

# Involvement of ultramarathon runners: Understanding intention, behavior, and perceived skill of the "Absolute Unitary Being"

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## Abstract

Ultramarathon running, competing in distances beyond the 26.2 mile marathon, is one of the fastest growing segments of endurance competition. The sport has more than tripled in entrant size over the past 12 years and now attracts over 26,000 athletes on an annual basis. However, there is a limited understanding of what motivates individuals to pursue such a taxing physical and emotional activity. This study explored the dimensions of the Zaichkowsky Personal Involvement Inventory (PII) and the Laurent and Kapferer Consumer Involvement Profile (CIP) as predictors of ultramarathon runners' intention to participate, behavioral participation, and perceived skill level. Multiple regressions indicated that the cognitive and affective facets of the PII scale were significant in predicting the behavior and that the cognitive facet of the PII scale was a unique significant predictor of the perceived skill. In addition, it was found that the CIP affective dimensions of "pleasure" and "sign value" were unique significant predictors of the intention to participate.

*Key words:* Ultrarunning, endurance sport, involvement theory

## Introduction

The recreational activity of running has experienced remarkable growth. Running and jogging experienced a 6.7% increase from 2008 to 2009, with 43.89 million athletes participating in the sport ("Outdoor recreation participation report," 2010). Ultramarathon running, the sport of foot racing in events surpassing the traditional 26.2 mile marathon distance, has attracted a highly motivated segment of the running audience. The sport has more than tripled in entrant size over the past 12 years. In 2010, 26,842 individuals competed in ultradistance events, amassing a total of 46,280 finishes (Medinger, 2011).

Most ultramarathoners perform continuously for more than four hours, while some maintain pace for more than 24 hours and beyond when 100 mile or multi-day races are entered. Muscular degeneration occurs over these extended race distances, while mental and physiological exhaustion comes into play. Competitors must monitor fluid intake, electrolyte levels and food consumption, while also monitoring emotional and cognitive decision-making abilities. The ultramarathon experience has been defined as a hypothetical mystical state of consciousness, and is referred to as an "Absolute Unitary Being" by Hones (2004, p. 40). However, ultramarathon running is not limited to the elite. The Susan G. Komen Breast Cancer 3-Day encompasses three 20-mile segments over an extended weekend. In 2012, the event encompassed 14 major U.S. cities. Participants raised awareness for breast cancer programs and generated millions of dollars to fund breast cancer research and community health programs ("2012 3-Day Schedule," 2012).

Though literature provides a definition of ultramarathon running, there is a limited understanding about what motivates individuals to

pursue such taxing physical and emotional activities. Few studies have investigated the psychological schemas of competitors who run 100 miles and beyond.

The construct of involvement is frequently used to explore the psychometric profiles of participants in different sports. Sport involvement is defined by Dimanche, Havitz, and Howard (1991) as follows:

psychological state of motivation, arousal, or interest between an individual and recreational activities, tourist destinations, or related equipment in one point in time, characterized by the perceptions of the following elements: importance, pleasure value, sign value, risk probability, and risk consequences (p. 237-238).

Involvement has been a popular measure within leisure study. Gender study of the involvement among leisure participants indicated that women had higher activity-attraction involvement than men (Wiley, Shaw, & Havitz, 2000). McIntyre (1989) incorporated the measurement of the involvement within a beach camping setting while Ajzen and Driver (1992) constructed a multi-item involvement profile as a predictor of behavioral intent among leisure sport participants. In addition, Jamrozy, Backman, and Backman (1996) applied the dimensionality of involvement in their study on nature-based tourism.

Other scholars have used the involvement as a measure in recreational sport. Gibson (2004) included involvement scales in his study on incentives that affected sport tourism. Ko, Kim, Kim, and Lee (2010) used the involvement construct to investigate perceptions of quality among Taekwondo participants. Ego involvement was investigated by Gernigon, d'Arripe-Longueville, Delignières, and Ninot (2004) within the context of simulated judo competition. Baker, Côté, and Deakin (2005) measured the involvement among elite ultra-endurance triathletes, where the involvement in training did not prove to be a statistical predictor of performance.

Several studies have been specific to the involvement and running. Bloch, Black, and Lichtenstein (1989) used the involvement to confirm that a psychological commitment to running had a positive effect. McGehee, Yoon, and Cárdenas (2003a) explored the involvement among recreational runners in North Carolina. Also, Kyle, Kerstetter, and Guadagnolo (2002) used the involvement as a measure of participation with 10-kilometer road runners.

In his Hierarchy of Effects model, Ray (1973) posited that the involvement construct contained not only the cognitive and affective dimensions, but also a conative component, which is defined as mental processing devoted to behavioral intention. Recreational and leisure sport scholars have also used the involvement construct as a predictor of behavioral intention. Dimanche et al. (1991) cited the involvement as a behavioral predictor in sport. Kim, Scott, and Crompton (1997) suggested that leisure researchers should investigate social-psychological involvement in predicting

intentions to pursue leisure travel. Iwasaki and Havitz (2004) stated that social-psychological involvement held implications for behavioral involvement and future intentions.

Two involvement scales have been widely applied in sport and recreation area. The first is Zaichkowsky's (1994) Personal Involvement Inventory (PII). Though initially designed to measure consumer response in advertising, Zaichkowsky stated her 10-item, semantic-differential unidimensional scale was designed to "easily relate across product categories and can be appropriate to other domains" (p. 342) and that the CIP can "capture a motivation, therefore it is applicable to all ideas and objects. Sport is no exception. Behavior is an outcome of being involved, involvement predicts behavior, and behavior and involvement are correlated" (Zaichkowsky, personal communication, September 14, 2009).

The second involvement scale is Laurent and Kapferer's (1985) Consumer Involvement Profile (CIP). Laurent and Kapferer cited the work of Rothschild (1977) who stated that no single indicator could satisfactorily predict the antecedents to involvement, indicating that multidimensionality is necessary to define an involvement profile. The CIP was designed to capture five facets: (a) the importance of the product class, (b) pleasure of hedonic value, (c) sign or symbolic value, (d) risk probability as associated with purchase, and (e) risk consequences associated with mispurchase.

A substantial level of research has occurred using the construct of involvement as a measure in recreational leisure and sport. Dimanche et al. (1991) stated that sport scholars should further conceptualize and refine the dimensionality of the involvement construct, expanding research to diverse populations and activities. Therefore, this study investigated how the involvement construct would predict intention, behavior, and perceived skill among the population of ultramarathon athletes. The hypotheses of this study were (a) Zaichkowsky's PII scale would be statistically significant in predicting intention to participate, behavioral participation, and perceived skill level among ultramarathon runners, and (b) Laurent and Kapferer's CIP scale would be statistically significant in predicting intention to participate, behavioral participation, and perceived skill level among ultramarathon runners.

## **Method**

### **Participants**

Participants of this study were solicited through a population sample of subscribers to UltraRunning magazine, the leading publication for ultramarathon athletes, and through an email database of athletes entered in the Umstead 100 mile endurance run, a premier event in North Carolina. The survey used for this study was disseminated using a web-based survey tool to more than 2,400 ultramarathon athletes, and 414 responders completed the survey, resulting in a 17.7% response rate. Participants' age ranged from 20-79 years with  $M = 46.74$ ,  $SD = 10.72$ . Seventy-one percent ( $n = 301$ ) were male and 27.4% ( $n = 116$ ) were female, with 1.7% ( $n = 7$ ) not reporting their gender. The proportion of female competitors was similar to that of the general ultramarathon population, which is 29.4 percent (Medinger, 2011). The approval from Institutional Review Board (IRB) of the author's institute was attained for this study prior to the data collection.

### **Instruments**

A multi-part survey was utilized for this study. The first section included a general introduction to the survey and informed consent. Demographic questions captured information on age, gender, income, marital status, education, state of residence, print media usage related to the sport, and Internet usage related to the sport. Two multi-item scales, Zaichkowsky's PII and Laurent and Kapferer's CIP, were used to assess the cognitive and affective dimensions of the involvement among participants. The PII scale contains 10 semantic-differential items scored through a 7-point scale, five items measuring affective (interesting, appealing, fascinating, exciting and involving) and the other five items measuring cognitive (important, relevant, valuable, means a lot and needed) dimensions. Points of the five affective items were summed and divided by five to produce a grand mean score for affect, and points of the five cognitive items were summed and divided by five to produce a grand mean score for cognition.

The Laurent and Kapferer's CIP contained five factors (sign value, pleasure, importance, risk of negative consequences, and risk of making a mistake), and each factor was represented by three items, totaling 15 items. Each item was measured with a 5-point Likert-type response, where 1 indicated strongly disagree and 5 strongly agree. The factors of "sign value" and "pleasure" represented affective factors, and the other three factors represented cognitive factors. Scores of each 3-item factor was summed and divided by three to produce a grand mean score for that factor.

In addition, the survey included measurement of three dependent variables associated with participating in ultramarathon, which were intention, behavior, and perceived skill. Intention measurement asked (a) how likely the participant was to compete in additional ultramarathon events, (b) if it was the participant's intention to participate in ultramarathon events in the coming year, and (c) if it was the participant's plan to participate in ultramarathon events in the next year (Kaplanidou, personal communication, June 10, 2008). The items used endpoints "strongly disagree" and "strongly agree" within a 5-point scale. Scores of the intention items were summed and divided by three to produce a grand mean of intention to participate in ultramarathon.

Behavioral items in the survey incorporated years respondents had participated in the sport, a scaled level of commitment to the sport, number of annual events the respondent participated in, distance traveled to events and annual financial commitment to the sport. Participants were also asked to input the average number of miles running each week and the average number of days running each week, and then average miles running per day could be calculated as a behavioral participation dependent variable. The perceived skill level was represented through one item that stated "how do you perceive your skill level in ultrarunning." The item used response points "very low" (1 point), "beginner," "intermediate," "accomplished runner" and "very high" (5 points) within a 5-point scale.

### **Data Analysis**

Scales were tested for construct validity using confirmatory factor analysis (CFA), which explores patterns of relationships among variables. Three statistical tests within CFA were chosen to determine the validity of the scales, which were (a) a test for

goodness-of-fit (GFI), (b) maximum likelihood fitting function (FF), and (c) root-mean-square residual (RMR). The GFI allows researchers to determine how covariances and correlations of the observed models are predicted by the estimated model (Hair, Anderson, Tatham, & Black, 1998). GFI offers an advantage in model testing in that it is not affected by sample size. The FF test was the basis for a Chi square test statistic and  $\chi^2/df$ . Chi square and  $\chi^2/df$  (also known as relative  $\chi^2$ ) are two indexes frequently used in CFA. RMR is bounded by 0 and 1 and examines the square root of the mean of the squared residuals in the observed and expected elements of the models (Marsh, Balla, & McDonald, 1988).

Regression analysis was used to determine if the dependent variables of intention, behavior and perceived skill were affected by the independent variables represented by dimensions of the involvement in the PII and CIP scales. A correlation coefficient ( $r$ ) indicated the correlation between variables and the positive and negative associations between participation and involvement. Data was analyzed within the Statistical Package for the Social Sciences (SPSS) Statistics version 19 and Analysis of Moment Structures (AMOS) version 19.

**Results**

The majority of participants (76.4%) had been competing in ultramarathon for less than 10 years. Participants ran an average of 44.22 miles per week and spent an average of \$2206.91 annually competing in ultramarathon events. The most frequently self-reported level of performance was Intermediate ( $n = 178$ ) followed by Accomplished ( $n = 131$ ). Most ( $n = 311$ ) of them were married and almost half ( $n = 205$ ) held a graduate degree or doctorate.

Confirmatory factor analysis indicated the PII scale was not unidimensional within the ultramarathon sample group ( $\chi^2 = 482.16$ ,  $df = 36$ ,  $CMIN/DF = 13.39$ ,  $RMSEA = .18$ ,  $RMR = .17$ ,  $GFI = .80$ ). Exploratory factor analysis using Varimax rotation was employed to test the affective and cognitive dimensions of PII scale. Factor 1 captured the affective items exciting, appealing, fascinating, and involving, but also collected the cognitive item "relevant." Cognitive items important, means a lot, valuable, and needed loaded onto Factor 2. The item "interesting" was confounded. A second confirmatory factor analysis test confirmed the cognitive and affective dimensions as factored within the PII scale ( $\chi^2 = 208.26$ ,  $df = 34$ ,  $CMIN/DF = 6.12$ ,  $RMSEA = .12$ ,  $RMR = .10$ ,  $GFI = .91$ ) (Figure 1). When independent dimensions were tested as significant, affective items were summed and divided by five, and cognitive items were summed and divided by four, to create grand mean cognitive and affective measures as independent variables.

A confirmatory factor analysis was performed to determine if the CIP scale would retain its 5-factor construct. A goodness of fit test indicated the 5-factor solution was appropriate (Figure 2) for data related to ultramarathon athletes ( $\chi^2 = 179.26$ ,  $df = 80$ ,  $CMIN/DF = 2.24$ ,  $RMSEA = .06$ ,  $RMR = .04$ ,  $GFI = .94$ ).

Multiple regressions indicated that the cognitive and affective elements of the PII scale were not predictive of intention to participate among ultramarathon athletes due to a non-significant coefficient ( $r = .11$ ,  $F = 2.65$ ,  $p = .07$ ). However, the regression to

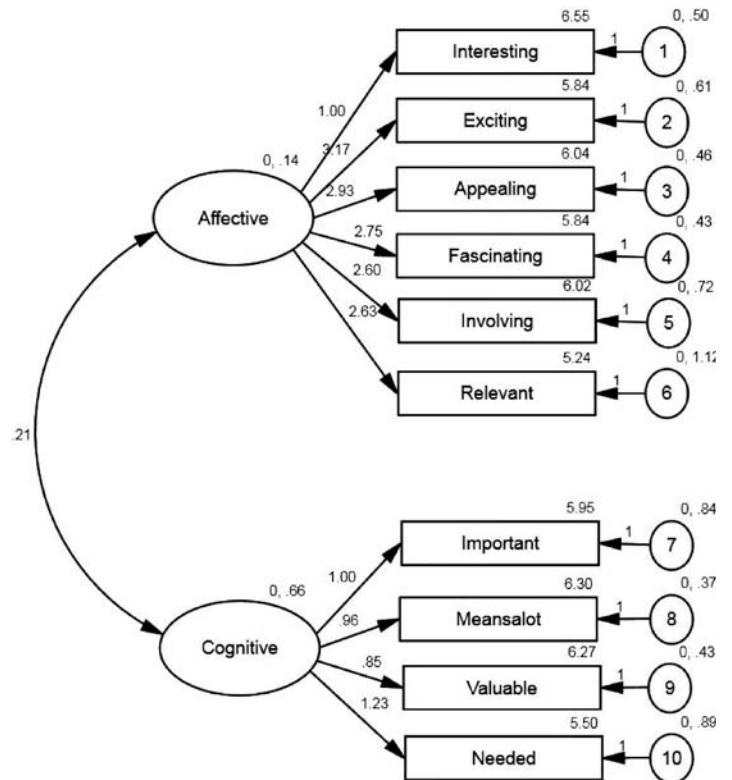


Figure 1. Factored unidimensional model with cognitive and affective dimensions

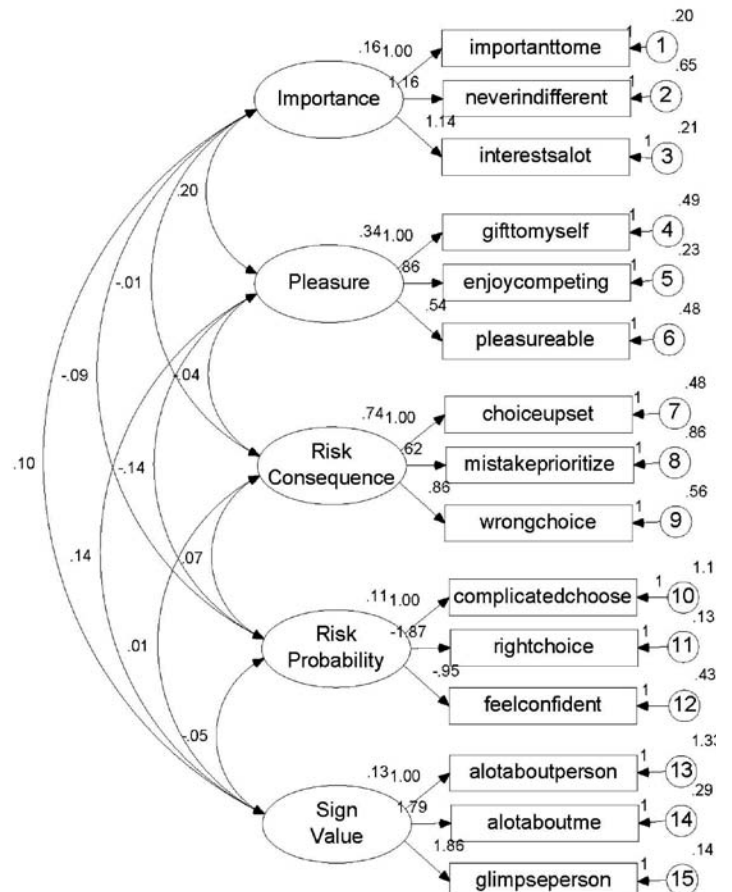


Figure 2. Multidimensional involvement model for ultramarathon runners

determine the predictors of behavioral participation was significant ( $r = .13$ ,  $F = 3.31$ ,  $p = .03$ ) (Table 1), but neither the cognitive nor affective dimension held unique significance. In addition, multiple regressions indicated that the cognitive and affective elements of the PII scale were effective in predicting the perceived skill level of ultramarathon athletes ( $r = .17$ ,  $F = 6.40$ ,  $p < .001$ ), and the cognitive facet held unique statistical significance (Table 2). The first hypothesis was partially supported.

**Table 1. Regression of Zaichkowsky Cognitive and Affective Subscales on Behavioral Participation for Ultramarathon Runners**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.58	1.31		5.02	.00
	cognitive	.07	.25	.08	.26	.79
	affective	.48	.27	.12	1.78	.02

*Note.* Dependent: Average miles/day. Independent: Zaichkowsky Cognitive and Affective  $R = .13$ ,  $F = 3.31$ ,  $p = .04$ ,  $n = 401$

**Table 2. Regression of Zaichkowsky Cognitive and Affective Subscales on Perceived Skill Level for Ultramarathon Runners**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.17	.31		6.94	.00
	cognitive	.17	.06	.17	2.71	.01
	affective	.00	.06	.00	.02	.98

*Note.* Dependent: Perceived skill level. Independent: Zaichkowsky Cognitive and Affective  $R = .17$ ,  $F = 6.40$ ,  $p < .001$ ,  $n = 401$

Multiple regressions indicated the five CIP factors were predictors of intent to participate (Table 3). The multiple regression was significant ( $r = .19$ ,  $F = 2.91$ ,  $p = .01$ ). Among the five dimensions of the CIP scale, "Pleasure" and "Sign Value" held independent statistical significance, and "Importance," "Risk Consequence" and "Risk Probability" did not contribute significantly to intent to participate in ultramarathoning. But multiple regressions were not statistically significant in predicting the behavioral participation ( $r = .14$ ,  $F = 1.48$ ,  $p = .20$ ) and the perceived skill level ( $r = .12$ ,  $F = 1.06$ ,  $p = .39$ ), indicating that the five CIP factors were not

**Table 3. Regression of Laurent and Kapferer Multidimensional Subscale on Intent to Participate for Ultramarathon Runners**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.40	.54		6.24	.00
	important	.03	.11	.01	.24	.81
	pleasure	.26	.10	.16	2.61	.009
	risk consequence	-.04	.06	-.03	-.68	.49
	risk probability	.18	.12	.08	1.56	.12
	sign value	-.15	.08	-.11	-1.92	.05

*Note.* Dependent: Intent to Participate. Independent: Sign Value, Risk Probability, Risk Consequence, Pleasure, Important  $R = .19$ ,  $p = .01$ ,  $n = 400$

predictors for the behavioral participation and the perceived skill level. Thus, the hypothesis (b) was partially supported.

**Discussion**

The purpose of this study was to explore the construct of involvement as a predictor of intention, behavior, and perceived skill level among ultramarathon runners. Confirmatory factor analysis revealed the PII involvement scale did not fit a unidimensional design and instead factored into affective and cognitive dimensions. The PII scale was significant in predicting behavior. However, affective and cognitive dimensions of the scale were not unique contributors to behavioral participation. The PII was also significant in predicting perceived skill with the cognitive dimension of the scale a unique predictor, but not significant in predicting intention to participate.

These findings run contrary to studies using similar involvement scales in athletics and leisure sport. There are interesting differentiations between ultramarathoners and other athletic groups. Scholars who previously applied the PII scale to 222 recreational runners in North Carolina (McGehee, Yoon, & Cárdenas, 2003b) determined that the scale should be utilized as a unidimensional involvement measure. Likewise, the Jamrozny et al. (1996) study on leisure sport did not find a differentiation among the cognitive and affective items in the PII scale. In this study, however, exploratory analysis for ultramarathon athletes indicated distinct affective and cognitive dimensions, with cognition a unique indicator of perceived skill.

Results in this study provide a practical application for use of the PII scale. Behavior, operationalized as average miles per day in this study, represents the ultramarathoner's commitment to training and racing. Both cognitive and affective messaging proves significant in predicting motivation to run. The dependent variable of perceived skill is paramount to enjoyment and overall performance in ultra endurance events. Messaging that would be seen as relevant might be operationalized through semantic word pairs provided in the PII cognitive facet. "Relevant," "valuable" and "needed" serve as adjectives that frame mental processes that provoke attention and problem solving.

When testing the CIP scale, confirmatory factor analysis indicated an acceptable fit for the 5-factor model. But once again the results of the ultramarathon runners were distinct from those derived from leisure and recreational sport studies. McIntyre (1989) used a combined measure of importance (cognitive) and pleasure (affective) and posited that dimensions of risk were key indicators of leisure involvement. Dimanche et al. (1991) factored the original CIP scale in his study of 144 track and field athletes (ages 35-81) and found importance and pleasure loaded onto a single factor. Similarly, a study with 468 ten-kilometer runners (Kyle et al., 2002) found the importance factor loading onto the pleasure factor to form one merged facet.

In contrast, ultramarathon athletes in this study responded to the unique significant factors "pleasure" and "sign value," which are identified as "think-feel" (Laurent & Kapferer, 1985, p.52) and are affective in nature. Pleasure, as operationalized through the CIP scale, is represented by the gift a person gives him/herself, enjoyment of the activity, and pleasurable nature of the activity. Sign value is measured through what the activity

allows us to know about others, what an individual sees within him/herself, and the character of the competitors. This factor (the sign) is associated with social identity theory, which states that identification with a collective group can have a powerful impact on behavior. When competitors affiliate with the ultramarathon community, a psychological group is formed, that is more than the sum of its interpersonal relationships. Social identification is a mechanism that allows individuals to conceive of and form loyalty to an organization (Ashforth & Mael, 1989).

The specialized long-distance runners profiled in this study adhere to an affective approach to their sport and engage with emotional antecedents prior to participatory intention. As ultramarathon runners are influenced by emotions, they will attempt to attach through affective means. As stated by Laurent and Kapferer (1985), consumers who are attracted to hedonic desire and symbolic values will respond to affective response and feelings.

Ultrarunners play harder and may possibly think more. As compared to general club runners in the McGehee et al. (2003b) study, Ultrarunners are similar to them in age (46 years) but complete 44 miles per week training, as opposed to 22 miles per week for club participants. Ultrarunners also invest \$2206 per year while club runners spend \$640 annually. In addition, more ultrarunners may be trained to explicate meaning through their sport. Eighty-seven percent of club runners have "some college" while half of the ultrarunning sample group held graduate or doctorate degrees.

There is a balance of cognitive and affective outcomes that build the ultramarathon experience. Runners are attracted to the sport through emotion (affective) then build self-perceived skill through facts and problem-solving (cognitive). Emotion may elicit attraction, but the mental exercise of finding meaning among ultradistance events might prove the ultimate cognitive challenge.

Limitations may exist among the population sample and their relationship to involvement. Ultramarathon runners, defined by the nature of their sport, compete in a complex environment over long distances and times. They prepare for competition by adhering to an almost daily routine of exercise and related diet and fitness activities. The rigors of training and preparation are exceptional and simply by means of engagement, may account for high involvement scores.

It should also be noted that the causal relationship between the facets of the involvement and intention, behavior, and perceived skill could not be fully defined. In this study, involvement dimensions were tested as predictors (independent variables) while intention, behavior and perceived skill served as dependent variables. Increased miles run per week, increased intent to participate or heightened skill levels may prove to be antecedent to increased involvement measures.

There are other opportunities for future research within the ultramarathon community. A surge of record-breaking performances from elite competitors have been documented within recent years, while growing numbers of "back of the pack" runners are also joining the ultradistance fraternity. Ongoing studies should include samples from a diverse audience of participants so that an improved understanding of involvement subscales can be examined for both those who race to win and for those who

run to finish. Further research should also continue to explore the factor structure of multidimensional scales used to measure the psychological motivators of endurance sport athletes. Incorporating additional social-psychological items within a research design for modified scale testing is warranted.

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