Do more involved trail runners feel happier? An application PERMA Model.

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Abstract

This paper examined involvement of trail runners and compared the level of perceived well-being among trail runners in the different stages of the Psychological Continuum Model (PCM). Four hundred and three trail runners participated in the study and filled out the Leisure Involvement and the PERMA questionnaires. Following a stage-based segmentation algorithm, the trail runners were categorized into the stages of the PCM. The results of the multivariate analysis indicated that runners' PERMA scores increased with the advancing through the PCM stages. Runners in the Allegiance stage reported the highest PERMA scores compared with the runners in the other two stages in all the PERMA pillars. The post hoc paired comparisons revealed statistically significant differences for almost all the pairs. The results indicated that more involved trail runners reported higher PERMA-scores. These findings provide empirical evidence for trail running as the key for improving connection with oneself, others and nature, and support the value of integrating "serious leisure" in strategies for promoting individual well-being and collective social welfare.

Keywords: leisure involvement, psychological continuum model, well-being, PERMA, trail running

Introduction

Trail running, is one of the outdoor activities, takes place in nature. It has attracted over 20 million trail runners around the world (Viljoen et al., 2022), which makes it one of the most popular disciplines in endurance running (Groslambert et al., 2020; Suter et al., 2020). There is evidence that the outdoor context is pivotal for runners' physical and psychological health and in their perceived well-being (Martinez & Scott, 2016; Thomsen et al., 2018).

While the relationship between leisure participation and well-being has been established in the literature (Ma & Ma, 2014; Mirehie & Gibson, 2020a), there is still no consensus on which types of physical activities and contexts (e.g., indoor vs outdoor) are specifically linked with increased levels of well-being, and whether different involvement levels relate with perceived well-being. Today, individual and collective social well-being are important indicators of quality of life and healthy societies (Das et al., 2020). It is well documented that higher perceived well-being levels are associated with multiple benefits, such as adopting healthy behaviour, socially integrated life, psychological health, and life satisfaction (Liu & Opdam, 2014; Newman et al., 2014).

Despite the increasing popularity of trail running and the wide recognition of the role of well-being on building healthy societies (Das et al., 2020), research on the relationship between trail running and perceived well-being is still limited (Theodorakis et al., 2019). Mackenzie et al. (2021) noted in their conceptual paper that research on psychological well-being outcomes of adventure is still limited in both tourism and non-tourism contexts. Furthermore, the same authors pointed out that there is no consensus on universally accepted measure of psychological well-being outcomes and they proposed that researchers employ some of already established psychological indicators. In addressing this research gap the present study examined trail runners' well-being levels with the holistic approach of the

PERMA profiler, which is a well-established measure of perceived well-being (Butler & Kern, 2016).

Furthermore, while several behavioural antecedents of well-being were studied (Das et al., 2020), there is a gap in literature examining whether well-being changes when participants advance through the involvement stages. As known from the sport medicine literature, high involvement in the form of excessive training (e.g., as part of preparation for an event) might not be associated with improved health for recreational sport participants (Boullosa et al., 2021). In addressing these research gaps our study is the first to examine the well-being perceptions of trail runners in relation to their advancement through the stages of the PCM model. This model has been previously validated in several sport related contexts (see Funk et al., 2022); it provides a clear framework to categorize sport participants within distinct involvement stages of awareness, attraction, attachment, and allegiance (Alexandris et al., 2017). Our study has applied value. If higher running involvement is associated with higher perceived well-being levels, then policy makers must provide opportunities for participating in trail running events, as Mackenzie et al. (2021) proposed for adventure tourism in general. Following the above discussion the present study aimed to segment trail runners according to their involvement levels and further study changes in runners' well-being levels in relation to their involvement stage.

Literature review

Trail running as serious leisure

The focus of this study is on small-scale outdoor trail running events. The International Trail Running Association (ITRA, 2024) specifies that for a race to be classified as a trail race, no more than 20% of the route can consist of paved roads. Trail running attracts a restricted number of participants who pay premium cost for a race entry, when compared to road-running events. This gave trail running a reputation as an elitist (although alternative) activity, chosen by a niche market interested in this unique mixture of tourism and sport (McEwan et al., 2020). In discussing trail running involvement and in relation to perceived well-being the concept of serious leisure is particularly applicable. According to Stebbins (1992, p.3), serious leisure is ‘a systematic pursuit of an amateur, hobbyist, or volunteer activity that is sufficiently substantial and interesting for the participant to find a career there in the acquisition and expression of its special skills, and knowledge’. It was suggested that serious leisure has six main qualities: the need to persevere, career, significant personal effort, durable benefits, unique ethos, and strong identity. The need to persevere refers to individuals’ confronting and overcoming difficulties during leisure participation - such as frustration, fatigue and injury (Lamont et al., 2014). Research on running (e.g., Shipway & Holloway, 2010) demonstrated that runners occasionally need to persevere during their event participation process: individuals usually invest a lot of time for preparation, overcome difficulties and make great physical, psychological or economic efforts to complete a race.

The quality of career progress (Stebbins & Elkington, 2014) depends on the developmental process of individual leisure participation. Preparations for races might take months, so long-distance running might have greater costs compared to other leisure activities. Hence, runners are likely to be highly involved (Mackenzie et al., 2021) and may develop an ‘event-travel career’ while improving their ability (Fotiadis et al., 2021). Marathon runners reported durable benefits from serious participation in the form of self-esteem, expression of self-worth, and a feeling of freedom (Shipway & Jones, 2007). Serious leisure participants often share a common ethos – a set of unique behaviors and attitudes (Stebbins, 2007). For trail runners, the uniqueness of ethos may be even more peculiar: they form long-lasting resonant bonds due to the level of understanding and connection with each other because of endurance running experience (Simpson et al., 2014). As a unique ethos integrates into one's value system, they also can develop a social identity through an activity (Lee & Ewert, 2019).

Subjective well-being: The PERMA model

Subjective well-being is a general term that describes types of individual well-being. Previous literature demonstrated that subjective well-being is close to the concepts of quality of life and happiness which makes it difficult to define it in isolation (Pomfret et al., 2023). The origins of the contemporary term go back to Diener (1984) who defined it as a subjective perception and evaluation of their own life by an individual. Previous research proposed that well-being includes both cognitive (eudemonic) and affective (hedonic) elements (Huta & Waterman, 2014). Eudemonic well-being - also referred to in the literature as psychological well-being – is the pursuit of achieving meaningful goals in one's life and the consequences of self-growth and self-actualization (Waterman, 1993). Hedonic well-being has often been referred to as the search for pleasure while avoiding the pain (Diener & Ryan, 2009). Hedonic well-being is based on an individual's subjective evaluation of their life, irrespective of any external factors, and it relies on making sense of one's emotions and feelings (Brandel et al., 2017).

While most of the studies looked at either eudemonic or hedonic well-being in isolation, Seligman (2011) developed a framework of well-being that integrates the two components. The proposed model – PERMA - included the five basic elements: positive emotions, engagement, relationships, meaning, and accomplishment. Seligman (2011) argued that this model represents a more holistic approach since the combination of these five indicators of well-being purportedly gives rise to a flourishing life and thriving society. Following the creation of PERMA, other researchers (e.g. Coffey et al., 2016; Goodman et al., 2018) sought and provided support for the structure of well-being proposed by the model.

Positive emotions represent the first pillar of PERMA; they refer to the situation when an individual feels happy in their everyday life (Butler & Kern, 2016). Positive emotions can liberate individuals from everyday productivity-focused life, personal struggles and fill life with meaning and interconnectedness (Desjardins & Ketterling, 2024). In the context of sport, research has shown that running can develop positive emotions for participants and have a positive impact on their life satisfaction. Zhou et al. (2018) discussed how inspiration, which is a psychological construct related to strong and positive emotions, such as enhancement, activation, arousal and excitement, motivates runners to invest time and effort in training and participating in running events. On the other hand, positive emotions are also associated with physiological "natural highs" caused by the adrenaline, thrill and excitement of the activity (Pomfret et al., 2023). It has been proposed that participation in adventure sport tourism strengthens one's connection to nature and addresses their basic psychological needs and thereby affects hedonic and eudaimonic psychological well-being (Mackenzie et al., 2021). Pomfret (2021) suggested that adventure activity participation supports homeostasis as participants use their resources (i.e., physical, psychological, social) to deal with challenges of the natural setting or within their everyday lives. We argue that this can be particularly the case in trail running, since for trail runners, being on the trail can serve as a perceived well-being tool in emotional management as well as an outlet for producing complex and contradictory emotions (Desjardins & Ketterling, 2024).

The second pillar – engagement – represents the state of an individual who is engaged and absorbed with their activities. In the context of recreation and adventure sports, this state is known as a state of 'flow' characterized by one's alterations in time perception, high concentration, the feeling of effortlessness, and perceptions of being in control (Boudreau et al., 2020). Absorption with an activity is closely related to deceleration and mindfulness, i.e. living in the present and enjoying what is happening in the moment of it happening (Kabat-

Zinn, 1994). In addition, feelings of liminality (Turner, 1974) are created through disconnecting from the usual surroundings; they can encourage one's full immersion and escape (Goodnow & Bordoloi, 2017).

The third pillar – positive relationships - refers to feelings of being accepted and supported by others (Brandel et al., 2017). Leisure and recreation environments promote social relationships and contribute to the social well-being of sport participants (Brajša-Žganec et al., 2011). This is particularly the case in running, where participants are members of formal or informal social groups, train together and participate in running events as groups (Alexandris et al. 2017; Ma & Kaplanidou, 2021). In connection with this, Pomfret and Varley (2019) point out the concept of collective efficacy, i.e., "a group's belief in its ability to organize and manage outdoor activities using the different skills of its members" (p. 497), which helps everyone involved to deal with demands of the activity.

The fourth pillar – meaning – describes the ability of an individual to add value in a professional context, family, and community, as it has been also proposed in the social identity theory (Hirshon, 2020). Runners identify with both the activity and the running groups developing a self of belonging and a holistic life (Ye et al., 2019). Through self-expression and identification with specific activities, running can make an individual's life purposeful (Alexandris, 2013). Collective identity is based on shared values and beliefs as well as interests and experiences; this identity strengthens through collective sense of gaining control of challenging situations and overcoming them (Brymer & Feletti, 2020). The challenging and inspiring context of trail running can provide individuals with a unique opportunity to realize life's meaning and develop courage and humility as parts of who they are (McGannon et al., 2020). The adventure of trail running allows for self-exploration, a greater sense of awareness and appreciation for the world. Shipway and Jones (2007) pointed out that serious runners identify distance running as a central aspect of their lives in terms of both the running community and the activity of running a race.

The fifth and the last pillar of PERMA – accomplishment – refers to the self-perception of an individual and their personal goals. In the context of running research has shown that participants set goals (e.g., finishing a race or training with a specific intensity) and they tend to compete with themselves in their effort to achieve these goals (Alexandris et al., 2017). Interestingly, studies in trail running (e.g. Hill et al., 2018; Waleriańczyk, 2023) highlight importance of perfectionism – a multidimensional personality disposition that comprises excessively high standards accompanied by overly harsh evaluations of personal performance (Frost et al., 1990). These studies posit that perfectionistic strivings are positively associated with performance, and therefore with the feeling of accomplishment.

The PERMA model has been recently used by several studies in different contexts and populations, such as skiing participants (Mirehie & Gibson, 2020b), sport fans (Doyle et al., 2016), marathon runners (Filo et al., 2022), adventure education programs (Ingman, 2024), residents in large sport events destinations (Doyle et al., 2016) and charity sport event participants (Filo & Coghlan, 2016). It was found to be a valid framework for measuring individual well-being in both qualitative and quantitative research designs. The above studies proposed that the PERMA domains get activated in different contexts, providing evidence for the positive role of sport and recreation participation in promoting individual well-being. However, to date no studies have looked at the link between PERMA and involvement among trail runners; the relationship between the PERMA domains and the involvement stages is still not established today.

Leisure Involvement

As previously noted, research on the relationship between trail running involvement and perceived well-being is still limited. Involvement is a term that describes the level of interest that an individual has in sport and recreation activities (Funk et al., 2022). It represents how relevant a sport activity is for an individual and determines the level of individual devotion to this activity (Beaton et al., 2011). In the past twenty years research in sport involvement has been extensive (see Funk et al., 2022). This is because involvement has positive behavioral outcomes which are important for business decision-making, e.g. repeated behaviour, frequency of behaviour, and quantity of consumption. For example, Getz and McConnell's (2014) study on trail running and mountain biking showed that highly involved individuals participate in numerous events per year and may travel to international locations, investing considerable amounts of time and money.

To study the relationship between trail runners' well-being and involvement we used the theoretical framework of the Psychological Continuum Model (Funk & James, 2015). This model explains how a sport consumer gradually develops psychological connection with a sport activity or a team (Funk & James, 2001), as she/he moves across the four stages of the model: awareness, attraction, attachment and allegiance. In the awareness stage an individual recognizes the existence of a specific sport and starts collecting information about its attributes, regulations and opportunities to participate (e.g., "I know about trail running"). At this stage an individual has still no interest in participating in a specific sport. Increased levels of awareness might move an individual towards the next stage: attraction. At this stage an individual develops an interest for a specific sport and makes a conscious decision to start taking part on it (e.g., "I like trail running"). Hedonic and social motives play an important role for an individual to move to the attraction stage, as well as the negotiation of intrapersonal constraints (Alexandris, 2013). In the next level of attachment an individual has formed a stable psychological connection to a sport and has developed an identity (e.g., "I am a trail runner").

The attributes, benefits and the image associated with the specific sport activity acquire a personal meaning. Individuals are motivated by intrinsic motives at this stage (Alexandris, 2013). Finally, in the stage of Allegiance an individual has developed a strong loyalty and adherence to the specific sport, which can even take the form of addiction (e.g., “I live for trail running”). The activity has a central role in their everyday life; they invest a considerable amount of time and effort to train as formal or informal members of social groups (e.g., runners). It has to be noted that this flow is not one-directional: the four psychological stages represent a continuum, and the movement occurs in either direction or stalls at a specific stage (Beaton & Funk, 2008). As individual progresses through the four stages, psychological connection with the sport object strengthens.

In leisure context, the PCM was explored by several empirical studies which validated its usage for clustering leisure and sport participants (i.e., Beaton et al., 2009; Baker et al., 2020). The strengths of this model relate to its ability to measure the strength of a psychological connection that an individual has with a sport object and how this connection changes over time. Furthermore, several intrinsic and extrinsic inputs and outputs have been linked with the strategies of the model, such as behavioral variables, motivation, constraints, socio-cultural and personality factors that play role in an individual’s transition between the stages of the model (i.e., Alexandris et al., 2011; Beaton et al., 2009; Khodadadian et al., 2024). Well-being as a possible output variable of the model has not yet been empirically tested. We propose that well-being can be increased as an individual moves across the stages of PCM. However, since runners in the stage of allegiance might do excessive training, which is not always associated with health benefits (Boullosa et al., 2021), this is an issue that needs to be investigated.

Objectives of the Study

Based on the above literature review, the following research objectives were set: a) to examine the level of involvement of trail runners, based on the three stages of the PCM (attraction, attachment, and allegiance); and b) to compare the level of perceived well-being, as measured with PERMA, among trail runners in the different stages of the PCM. It was hypothesized that there will be significant differences among runners in the different stages of the model, in terms of their perceived well-being scores. Those in the allegiance stage will have higher scores in PERMA, than those in the Attachment and Attraction stages.

Material and Methods

Sample and procedures

The data were collected in December 2023, targeting Greek adult trail runners who participated in at least one trail running event the year before the research. A cross-sectional study with a convenient sample was used. The data were collected with the use of an online survey. The online questionnaire was distributed in two popular trail running clubs in northern Greece; their members were invited to voluntarily participate in the research by an email. A total of 1200 emails were sent to members of both running clubs. Consent was obtained from all individuals who participated in the study. The data were kept in a database accessed only by the principal investigator and the research associates of the study, adhering to the ethics process regulations. Four hundred and three (N= 403) valid questionnaires were returned, yielding a response rate of 33.7%. This relatively low response rate and the non-random sample are among the limitations of the present study. Results cannot certainly be considered as representative of the trail running population in Greece and cannot be generalized with confidence. The sample size, however, is large enough to run the statistical analysis required to answer the research objectives and test the hypothesis of the study.

The demographic analysis of the data showed that most respondents were males (N=364, 90.3%). This was expected, as this percentage is similar with the profile of train runners in Greece, since in the latest official report of the trail running market males were reported to be 80,5% and females 19,5% (Tsogarakis, 2019). The age group of 35-44 (N=196, 48.6%) was the majority, followed by the 25-34 (N=90, 22.3%), the 45-54 (N=84, 20.8%), the 55 and more (N=22, 5.5%) and the 18-24 (N=11, 2.7%) age groups. In terms of educational background, the largest groups comprised individuals with undergraduate (N=172, 42.7%) and postgraduate degrees (N=84, 20.8%), followed by those with technical/ vocational (N=75, 18.6%) and secondary education (N=72, 17.9%). Regarding the annual trail running event participation, most of the respondents participated in one-two events (N=146, 36.2%) followed by those who participated in three-four events (N=139, 34.5%), five-six events (N=66, 16.4%) and seven and more events (N=52, 12.9%).

Measurement tools

Leisure involvement was measured with Kyle et al.'s (2003) scale, adapted to trail running context. It includes three dimensions: Centrality, Self-expression, and Attraction. Seven-point Likert scales ranging from 1 - totally disagree to 7- totally agree were used. This scale has been used in several different (i.e., shorter or longer) versions among studies in sport and leisure contexts (Alexandris, 2016; Kyle & Chick, 2004; Kyle, et al., 2003; Kyle et al., 2004). According to Funk et al. (2022) and Beaton et al. (2011), this scale is appropriate to categorize sport participants into the PCM stages through the three-step staging, as it is explained in the next section.

Subjective well-being was measured with the PERMA profiler (Butler & Kern, 2016) including the five pillars, as discussed above: "positive emotions" (3 items), "engagement" (3 items), "positive relationships" (3 items), "meaning" (3 items) and "accomplishment" (3 items). This scale has been applied in several studies in sport settings and has been shown to be reliable and valid (Filo et al., 2022; Mirehie & Gibson, 2020b; Oshimi & Kinoshita, 2022).

Statistical analysis

Initially, a confirmatory factor analysis (CFA) was performed to evaluate the factorial validity of the latent constructs - running involvement and PERMA. Following the confirmatory analysis, participants were categorized into the distinct PCM stages: attraction, attachment and allegiance. Since all the individuals were already runners nobody was in the first stage (awareness), which includes non-participants. In accordance with the segmentation algorithm proposed by Beaton et al. (2011) the following method was used to categorize participants within the three stages: (a) weighted mean scores for each dimension of leisure involvement were computed; (b) these mean dimensions' scores were employed to develop involvement profiles for each participant. Lastly, a one-way multivariate analysis of variance (MANOVA) was utilized to assess the significance of differences in PERMA scores among the PCM stages.

Results

Measurement model

The validation of the measurement model was established with confirmatory analysis. The evaluation of the measurement model indicated marginal model fit: X^2 (928,78)/df (223) = 4,1, $p < 0.001$, CFI=.905, TLI=.901, RMSEA=.088 and SRMR=.064. While examining the factor loadings, it was identified that two items from the Attractive dimension ("Trail running is important to me", b=.43), "Trail running interests me", b=.36) were below the 0.50 cut-off point (Byrne, 2013). These two items were subsequently excluded, and a second round of CFA was run. The overall new model fit assessment revealed better fit indices: X^2 (723,45)/ df(220)=3,2, p= .001, CFI =.926, TLI=.917, RMSEA=.078, and SRMR=.056. The Cronbach's alpha values indicated satisfactory scores ranging from .81 to .91; the CR index fell within acceptable limits, ranging from .84 to .93 (Bagozzi & Yi, 1988) (see Table 1). For convergent validity, two tests were employed: a) t-values, which ranged from 18,50 to 30,23, meeting the requisite threshold (≥±1.96) (Byrne, 2013), and b) the Average Variance Extracted (AVE) for the latent variables, which exceeded the .50 cut-off criterion (Brown, 2015). To evaluate discriminant validity, the method proposed by Fornell and Lacker (1981) was utilized. As illustrated in Table 2, the square roots of AVE for all latent variables, indicated in bold along the diagonal axis, were greater than the inter-correlations among the latent factors. Therefore, the validation of the measurement model was confirmed.

[Table 1 near here]

[Table 2 near here]

One-way MANOVA results with the PCM staging algorithm

First, a stage-based segmentation algorithm was implemented in accordance with the three-step procedure outlined by Beaton et al. (2011), as described before. Trail runners were placed in the Attraction (N=77), Attachment (N=154), and Allegiance (N=172) stages, according to their involvement level (Table 3). Thus, the first research objective was met, since PCM found a valid tool to segment trail runners according to their involvement level.

[Table 3 near here]

To examine the differences in trail runners' PERMA scores within the PCM framework, a one-way MANOVA was performed. The findings of the model indicated significant multivariate main effects. The Box’s test of equality of covariance matrices (Box’s M=123.7) showed statistically significant results (p=.01), showing that the dependent variable variance-covariance matrices are not equal. The Pillai's Trace indicator accounted for 81% of the total multivariate variance (Pillai's Trace=.81, $F_{(5)}$=8.39, p=.001). The Levene's test revealed statistically significant results for all dependent variables: Positive Emotions ($F_{(2)}$=5.82, p<.01), Engagement($F_{(2)}$=3.68, p<.05), Relationship($F_{(2)}$=5.48, p<.01), Meaning($F_{(2)}$=5.73, p<.01), Accomplishment($F_{(2)}$=5.51, p<.05), indicated the violation of homogeneity. Thus, a Post Hoc paired comparisons using Tamhane's T2 test were employed (Meyers et al., 2016). Table 4 shows the evaluations of the univariate effects for all the dependent variables which were statistically significant (p=.001). Finally, the Post Hoc paired comparisons revealed statistically significant results for almost all pairs (p<.001). Based on this, the second research objective was partially met. The Attraction, Attachment and Allegiance stages had different PERMA scores among trail runners. The higher the activity engagement the more a trail runner scored in the PERMA model. Only the pair of Attraction – Attachment for the Positive Emotions, Engagement, Relationship, and Meaning showed p-values above the recommended threshold (Table 5).

[Table 4 near here]

[Table 5 near here]

Discussion

This study examined the perceived well-being levels of trail runners in relation to their levels of involvement. First, the results confirmed the applicability of the PCM model as a useful segmentation tool in trail running, supporting studies that have been conducted in other sport and exercise settings (e.g. Alexandris et al., 2017; Funk et al., 2022; Lock et al., 2012). We discussed earlier that trail running is an activity that requires a considerable amount of personal investment. It is therefore not surprising that a large group of runners was categorized within the allegiance stage. The social identity theory is a framework that can be used to interpret runners' highly involvement levels, and in relation to their increased well-being levels. As previously noted, the social identity theory explains individuals' tendency "to identify with a specific group to satisfy their needs for positive self-esteem, belonging, control, and a holistic life" (Ye et al., 2019, p. 159). This can be particularly the case of highly involved runners, who belong to formal and informal running clubs. Hirshon (2020) emphasized the role of group memberships in affecting people's self-concept. In a similar discussion, Lock et al. (2012) proposed that attitudinal outcomes of individuals in the allegiant stage include the development of a durable and important identity with the activity. Individuals at this level derive social identity benefits from overtly displaying to others that they are committed members. Our research further extends this proposition to sport participants / trail runners who have reached the allegiance stage. They show their commitment level to other runners through increased knowledge about the activity, time and money investment and behavioral loyalty. It helps them to develop a strong identity as trail runners; they also hold common social values and positive sustainability attitudes. They can be considered as "inspired" runners. Achieving personal goals, developing interpersonal and intrapersonal connections, and enjoying the running event experiences can be important inspiration factors (Zhou et al., 2018). Furthermore, they are very knowledgeable about trail running, nutrition requirements, and training programs (Shipway & Jones, 2007). They set personal goals, the achievement of which acts as a way of career enhancement and satisfaction of internal motives, related to self-fulfillment, self-actualization, and freedom (Alexandris, 2013). These individuals match the characteristics of serious leisure participants, i.e. perseverance, career record, personal effort (Stebbins, 1992). From a marketing perspective, this group of runners is the loyal "consumers", who do not easily drop out of the activity. It is a demanding group due to their level of experience and knowledge (Kennelly et al., 2013).

The results identified a second group of runners who belong to the Attachment stage. Attached outcomes include both a stronger cognitive, as a result of increased knowledge about the activity, and an affective connection, as a result of the direct experience with the activity (Funk & James, 2006). These are runners who have started to formulate a psychological connection with running and develop their identity as trail runners. They are motivated mainly by intrinsic and more autonomous related motives (e.g., hedonic) or by extrinsic ones that have been internalized (Alexandris, 2013). As a result of direct experience, they perceive now running as a fun and pleasurable activity that gives them internal self-fulfillment; they may also value the benefits of trail running - self-esteem, expression of self-worth, a feeling of freedom and belonging (Cheng et al., 2016) – and internalize these motives, while overcoming various constraints which they may have faced. From a marketing perspective, these individuals are also a loyal group; they are unlikely to drop out if they continue to view the total experience of running as fun and pleasurable. Since group-based positive rewards can play an important role in forming durable benefits from participation (Cheng et al., 2016), promoting the social aspect of running is an important strategy for keeping these individuals involved and motivated. Running communities can help to sustain or further develop their running identity and motivate them (Alexandris et al., 2023; Kimmerle et al., 2013).

The third group of trail runners was categorized within the Attraction stage. These are runners who view running as an attractive activity, with potential value for them. They can be motivated by either intrinsic motives or by less autonomous motives (Alexandris, 2013). These runners are still in the process of determining whether they enjoy running and if it is worth investing time, effort, and money. Attitudes were formed but are not yet stable. If they are positive, they are likely to move to the next attachment stage. However, identification is still not internalized (Funk & James, 2006). From a marketing perspective, this group is not loyal yet due to their limited psychological connection with the activity. They are prone to facing both intrinsic and extrinsic constraints, which might limit their participation. Some of these individuals might proceed to the Attachment stage if they overcome constraints, while others might drop out (Funk et al., 2022).

While supporting the usefulness of the PCM model for segmenting trail runners, our findings are aligned with the way Godbey (1994) presented the stages of leisure. From getting involved in an activity, trail runners can experience continuity, growth, change, and occasional ceasing of participation. Attitude formation in the Attraction stage can be determined by four conditions, i.e. having an opportunity, knowledge, social approval, and willingness to enter the new experience. The four conditions can be a matter of one or more specific events as well as pure accident (Godbey, 1994). The Attachment and Allegiance stages of PCM align with the concept of "specialization" proposed by Hobson (1979). In the Attachment stage, trail runners may continue and progress their involvement through different levels, i.e. as beginners with few expectations, learners who accept bigger challenges and document success, or masters of a specific aspect of trail running (e.g. ultra-runners). If runners reach the Allegiance stage, they become lovers of the sport who build their identity around trail running.

The second objective was to study runners with different involvement levels in terms of their perceived well-being level. The study aimed to fill the gap in research related to the link between PERMA scores and involvement levels at different stages of the PCM model. The PERMA proved to be a reliable and valid instrument to measure perceived well-being among trail runners, supporting findings that have been conducted in other sport and recreation settings (Filo et al., 2022). The results indicated that runners' perceived well-being levels increased with the advancing of the PMC model stages. Runners in the Allegiance stage reported the highest PERMA scores in comparison with the runners in the other two stages, across all the PERMA pillars. These results can be interpreted by discussing the pillars of PERMA in relation to the characteristics of the runners in this stage.

First, trail runners within the Allegiance stage are very likely to develop positive emotions and decrease the negative ones, because of feeling that they take part in an enjoyable and exciting activity. These emotions are related to the satisfaction of their intrinsic and more self-determined motives, as defined in the self-determination theory of motivation (Deci & Ryan, 1985). The concept of "inspiration" can also be used to interpret these results. It is a psychological construct related to strong and positive emotions such as enhancement, activation, arousal and excitement (Zhou et al, 2018). Inspiration leads to enthusiasm, determination and excitement (Thrash & Elliot, 2004), all of which are characteristics of runners in the allegiance stage. Zhou et al. (2018) found in their research that achieving personal goals, which describes intrinsically motivated behavior, is an important source of inspiration, which leads to life satisfaction.

Since trail running has a group-based context (i.e. either during training or participating in racing events), runners are affiliated formally or informally with running clubs, groups, or communities (including online communities and forums) (Rochat et al., 2018). These groups can be considered as "social worlds", which consist of people, organizations, activities, and practices in which participants have shared understandings of unique cultural elements. (Gahwiler & Havitz, 1998). These "social worlds" help their informal members to develop roles, identity, affiliations and meaning through exchange of leisure experiences and interactions. Research on leisure involvement has also emphasized the important role of social interactions. Kyle and Chick (2002) reported that interactions with members of their social groups and exchange of information are important antecedents of leisure involvement. Runners always look for ways that will empower them through social interaction to finish a trail race (Philippe et al., 2016). One way of doing so might be through discussions with peers and virtual communities of practice which enable runners to seek others' experiences via social media on the Internet to learn from each other (Kimmerle et al., 2013). Interacting with individuals of similar interests and values can increase runners' engagement with the activity, which leads to increased levels of perceived well-being.

As serious leisure participants, runners in the Allegiance stage set personal goals: they compete with others, but also with themselves, and accomplishment of these goals brings them a sense of achievement (Alexandris et al., 2017) and becomes a source of meaningful life (McGannon et al., 2020). One aspect that was not confirmed in the current study is the negative consequences of dedication characterizing individuals in this stage, i.e. excessive training, injuries, mental exhaustion, and reaching limits of physical capacity. Instead, our study supports previous research in which the association of self-rated wellness with higher involvement of runners was reported (Smiley et al., 2020).

While the pair comparisons between runners in the Allegiance and the other two stages in the PERMA scores were significant, the results showed non-significant differences between the PERMA scores in the Attraction and Attachment stages, except for the Achievement pillar. These results were somewhat unexpected. They show that, while individuals in the Attachment stage start to develop the psychological connection with trail running, this connection might be not sufficiently strong to develop fully both the eudemonic and hedonic elements of well-being. On the other hand, our research proposed that some individuals in the Attraction stage are enthusiast runners with average involvement levels, yet they still feel that running positively influences their well-being. Achievement, however, was higher among the runners in the Attraction stage: as more serious runners, they set more goals and try to achieve them.

These results have practical implications. From a policy perspective, they support the value of promoting trail running as one of the activities that builds individual well-being. Providing appropriate trail running routes, persevering the environment in which running takes place, and following the principles of sustainability are important elements of the promotion strategy. Our research also provides support for the value of organized trail running events.

These events can appeal to several motives of trail runners, such as socialization, achievement, engagement, and meaningful life, thereby helping them to develop both the eudemonic and hedonic elements of perceived well-being. Co-creation of such events and matching the events with runners' choices and expectations of specific destinations can further increase participants' involvement (Fotiadis et al., 2021). Finally, the importance of social support for trail running participation should be considered by policymakers and sport development officers. Promoting the launch of running clubs and support for their operation should be part of the developmental strategy. Previous studies provided evidence that these clubs are important providers of recreational sports, especially recreational running (Alexandris et al., 2023).

Study Limitations and Future Research

While the profile of trail runners may be globally similar in terms of socio-demographics and psychographics, the cultural aspects of the sample should be considered. The trail runners who participated in the study were Greek. Considering that today many of the trail running events attract international runners, future studies could include a more diverse sample to be able to draw more global conclusions.

The sample of the study included runners who had participated in at least one trail running event. It has however to be noted that trail runners do not always constitute a homogeneous group, considering that ultra-runners might have different behavioral and psychographic characteristics. It will be interesting for future studies to study the welling levels of ultra-runners since there has been some critique on the health benefits of overtraining.

A final note is about the design of the study. While the results of the study indicated that well-being increased with runners advancing the stages of the model, the study did not test the relationship between involvement and well-being. As a cross-sectional study, it did not intend to show any causality in the relationships between involvement and well-being.

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Table 1. Measurement model validation

Factors	Loading	t-value	Mean	a	CR	AVE
Trail running involvement						
Attraction			6.22	.91	.93	.82
Trail running is pleasurable	.918	27,56***				
Participating in trail running is one of the most enjoyable things that I do	.846	26,11***				
I really enjoy trail running	.857	26,25***				
Centrality			5.34	.90	.85	.66
I find a lot of my life organized around trail running	.843	25,73***				
Trail running plays a central role in my life	.760	19,06***				
I find a lot of my life is organized around trail running	.840	23,65***				
Self expression			5.56	.91	.90	.75
When I participate in trail running I can really be myself	.854	23,66***				
You can tell a lot about a person by seeing them running in the mountains	.884	24,01***				
When I participate in trail running others see me the way I want them to see me	.867	24,34***				
Participants' Wellbeing – PERMA						
Positive Emotion			6.12	.85	.92	.80
How often do you feel joyful?	.929	28,45***				
How often do you feel positive?	.941	29,99***				
To what extent do you feel contented?	.820	22,14***				
Engagement			5.98	.85	.87	.70
How often do you become absorbed in what you are doing?	.778	20,12***				
To what extent do you feel excited and interested in things?	.883	24,23***				
How often do you lose track of time while doing something you enjoy?	.858	22,10***				
Relationship			5.37	.89	.86	.67
To what extent do you receive help and support from others when you need it?	.765	18,50***				
To what extent have you been feeling loved?	.903	25,35***				
How satisfied are you with your personal relationships?	.793	20,39***				
Meaning			6.10	.81	.84	.78
To what extent do you lead a purposeful and meaningful life?	.873	20,12***				
To what extent do you feel that what you do in your life is valuable and worthwhile?	.899	30,23***				
To what extent do you generally feel you have a sense of direction in your life?	.887	21,14***				
Accomplishment			5.70	.89	.88	.72
How much of the time do you feel you are making progress towards accomplishing your goals?	.882	23,98***				
How often do you achieve the important goals you have set for yourself?	.885	23,67***				
How often are you able to handle your responsibilities?	.773	18,94***				

Table 2. Inter-correlation matrix.

Variables	Inter-correlation matrix							
	1	2	3	4	5	6	7	8
1. Attraction	**.908**							
2. Centrality	.712	**.815**						
3. Self expression	.658	.801	**.868**					
4. Positive Emotions	.581	.319	.374	**.898**				
5. Engagement	.605	.434	.415	.810	**.841**			
6. Relationship	.482	.427	.460	.688	.769	**.822**		
7. Meaning	.577	.387	.409	.803	.803	.801	**.886**	
8. Accomplishment	.505	.469	.579	.587	.656	.571	.640	**.848**

Note: Square root of AVE values in diagonal boldface.

Table 3. Trail runners' wellbeing outcomes within the PCM staging algorithm.

	Mean					
Stage	*N* = 403	POSEM	ENG	REL	MEA	ACC
Attraction	77	5.76	5.55	4.82	5.68	4.99
Attachment	154	6.08	5.87	5.19	6.02	5.57
Allegiance	172	6.33	6.27	5.77	6.35	6.14

Notes: POSEM=Positive Emotions, ENG=Engagement, REL=Relationship, MEA=Meaning, ACC=Accomplishment

Table 4. Results of between-subject effects.

	POSEM		ENG		REL		MEA		ACC	
	F-value	η^2	*F*-value	η^2	*F*-value	η^2	*F*-value	η^2	*F*-value	η^2
PCM stage	10.97***	.05	18.18***	.08	21.84***	.09	15.78***	.07	37.44***	.15

Notes: POSEM=Positive Emotions, ENG=Engagement, REL=Relationship, MEA=Meaning, ACC=Accomplishment

****p < .001*

Table 5. Post hoc test results of one-way MANOVA.

DV	(*I*) Stage	(*J*) Stage	Mean difference (*I* − *J*)	Std. error	*p*
POSEM	Attraction	Attachment	-.31	.15	n/s
	Attraction	Allegiance	-.56	.12	.001
	Attachment	Allegiance	-.24	.09	.01
ENG	Attraction	Attachment	-.31	.15	n/s
	Attraction	Allegiance	-.72	.15	.001
	Attachment	Allegiance	-.40	.09	.001
REL	Attraction	Attachment	-.37	.18	n/s
	Attraction	Allegiance	-.95	.17	.001
	Attachment	Allegiance	-.58	.11	.001
MEA	Attraction	Attachment	-.33	.15	n/s
	Attraction	Allegiance	-.67	.15	.001
	Attachment	Allegiance	-.33	.08	.001
ACC	Attraction	Attachment	-.58	.16	.001
	Attraction	Allegiance	-1.14	.16	.001
	Attachment	Allegiance	-.56	.10	.001