to the activity and activity evaluation are increasingly based upon individual (as opposed to sociological) processes, prompting movement into the Attachment stage.

Attachment

Attachment occurs when an individual's attitudes toward the activity and self-concept become aligned (e.g., "I am a runner"). As both behavioral and psychological connection increase, functional, emotional, and symbolic meaning is attached to participation (Funk & James, 2006). Additionally, the increased frequency and regularity of participation in the activity creates opportunities for self-expression and immersion into relevant subcultures. The connection between participant and activity develops a strength property of collective associations generated through individuation (differentiation of self from other runners), integration (integration of self with other runners), and temporal orientation (self-changes from running situation to situation).

Allegiance

Upon entering the Allegiance stage, performance of the activity has become central to the participant's existence (e.g., "I live to run"), and the values of the activity are congruent with personal values. The cognitive connection between the individual and the activity becomes highly complex and guides further internal processing. The strength and complexity of this relationship guards against negative activity evaluation or information about viable alternatives (Pritchard, Havitz, & Howard, 1999). In the context of active leisure, it is proposed that the high resistance to change among allegiant participants can provide information about maintenance of participation, as it necessitates the rejection of alternatives (e.g., other forms of leisure activity or sedentary behavior).

At this juncture, it is pertinent to discuss how the PCM differs from another popular leisure framework—that of *serious leisure* (Stebbins, 1992). Serious leisure is defined as the pursuit of a "core activity that is highly substantial, interesting, and fulfilling and where, in the typical case, participants find a career in acquiring and expressing a combination of its special skills, knowledge, and experience" (p. 2). A key difference between the two frameworks is their treatment of *casual leisure*. Stebbins (2001, p. 305) notes that casual leisure can be defined as "all leisure not classifiable as amateur, hobbyist, or career volunteering," the three categorizations of those engaged in serious leisure, and that it refers to an, "immediately, intrinsically rewarding, relatively short-lived pleasurable activity requiring little or no special training to enjoy it" Stebbins, 1997, p. 18).

The PCM, on the other hand, treats hedonic benefits as a single facet of psychological involvement, which could be symptomatic of individuals in either the Attraction, Attachment, or Allegiance stages. While Stebbins' framework is better suited to differentiating between highly involved individuals (i.e., those who are engaging in serious leisure), his definition of casual leisure as universally hedonic (Stebbins, 1997; 2001) excludes groups that are important to the context of physical activity. For example, those who use their leisure time to improve their health through physical activity, but who derive little pleasure from participation itself. In this regard, the PCM offers a more nuanced categorization of those whose psychological involvement with physically active leisure is less or undeveloped.

Leisure Involvement

Psychological connection to a leisure activity is operationalized into the PCM framework using the leisure involvement construct. Involvement is defined as "a multifaceted construct that represents the degree to which participation in a [leisure] activity becomes a central component

of a person's life and provides both hedonic and symbolic value" (Beaton et al., 2011, p. 136). Although there is a general consensus that leisure involvement is a multifaceted construct (Havitz & Dimanche, 1997; Kyle & Mowen, 2005), the facets that ought to be included have sparked considerable debate.

Recent conceptions of the construct comprise three principle facets: *Pleasure, Sign,* and *Centrality*, which will be defined here in relation to running behavior. Pleasure refers to the hedonic or positive affect elicited from running. This facet was first acknowledged as a deficiency in unidimensional involvement constructs that did not account for such responses (Zaichkowsky, 1987). Sign is the extent to which running provides opportunities for self-expression, while Centrality indicates how central running is to an individual's life (Beaton et al., 2009). The use of similar variations of these three facets to measure leisure involvement has been supported within the associated literature (e.g., McIntyre, 1989; Schuett, 1993).

It is likely that a positive linear relationship will exist between psychological connection to a leisure activity and actual participation, as seen in the PCM stage progression in Figure 1; however, this is not always the case. Pritchard and Funk (2006) note that a state of ambivalence can occur when the relationship between connection and participation becomes inert or bi-directional. In relation to this, prior research examining stage-based attitudes and behaviors underlines the potential of the PCM framework to account for potential non-linear relationships between psychological connection to and participation in a leisure activity (Funk, Beaton, et al., 2011). As such, the framework is able to identify two theoretically important groups: 1) individuals with corresponding levels of attitudes and behaviors (i.e., level of connection = level of participation), and 2) individuals whose observed behaviors are inconsistent or weakly correlated to attitudes (i.e., level of connection > level of participation; or level of participation > level of connection).

The possibility of divergent profiles highlights important differences that can exist between attitudes and goal directed behaviors related to motivation. For example, within the PCM, psychological connection is operationalized through leisure involvement, and could be conflated with a motivational construct. However, psychological connection represents a more complex attitudinal evaluation that considers a leisure activity holistically (e.g., the perception that running or walking is fun, linked to one's self-concept, and an important part of everyday life). In contrast, motivation is generally conceptualized as directed purposeful behavior specifically *toward* an actual behavior (e.g., "I want to run or walk 5K on Saturday morning"). As such, motivation is best described as a force or influence that results in goal directed behaviors that could influence the level of psychological connection. A successful framework of physically active leisure must be able to account for such complexity in order to provide a comprehensive account of participation (i.e., motivation *and* psychological connection); thus, conceptual and empirical distinction of motivation within the PCM is vital.

Behavioral Regulation

Self-Determination Theory (SDT: Deci & Ryan, 1985, 1991) is perhaps the most popular theory for examining the relationship between motivation and participation in active leisure (Hagger & Chatzisarantis, 2007). According to SDT, different types of motivation correspond to different ways in which behavior (e.g., participation) is regulated (Ryan & Deci, 2000). Behavioral regulation has been operationalized as a multidimensional construct consisting of different types of regulation (presented here in relation to running): *amotivation* refers to the absence of any motivation to run; *external regulation* denotes running entirely due to external pressures or rewards; *introjected regulation* internalizes external factors as self-imposed pressures to run,

thus avoiding feelings of guilt or boosting self-esteem; *identified regulation* accepts running as an important pathway to achieving outcomes that are of personal importance; *intrinsic motivation* involves running solely for the pleasure derived from participation (Ryan & Deci). Intrinsic motivation and identified regulation are autonomously endorsed types of behavioral regulation, reflecting personal volition and perceived importance of a behavior.

Many studies regarding behavioral regulation and physical activity have examined behavioral *intentions* as opposed to actual behavior. Prominent works focus on such intentions related to women's (Wilson & Rodgers, 2004) and children's (Chatzisarantis, Biddle, & Meek, 1997; Standage, Duda, & Ntoumanis, 2003) participation in physical activity, concurring that autonomously regulated behavior is associated with increased intentions to maintain behavior. However, more recently, studies have addressed the relationship between autonomous regulation of behavior and actual participation in physically active leisure. Teixeira, Carraça, Markland, Silva, and Ryan (2012) conducted a review of 66 studies published up until 2011 related to exercise motives, self-regulation, and motivation. The authors concluded that intrinsic motivation was mostly predictive of long-term adherence to physically active behavior. Further studies have made similar observations in various contexts, using both adolescent (e.g., Caldwell, Patrick, Smith, Palen, & Wegner, 2010; Sebire, Jago, Fox, Edwards, & Thompson, 2013) and adult samples (e.g., Gardner & Lally, 2013).

Outside the exercise psychology and leisure literature, Williams et al. (2009) found that an anti-smoking intervention promoting autonomous self-regulation facilitated long-term tobacco abstinence. Cessation of a behavior (i.e., cigarette smoking) cannot be equated to the adoption of another (i.e., engaging in active leisure) (Adams & White, 2005); however, the body of literature concerning SDT and various types of behavior change provides the best indication that a relationship exists between the autonomous regulation of behavior and the maintenance of behavior. Support has also been found in the contexts of adherence to medical prescriptions (Williams, Freedman, & Deci, 1998), and attendance at an outpatient clinic (Ryan, Plant, & O'Malley, 1995). Therefore, examining the development of autonomous regulation within the PCM framework is important if it is to inform recreation and health professionals about the adoption and maintenance of active leisure.

Conceptually, as psychological connection to the leisure activity increases, so would one's ability to autonomously self-regulate behavior (Beaton et al., 2009), but this has not yet been empirically demonstrated. Establishing a causal relationship between a psychological connection to an activity and behavioral regulation is problematic, as it likely that each provides the impetus for the other during different periods in an individual's association with an activity, or indeed, that involvement and behavioral regulation work in tandem to influence participation. Motivation is however, an integral part in participants' decision-making sequence, and it is important to verify that high involvement is consistent with autonomously regulated behavior. The highly resistant connection between participant and activity described in the Allegiance stage will guard against relapse into sedentary lifestyles (Iwasaki & Havitz, 1998).

At this juncture, it is helpful to clarify the advantages of using both the SDT and the PCM. First, SDT is a theory of motivation, useful in explaining why participation in physically active leisure occurs through the use of key constructs, correlates, and casual relationships. The PCM is a conceptual framework that describes why and when certain segments of a population achieve different levels of attitude formation to the leisure activity. This allows researchers to integrate various theories such as SDT to help identify and explain key antecedents and relationships at various stages. It is proposed here that the different types of behavioral regulation described

within SDT can inform the development of motivation within the PCM stages, providing a stage-based understanding of participation in and adherence to physically active leisure. Conversely, the PCM can also provide information about behavioral regulation that can be useful to scholars in future theoretical development, and to practitioners through subsequent application.

Previous PCM studies have examined participants' resistance to behavioral change (e.g., Beaton et al., 2009), demonstrating an incremental increase coincides with PCM stage progression; however, this must be seen as distinct from behavioral regulation. Resistance to change is defined as "the tendency to resist changing preference for activity" (Beaton et al., 2009, p. 190), focusing on stopping or changing behavior. Similarly, this cannot be assumed to be the same force as motivation, as it does not direct individuals *toward* a specific physically active behavior. Instead, levels of autonomous and nonautonomous regulation of running behavior can provide more detailed accounts of the attitudes participants in each PCM stage form toward the activity. Additionally, this approach is better able to account for a range of individuals who have different levels of experience with a particular activity. For example, someone who has only recently taken up running may be motivated to run, but may still be susceptible to suggestions of alternative activities.

As stated, much of the PCM's potential is contingent upon its ability to account for individuals' motivation to participate in physically active leisure. To this end, the following hypotheses are offered to empirically examine the development of behavioral regulation (motivation) across its three stages:

H_1: A positive relationship will be observed between the level of autonomous types of behavioral regulation (i.e., identified and internal regulation) and progression through stages of increasing psychological connection toward the leisure activity

H_2: A negative relationship will be observed between the level of nonautonomous types of behavioral regulation (i.e., amotivation and external regulation) and progression through the stages of increasing psychological connection toward the leisure activity.

Future Intentions to Exercise

Ajzen (1991) proposes that future intentions are an essential part of positive or negative feelings toward an activity—in this case, general exercise behaviors. Future intentions to engage in such behaviors are manifested in an individual's readiness to perform certain actions (e.g., engaging in regular physical activity, entering mass participation sporting events, etc.) (Alexandris & Stodolska, 2004). Furthermore, Funk, Jordan, Ridinger, and Kaplanidou (2011) found that mass-participation running events promote future intentions to engage in general exercise intentions among the least active sections of the population. These attitudes have been shown to be important correlates of future behavior (Wilhelm Stanis et al., 2009), raising the possibility that participants develop positive attitudes toward other exercise behaviors as they experience health benefits through preparation for and participation in running events (Wilson & Rodgers, 2004). Pertinent to the present context, Dishman (2003) suggests that 25% of future physical activity can be explained by intentions to participate; therefore, such intentions represent an important step toward receiving health benefits from active leisure.

To examine future exercise intentions among participants within different stages of psychological connection to running, the following hypothesis was generated:

H_3: A positive relationship will be observed between the level of future exercise intention and progression through stages of increasing psychological connection toward the leisure activity

Method

Participants

Data were collected from individuals who had registered for a Mass Participant Running Event (half-marathon) in the Northeastern United States. Completed surveys were obtained from 1,083 participants. Of this number, 43% were male and 57% were female, with 70% being 20–44 years old. The racial breakdown was 88% white/Caucasian, 5% Asian, 3% black/African American, and 2% Hispanic/Latino. Participants completed an average of 4.4 running events per year, with 47% completing three or fewer.

Mass-participation running events provide access to a large, active population that will inevitably display varying levels of involvement with running. Unlike many other events or activities, mass-participation running events have been shown to attract individuals from the least physically active sections of the population (Dishman, 2003), which is important for two reasons: a) the need to understand the adoption and maintenance of active leisure specifically concerns the well-being of those individuals, and b) participation among those individuals provides a greater number of responses from those in the early stages of running involvement.

Focusing on participants in a half-marathon event offers some benefits, but also presents some challenges. First, in order for the present study to examine how motivation is manifested throughout the PCM framework, it is imperative that the sample comprises individuals at each stage of psychological connection. While a full marathon may be skewed toward highly involved runners, and a short distance (e.g., 5k) may be skewed toward those with low involvement, a half-marathon provides a more even distribution. This is supported by the findings of Beaton et al. (2011), who recorded the involvement of participants in three running events (5k, half-marathon, and marathon) that were part of a single larger event. However, it is likely that the level of training that may be involved in preparing for and completing a half-marathon makes the results harder to extrapolate to a population level intervention. This was addressed in the interpretation of the results and study implications.

To confirm that the half-marathon sample did, in fact, include a cross-section of physical activity levels prior to the event (as per Dishman, 2003), respondents were asked to report on how many days in a typical week they engaged in physically active leisure. A relatively symmetric distribution of activity levels were observed, with 4% indicating that they were completely sedentary, and over 19% were active on three or fewer days. Furthermore, it is likely that these activity levels are inflated due to the training completed in anticipation of participation in the half-marathon. Thus, while the sample is still specialized (i.e., predominantly white/Caucasian adults aged 20–44), the results can still provide information about both active and inactive individuals within a section of society that reports 67% prevalence high body mass index, and 13% Grade 2 and 3 obesity (Ogden, Carroll, Kit, & Flegal, 2014).

Procedure

Contact information for participants was obtained from race registration data supplied by the event organizers. An online survey instrument was distributed via email, which contained an anonymous link. The email was sent to a total of 6,803 half-marathon registrants who provided

the organizers with a valid email address. A total 1,083 valid responses were received (response rate of 16%). The demographic information indicates that the sample was consistent with half-marathon participants in the US, as reported by Running USA (2014).

Measures

Psychological connection. Involvement with running was measured as a multidimensional construct on the three aforementioned facets emerging from the literature: Pleasure, Sign, and Centrality (Kyle & Mowen, 2005). Each subscale contained three items, each of which presented an associated statement, and responses were measured on a seven-point Likert scale, from *"strongly disagree"* (1) to *"strongly agree"* (7). Participants were assigned to PCM stages using the staging algorithm that was developed by Beaton et al. (2009). Mean scores are calculated for Pleasure, Sign, and Centrality, after which each score is classified as being high (H), medium (M), or low (L). These classifications were used to create an involvement profile for each participant (e.g., Pleasure = H; Sign = M; Centrality = L). Participants were then assigned to a PCM stage based upon this profile. See Figure 2 for detailed breakdowns of the profiles that correspond to each stage.

Attraction			Attachment			Allegiance		
P	C	S	P	C	S	P	C	S
M	L	L	L	L	M	M	H	H
H	L	L	L	L	H	H	H	M
L	L	L	L	M	L	H	M	H
			L	M	M	H	H	H
			L	M	H			
			L	H	L			
			L	H	M			
			L	H	H			
			M	L	M			
			M	L	H			
			M	M	M			
			M	H	L			
			M	M	M			
			M	M	H			
			M	H	M			
			H	L	M			
			H	M	L			
			H	M	M			
			H	L	H			
			H	H	L			

Involvement Facets
P = Pleasure
C = Centrality
S = Sign

Involvement Scores
L = Low
M = Medium
H = High

Figure 2. Involvement Profiles for Attraction, Attachment, and Allegiance PCM Stages, Adapted from Beaton et al. (2009)

Accordingly, participants were assigned to the three stages: Attraction (n = 152), Attachment (n = 373), or Allegiance (n = 558) stages. The Awareness stage was excluded from the study, as it is not conceptually possible for race participants to fall below Attraction (i.e., participation has to be an indication of Attraction or a higher level of involvement). Participants reporting a low score on all three involvement facets were placed into the Attraction stage.

Behavioral regulation. Self-determination was measured using the Behavioral Regulation Exercise Questionnaire (BREQ-2: Markland & Tobin, 2004). The BREQ-2 consists of self-report items that assess exercise regulations consistent with SDT. Items were measured on five subscales: amotivation, external regulation, introjected regulation, identified regulation, and intrinsic motivation. A series of statements were presented, with responses recorded on a seven-point scale ranging from *not true for me* (0) to *very true for me* (7).

Future exercise intentions. Participants' future intentions toward general exercise behavior were measured using three items,. each of which presented a statement about future intentions to exercise, with responses measured on a seven-point Likert scale from *"strongly disagree" (1) to "strongly agree" (7).*

Data Analysis

Survey data were analyzed using IBM SPSS Statistics, Version 21 for Mac OS X. Confirmatory Factor Analysis (CFA) was conducted in order to evaluate construct and discriminant validity (see Table 1). The CFA assessed relationships between 27 variables derived from survey items, and nine constructs (all of which were measured using three items): pleasure (PLE), sign (SIG), centrality (CEN), amotivation (AMO), external regulation (EXR), introjected regulation (IJR), identified regulation (IDR), intrinsic regulation (INR), and future exercise intentions (FEX). Cortina (1993) noted that constructs with fewer than six items can be considered to be acceptable above a Cronbach's alpha coefficient of .60; thus, all eight constructs were deemed to be valid.

Correlations were examined to determine the strength and directions of relationships between variables (see Table 2). Tabachnick and Fidell (1989) recommend that multivariate analysis of variance (MANOVA) be used with dependent variables that are moderately correlated or make conceptual sense. Excluding correlations involving AMO, EXR, and IJR, only the correlation between SIG and FEX fell below the standard for a moderate correlation (Dancey & Reidy, 2004). AMO, EXR, and IJR refer to nonautonomous types of behavioral regulation; therefore weaker positive and negative correlations with other variables make conceptual sense and are not problematic for the aims of the study. The variables are maintained to provide more information about nonautonomous regulation among individuals in different PCM stages. The remaining variables reported correlations between moderate (.40, SIG and INR) and strong (.76, PLE and INR).

MANOVA was conducted to assess whether significant differences existed between participants with different levels of running involvement (indicated by PCM stages of Attraction; A_1, Attachment, A_2; and Allegiance, A_3) in terms of autonomous regulation of running behavior, intentions to exercise in the future, and existing exercise behaviors. Homogeneity of variance was not assumed; therefore, Tamhane's T2 post-hoc test was conducted to confirm differences for each dependent variable between PCM stages. No differences based on demographic information (e.g., sex, age, race, etc.) were observed between participants classified into in each stage.

Table 1

Individual Scale Items and Factor Loadings (n = 1,083)

Involvement Facets	Factor Loadings
Pleasure (PLE)	a = .93
I like running	.86
I find running pleasurable	.91
I enjoy running	.94
Sign (SIG)	a = .77
You can tell a lot about a person by seeing them participate in running	.72
When I run, I can really be myself	.68
Running gives others a glimpse of the type of person I am	.90
Centrality (CEN)	a = .91
A lot of my life is organized around running	.88
Running has a central role in my life	.82
A lot of my time is organized around running	.95
Behavioral Regulation	
Amotivation (AMO)	a = .71
I don't see why I should run	.70
I don't see the point in running	.69
I can't see why I should bother running	.71
External Regulation (EXR)	a = .67
I run because other people say I should	.71
I run because others will not be pleased with me if I don't	.64
I feel under pressure from my friends/family to run	.70
Introjected Regulation (IJR)	a = .67
I feel guilty when I don't run	.70
I feel ashamed when I miss a running session	.68
I feel like a failure when I haven't run in a while	.63
Identified Regulation (IDR)	a = .77
I value the benefits of running	.76
It's important to me to run regularly	.79
I think it is important to make the effort to run regularly	.78
Intrinsic Regulation (INR)	a = .70
I run because it's fun	.72
I enjoy my running sessions	.71
I find running to be a pleasurable activity	.67
Future Exercise Intentions (FEX)	a = .80
I intend to exercise as much as I can	.75
I intend to exercise at least three times per week	.81
I intend to exercise regularly	.80

Table 2

Means, Standard Deviations and Correlations for Facets of Involvement and Behavioral Regulation, and Future Exercise Intention

	PLE	SIG	CEN	AMO	EXR	IJR	IDR	INR	FEX	M	SD
PLE	1.00									6.31	0.81
SIG	.59	1.00								5.15	1.15
CEN	.51	.64	1.00							5.39	1.26
AMO	-.33	-.09	-.15	1.00						1.57	1.01
EXR	-.30	-.04	-.13	.66	1.00					1.96	1.20
IJR	.10	.29	.25	.23	.17	1.00				4.29	1.53
IDR	.60	.35	.43	-.54	-.39	.21	1.00			6.32	0.81
INR	.76	.40	.47	-.61	-.36	.12	.74	1.00		6.27	0.82
FEX	.45	.30	.41	-.44	-.27	.19	.57	.60	1.00	6.30	0.81

Results

MANOVA revealed significant differences between PCM stages in terms of the five types of behavioral regulation (AMO, EXR, IJR, IDR, and INR) and FEX, with a large effect size according to the guidelines of Cohen (1992) (Wilk's $\Lambda = .68$; F (9, 2056.000) = 36.5, $p < .001$, $\eta^2 = .18$). Comparisons between PCM stages using Tamhane's T2 post-hoc test revealed significant ($p < .01$) incremental increases in IJR, IDR, and INR with PCM stage progression ($A_1 < A_2 < A_3$) (See Table 3). Accordingly, H_1 was supported. Mean scores for those three types of behavioral regulation at each PCM stage are as follows: IJR, $A_1 = 3.56$, $A_2 = 4.10$, $A_3 = 4.62$; IDR, $A_1 = 5.64$, $A_2 = 6.19$, $A_3 = 6.59$; INR, $A_1 = 5.51$, $A_2 = 6.13$, $A_3 = 6.60$.

Significant incremental decreases ($p < .01$) were observed in AMO with PCM stage progression ($A_1 > A_2 > A_3$), with mean scores of $A_1 = 1.98$, $A_2 = 1.61$, $A_3 = 1.45$. No significant difference was found for EXR between mean scores in A_1 (2.25) and A_2 (2.06), but participants in A_2 reported significantly ($p < .01$) higher scores than those in A_3 (1.82). As such, partial support for H_2 was observed.

Tamhane's T2 post-hoc test also revealed significant ($p < .01$) incremental increases in FEX in line with PCM stage progression ($A_1 < A_2 < A_3$), providing support for H_3. Mean scores for participants in each PCM were calculated as $A_1 = 5.67$, $A_2 = 6.16$, $A_3 = 6.60$.

Discussion

This study contributes to the understanding of adoption and maintenance of physically active leisure, addressing Jackson et al.'s (2005) call for additional testing of relevant theoretical frameworks. The results demonstrate that autonomous regulation develops incrementally alongside PCM stage progression. Specifically, as psychological connection to running increases, so does the ability to autonomously regulate behavior. In contrast, the reported levels of nonautonomously regulated behavior incrementally decrease alongside psychological connection to running. This provides new empirical evidence of how motivation operates within the PCM framework, supporting the conceptual description offered in previous literature (Beaton et al., 2009). The findings also corroborate previous studies that established the ability of the PCM to differentiate between participants in physically active leisure based on their attitudes toward

Table 3

Between-PCM Stage Multivariate Analysis of Variance of Behavioral Regulation (n = 1,083)

PCM Stages	Types of Behavioral Regulation					Intentions
	AMO [a]	EXR [b]	IJR [c]	IDR [c]	INR [c]	FEX [a]
Allegiance	1.45	1.82	4.62	6.59	6.60	6.60
(SD)	(1.01)	(1.20)	(1.53)	(.69)	(.65)	(.66)
n = 558						
Attachment	1.61	2.06	4.10	6.19	6.13	6.16
(SD)	(.92)	(1.16)	(1.43)	(.73)	(.73)	(.80)
n = 373						
Attraction	1.98	2.25	3.56	5.64	5.51	5.67
(SD)	(1.11)	(1.19)	(1.40)	(.89)	(1.01)	(.93)
n = 152						

[a] Between-PCM stage post-hoc tests, mean score differences ($A_1 > A_2 > A_3$), $p < .01$
[b] Between-PCM stage post-hoc tests, mean score differences ($A_1 > A_3$; $A_2 > A_3$), $p < .01$
[c] Between-PCM stage post-hoc tests, mean score differences ($A_1 < A_2 < A_3$), $p < .01$

exercise (Funk, Beaton, et al., 2011). The context of a mass-participation running event (MPRE) further extends the application of the PCM in physically active contexts (Beaton et al., 2009; Beaton et al., 2011).

It should be noted that the reported effect size for the MANOVA suggests that a modest difference in each type of behavioral regulation existed between PCM stages; however, several authors (e.g., Glass, McGaw, & Smith, 1981; Thompson, 1999, 2008), including Cohen (1992) himself, cautioned on the dangers of relying on effect size categorizations of *small*, *medium*, and *large*. Rather than universally following these categorizations, researchers should also interpret their findings in relation to the research context. Subsequently, the meaningfulness of the observed differences in the present study is indicated by the incremental increases in involvement and autonomous forms of behavioral regulation, and the descending patterns of involvement with nonautonomous regulation. The following discussion addresses these findings in relation to the three hypotheses that were proposed.

Behavioral Regulation

Autonomous behavioral regulation. Hypothesis 1 stated that autonomous types of behavioral regulation (i.e., IDR and INR) would incrementally increase alongside PCM stage progression, and was supported. In the context of physically active leisure, the autonomous regulation of behavior refers to participation based upon internalized motivations. Such types of regulation result from an internal perceived locus of causality, reflecting a sense of personal volition and acknowledging the importance of active behavior (Ryan & Deci, 2000; Wilson & Rodgers, 2004). The incremental increases observed in identified and intrinsic regulation at each PCM stage indicate that internal motivational factors (e.g., to improve health, if that is personally important; or purely for the joy derived from running) become more salient as psychological connection to running strengthens.

As running behavior becomes more frequent and consistent, the psychological connection between participant and activity becomes more complex, in that it is implicated in the participant's sense of self (e.g., "I am a runner" or "I live to run") (Funk & James, 2001). This is important in the context of maintaining participation, as conceptually, the strength and complexity

of the connection guard against others' negative evaluations of running and/or consideration of alternative activities (Funk & James, 2006). Such negative evaluations could also result in the rejection of running entirely, resulting in sedentary lifestyles. Similarly, autonomous behavioral regulation is associated with behavioral persistence (Ryan & Deci, 2001); thus, the alignment of higher running connection (Attachment and Allegiance) with autonomous regulation of running behavior (IDR and INR) demonstrates the convergent validity of the PCM framework.

Participants in the Attachment and Allegiance stages reported high scores for both IDR and INR (means ≥ 6.13). These high scores facilitate two nonmutually exclusive interpretations: a) that allegiant and attracted individuals predominantly utilize both IDR and INR to regulate running behavior, and b) that runners in the Attachment stage are likely to experience positive motivational consequences similar to those in Allegiance. Ryan (1995) offers a possible explanation for this, noting that many people engage in behaviors that they think are important, but do not find them to be overly interesting or pleasurable. This can be seen in the involvement profiles proposed by Beaton et al. (2009), which indicate that an individual can score low on the Pleasure facet and still be in the Attachment stage provided the activity is central to their life and/or is of personal significance (see Figure 2).

The importance of IDR in understanding behavioral maintenance is further supported by the studies of Koestner, Losier, Vallerand, and Carducci (1996) and Wilson and Rodgers (2004), who found it to be the strongest predictor of voting behavior and physical activity participation respectively. In terms of physically active leisure, individuals in Attachment are similarly able to autonomously regulate their running behavior as those in Allegiance, indicating that motivation leading to behavioral maintenance is likely to occur prior to the summit of the PCM framework. This finding is also consistent with those of Kinnafick, Thøgersen-Ntoumani, and Duda (2014), and Markland and Ingledew (2007), who found that IDR can offer similar benefits to INR; thus, full internalization of motivation may not be necessary for adherence to physically active leisure.

These outcomes are potentially important for understanding both participation and maintenance of participation in physically active leisure. If movement through the PCM framework is progressive, individuals will reach Attachment to a leisure activity before Allegiance during the trajectory of their participation. This is based upon the premise that psychological connection to a leisure activity develops according to inputs and outputs that are not necessarily governed by temporal factors. For example, there is no guarantee that participating in running as a leisure activity for a long period time will result in consistent movement upward through the stages of the PCM framework. Indeed, an individual may never become allegiant to running regardless of long-term participation; thus, the finding that autonomous regulation is utilized by runners prior to Allegiance is encouraging. In accordance with the involvement profiles in Figure 2, this would mean that running participants are able to autonomously regulate behavior without attaining high levels on any one facet. Recreation and health professionals should therefore focus on developing Attachment inputs (e.g. functional, emotional and symbolic meaning of the leisure activity to the participant) as the end goal of stage-targeted interventions.

Nonautonomous behavioral regulation. Differing patterns were found for the two types of nonautonomous behavioral regulation that were measured (IJR and EXR), providing partial support for H_2. These are controlled regulations associated with forced compliance through external demands and negative feelings related to the target behavior (Ryan & Deci, 2001). First, the incremental increase in IJR with progression through the PCM stages reveals that as the connection toward running strengthens, the roles of guilt and failure as external motivational forces does not diminish, compared to those who are less connected. This finding highlights the

value of understanding motivation within the PCM stage-based framework, as external forces have been conceptualized as decreasing when higher stages are achieved. Hence, specific forms of external behavioral regulation such as guilt, shame and failure will continue to govern attitude formation and change and should be acknowledged. It is possible that the incremental increase observed is a function of continued positive benefits accrued regardless of the source of the goal directed behavior. Nonetheless, reported IJR levels are considerably lower than both IDR and INR among runners in Attachment and Allegiance.

Second, EXR is also a controlled regulation, and is concerned with external motivational factors, such as pressure from friends and/or family to run. In such a case, individuals reporting high EXR are likely to participate to avoid negative evaluation from those persons should they fail to do so (Ryan & Deci, 2000). As such, the incremental decrease in EXR with stage progression is conceptually aligned with the PCM framework. At the Attraction stage, individuals are gathering knowledge about running from external sources (e.g., friends and/or family), leading to positive social evaluations derived from participation (Funk & James, 2001). As the individual progresses through the stages of the PCM, social affiliation and social recognition needs dissipate as more internalized forms of behavioral regulation become salient. This leads to the predominance of autonomous regulations reported by more connected runners.

While nonautonomous types of behavioral regulation do not correspond to durable attitudes toward running (i.e., Attachment and/or Allegiance), it is vital that the PCM demonstrates the ability to account for a range of motivational profiles. Theoretical frameworks must be able to inform recreational and health practitioners about attitudes toward participation (or nonparticipation) among the least active sections of the population (Dishman, 2003), and the results of the present study support this functionality.

Contributions of the PCM to Motivation

In order to position the PCM as a framework that can develop interventions that motivate people to be physically active, it is important to demonstrate its contribution to understanding motivation. The observed association between levels of autonomous and nonautonomous behavioral regulation and the PCM stages enables conceptual inferences to be made about the needs and tensions that motivate participants in physically active leisure.

First, nonautonomous forms of behavioral regulation are associated with dispositional needs (e.g., psychological needs, personality traits, and individual attributes) stimulate an initial interest in participation. For example, deciding to join a running group may satisfy a person's need for social interaction or create a sense of belonging. Funk and James (2006, p. 192) suggested, "Such needs serve as catalysts and motive people to connect with sport objects… because the connection allows the individual to express important characteristics or traits and satisfy particular needs." This is consistent with Ryan and Deci's (2000) aforementioned suggestion that EXR might represent participation to avoid negative evaluation from one's social network, although it may equally be positively oriented. For instance, support from friends, family, and broader social networks has been found to be an important factor in decisions to participate in physical activity (Anderson et al., 2006; McNeill et al., 2006).

Levels of reported AMO and EXR were low (< 2.26) within the present study; thus, the appropriateness of basing intervention programing on these types of nonautonomous behavioral regulation may be ill advised. The higher levels of IDR and INR that were observed are perhaps more instructive in this regard. Conceptually, autonomous behavioral regulation is associated with a transition from sociological, to more individually oriented connections to running. These types of motivation are underpinned by functional, symbolic, and emotional meaning that par-

ticipants attribute to the activity. For example, as an individual's participation in running develops, their motivations may be less grounded in social interaction needs, and instead stem from the personal meaning, self-concept, and values that they derive from participation. To this end, participation becomes more contingent upon volitional choice (Pritchard, Havitz, & Howard, 1999), resulting in resistance to change (see Krosnick & Petty, 1995). This aligns with previous links between autonomous regulation and behavioral maintenance from other fields (e.g., Ryan, Plant, & O'Malley, 1995; Williams, Freedman, & Deci, 1998).

In this regard, those tasked with intervention programming may be better served by attempting to develop positive attitudes toward the specific activity—in this case, running. Psychological connection to, or motivation to participate in a specific activity should not be conflated with a propensity to be "physically active" in a general sense. Attitudes are linked to specific situations, and although they may align with broader beliefs and values regarding physical activity, they are distinct (Madrigal & Kahle, 1994). Although there can never be a guarantee that individuals will become intrinsically motivated to participate, promoting the unique features of the activity and the culture surrounding it may expose participants to aspects that fulfill higher order needs.

Future Exercise Intentions

Support is also demonstrated for H_3, that future exercise intention would incrementally increase with PCM stage progression. Future intentions concern intentional actions related to performing general exercise activities, and are considered to be important facets of the positive or negative attitudes that participants have toward exercise (Ajzen, 1991). Incremental increases in FEX with PCM stage progression indicate that psychological connection to running is associated with increased future intentions to engage in general exercise.

Research by Funk, Jordan, et al. (2011) demonstrated that participation in MPREs fosters positive attitudes toward physical activity and increased future (general) exercise intentions among the least active sections of the population. However, the results of the present study indicate that this increase in positive attitudes may be temporary. Despite reporting high intentions to exercise in the future, participants in the Attraction stage also recorded significantly higher levels of nonautonomously regulated behavior (AMO and EXR) than those in Attachment and Allegiance. Future research should seek to gain more insight into the possibility that individuals in this stage may be motivated by external factors (e.g., preparation for the running event, event-related goal setting, etc.) rather than internal factors that are more enduring.

Implications

The current study tested the stage-based development of behavioral regulation within the PCM framework, providing empirical support for the conceptual descriptions that were previously offered (Beaton et al., 2009). Results demonstrate that individuals placed in different stages of psychological connection to running utilize autonomous and nonautonomous behavioral regulation to different extents. Additionally, the incremental increase in autonomous regulation follows the progressive development of a psychological connection to the leisure activity within the framework.

Previous assertions by Funk, Beaton et al. (2011) that the PCM can be used by recreation and health professionals as a conceptual and analytic tool are supported. More specifically, the framework offers a means by which health and leisure professionals can capture important information about what drives directed and purposeful participation in physically active leisure. This information can help them to make informed decisions about how to address individuals with

different involvement and motivation profiles. The PCM framework can both place individuals into progressive stages and also track progress longitudinally to determine the effectiveness of an intervention. In particular, the staging procedure can account for individual differences in being influenced by various forms of behavioral regulation, and future exercise intention.

Accordingly, the PCM offers the benefits of a stage-based format that can facilitate targeted interventions to specific segments, emphasizing different rewards and/or benefits depending on the different types of motivation that are utilized by individuals in each stage (Brug et al., 2005). For instance, programs should focus on promoting enjoyment and social forces during the early stages of leisure activity participation (Guillot et al., 2004) when behavior is regulated nonautonomously. As motivation and subsequent behavior become more internally regulated, the focus can shift to promoting individualized connections to the activity.

Although there is a lack of consensus on the merits of staged-based approaches (Adams & White, 2005; Brug et al., 2005), this is largely due to the lack of efficacy demonstrated by existing frameworks. Developing alternatives is infinitely more responsible than continuing to misuse existing frameworks that have demonstrated poor suitability for studying physically active leisure (Adams & White, 2003; Hutchison et al., 2009), or ignoring the fact that individuals go through developmental stages during their participation in physically active leisure. Therefore, continuing previous work to validate the PCM framework answers calls to further develop stage-based approaches (Brug et al., 2005) and theoretical frameworks at large (Jackson et al., 2005).

The finding that types of autonomous and nonautonomous behavioral regulation align with increasing attitudinal engagement with an activity provides an additional, practical implication. Researchers are often subject to organizational limitations when conducting data collection with recreational and event participants, members of a sports club, and other such groups. For instance, organizations are often protective of their stakeholders, and do not want to subject them to lengthy surveys. The ability of the PCM framework to holistically capture participation (including behavioral regulation) reducing the number of items required. This can be of similar benefit to non-academic health and leisure professionals who wish to utilize the framework in applied settings to test interventions.

Limitations

There are a number of limitations that should be acknowledged with this research. Organizational limitations dictated that the online survey was not able to include all of the types of behavioral regulation in the interests of brevity. As such, *integrated regulation* was not measured. Although the types that were measured were able to provide an indication of autonomous and nonautonomous types of behavioral regulation, greater specificity would be achieved had integrated regulation been accounted for. The research setting also provided a challenge. MPREs provide greater access to less physically active sections of the population than other outlets; however, those in the Attraction stage of the PCM are still underrepresented in comparison to Attachment and Allegiance. This is likely due to the amount of training that participants engage in prior to the event, during which their attitudinal engagement is temporarily inflated. Additionally, as mentioned previously, the use of half-marathon participants limits the translation of the results into a population-level intervention. More research should be conducted using participants in shorter distance running events (e.g., 5k events) to offer additional insight into the capacity of MPRE within this context. Attention should also be paid to corroborating the results among different demographics.

Conclusion

Theoretical frameworks that provide information on how to increase physically active leisure remain underdeveloped (Jackson et al., 2005), and more work is required to validate alternative approaches that can inform the practice of recreation and health professionals. The current study demonstrates how different types of autonomous and nonautonomous behavioral regulation develop or decrease incrementally within four progressive stages of psychological connection to a leisure activity. This provides empirical support for the use of the PCM as the foundation for stage-targeted physical activity interventions, or as an analytic tool for participation. Future research should focus on the practical implementation of the framework to ensure successful translation to programming. Such implementation has self-evident implications for leisure and health practitioners, and those they serve.

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