

**ON THE CORRELATION OF PSYCHOLOGICAL CHARACTERISTICS
WITHIN RECREATIONAL MARATHON RUNNERS**

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ABSTRACT

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The purpose of this research study was to explore the performance related experiences of recreational marathon runners. Specifically, the relationship these experiences have with other psychological constructs involved in undertaking and maintaining participation in a given sport. Using self-report measures the psychobiosocial states prior to most successful performances, achievement goal orientations, motivation and regulation for sport participation and cognitive competitive appraisals were all assessed. The measures were taken from study participants one or two days prior to an upcoming marathon performance. Participants included sixty seven marathon runners from two marathons within the state of Wisconsin, in the United States of America, during the summer of 2014.

Data analyses included correlation data, both parametric and nonparametric. It was hypothesized based on previous literature within sport psychology that positive correlations would be established between challenge appraisal, task orientation, self-determined motivation and regulation, and both the intensity and impact scores of the theoretically helpful psychobiosocial states. In the opposite direction, it was hypothesized that a negative correlation would be established between threat appraisal, ego orientation, controlled regulation and amotivation, and both the intensity and impact scores of the theoretically helpful psychobiosocial states.

The results supported the hypotheses concerning the positive correlations, establishing positive correlations between challenge appraisals, task orientation, and self-directed motivation and regulation with both the intensity and impact scores of the theoretically helpful psychobiosocial states prior to most successful performance, with correlations being small to moderate in size. Notably, statistical significance was established in all but one of these correlations, with that correlation being between identified regulation and impact score of theoretically helpful psychobiosocial states prior to most successful performance, which was positive, but not statistically significant. In the opposite direction, the results did not completely support the hypotheses proposed concerning the expected negative correlations. Threat appraisal was negatively correlated with both theoretically helpful psychobiosocial states intensity and impact scores, but only statistically significant with the impact scores. The correlations between ego orientation and theoretically helpful psychobiosocial states intensity and impact scores were both close to zero, rather than negative as hypothesized. Lastly, the correlations between controlled regulation and amotivation and theoretically helpful psychobiosocial states intensity and impact scores were negative, but none were statistically significant.

The results suggest that from a coaching or sport psychologist's standpoint, which includes sharing in meaning making for athletes, runners can and should be better informed on the typical interaction of psychological characteristics within recreational marathon runners, and could use this information to better work towards making adaptive changes.

Keywords: Performance related experiences, marathon running, psychobiosocial states, psychological characteristics

INTRODUCTION

To begin this research paper, as a quick background, it is interesting to understand why distance running has become such a popular undertaking, including the recent boom over the last decades in marathon running participation. The evolution of the humans from our closest ancestors, chimpanzees, has provided humans with unique capabilities for long distance running (Lieberman & Bramble, 2007). Humans have gained distinct advantages for long distance running over other primates including, but not limited to spring-like ligaments in the feet, an enlarged gluteus maximus, a relatively narrow waist, a highly mobile thorax and thermoregulatory advantages from being specialized sweaters. Importantly, these advantages combine to create efficient human running, which is mechanically the most similar to quadrupedal trotting, despite humans being bipedal. All in all, evolutionarily speaking, the mechanical benefits are in place for humans to succeed at being advantageous long distance runners.

While Pheidippides, the ancient Greek, is credited with running from Marathon to Athens and inspiring what would become the sporting event that is now the marathon, the mechanisms that made this possible for him to accomplish were already firmly in place. Since then the marathon has seen a rise in popularity and in the number of active participants, especially since the introduction of the first “urban-tour” marathon, which was the 1976 New York City marathon (Burfoot, 2007). As author Amby Burfoot suggests in her 2007 article *The History of the Marathon*, “...the marathon has evolved from an Olympic competition to a world-wide social and fitness phenomenon” (Burfoot, 2007, p284). As there has been a rise in marathon participants in the recent decades, there is additionally an increased interest in the psychological characteristics of marathon participants.

Literature within sport psychology is vast; however there are specific studies which incorporate the psychological constructs of concern to this research study. The relevance of this study involves using the psychological constructs which are measured through self-report by the four scales employed to better establish in what capacity recreational marathon runners support previous studies in the sport psychology domain. The intention is to ascertain whether the participants, whom are recreational rather than competitive athletes, encompass the same or similar psychological characteristics as do competitive athletes. In this regard, this study provides useful and new information, which is lacking in previous literature, based on the composition of the population in which the study was conducted.

LITERATURE REVIEW

In order to better understand the literature regarding the psychological constructs and the significant variables within this research study, it is first necessary to understand the theories and previous research findings in sport psychology on these topics to date. A marathon to date has not ever been completed in less than 2 hours, and therefore can be considered an endurance event which represents a significant goal in just the mere completion of the event. Since a large part of the research is to better grasp the performance related experiences of the participants the literature review begins with an overview of the newest theory and its related scale, and subsequently ties in the other theories, their constructs, related instruments and measures.

While older research and studies in sport psychology focused largely on understanding anxiety in sport using theories and models aimed at understanding groups of athletes, or athletes as a whole, the last decades have seen a paradigm shift from this perspective. Previously, the traditional theories of how performance was affected by anxiety were

borrowed from general psychology (Ruiz, Raglin & Hanin, in press). While this served well as a jumping off point for research concerning anxiety in sport, a clear weakness was that the theories were not created using athletes as participants, and they therefore did not include well-learned tasks or sport specific skills. Another key point and evident flaw of these anxiety and performance theories was that they were all conceptualized using group-oriented, or nomothetic, perspectives. The underlying problem of conceptualizing these theories using nomothetic approaches is that they minimize the inter-individual differences among athletes. To lump all athletes into one group and study them undoubtedly carries with it the limitation that they are treating them all as one, when in fact it, athletes vary widely in the way they operate in the face of anxiety or pressure. The recent trend has been from attempting to understand collective groups of athletes, the nomothetic approach, to attempting to understand individual athletes, which is an idiographic approach. One sport psychologist to notice the weaknesses in the anxiety-related inventories that existed in the 1970's, and who subsequently has dedicated much of his career to researching athletes as unique individuals, was Juri Hanin.

Psychologist Juri Hanin developed the Individual Zone of Optimal Functioning (IZOF) model beginning in the 1970s, and subsequently he helped in creating the psychobiosocial state scale, which will be described later as it was used in this study. The Individual Zones of Optimal Functioning model seeks to describe the relationship between an athlete's emotions and their subsequent success (or lack of success) during a sporting task or performance. The key important factor here is that this model is based on an individual's patterns. Again, theories prior to the Individual Zones of Optimal Functioning model sought to understand athletes, and specifically their anxiety, collectively, in contrast this theory was founded on the basis of each athlete being

different, and therefore having different optimal conditions in order to have their own best chance of having a successful performance. What Hanin, amongst other sport psychologists, realized about the existing anxiety inventories being used with athletes, was that they were not sport specific and that they did not focus on the individual athlete's differences, and that therefore they were not effective to use in practice (Hanin, 2000). Hanin therefore developed the individual zones of optimal functioning model based off his studies and applied work with top level Russian athletes. Many types of athletes were represented in these studies and applied work by Hanin, including divers, gymnasts, rowers, swimmers, volleyball players, and weightlifters. A particularly informative experience was discovering that high levels of pre-competitive anxiety were helpful for some athletes and not for others, which again highlighted the need for analyzing and studying individual athletes, rather than athletes as a whole (Ruiz, et al., in press). So, from here sprung his interest in better understanding athletes' actual emotional experiences, rather than trying to pinpoint how the traditional anxiety-performance theories failed. This was, and remains, an important shift, in that it left behind the group-oriented studies of competitive anxiety in favor of focusing on the individual, and how each might function given how they have experienced and performed in past situations. As the title of the model suggests, each individual athlete has an optimal zone in which they will have the highest chance of having a successful performance, and these zones vary across athletes, providing the opportunity to study athletes in an idiographic fashion.

Since the initial development of the individual zones of optimal functioning model it has come quite far, as is evidenced by a current article overviewing its historical development by Ruiz, Raglin and Hanin, (accepted for publication) whom continues to work with the individual zones of optimal functioning model. The article summarizes

the individual zones of optimal functioning historical development and its current use, which has expanded a lot over the course of the past decades (Ruiz et al., in press). The individual zones of optimal functioning model attempts to describe an athlete's psychobiosocial states, of which emotions and per-performance anxiety are constituents. A psychobiosocial state is theorized to be a situation specific, multimodal (containing numerous modalities/states), and dynamic part of human functioning (Hanin 1997, 2000). Furthermore, two other important concepts regarding the emotional component of psychobiosocial states are the hedonic tone (pleasure-displeasure) and the performance functionality (optimal-dysfunctional consequences). Using a two by two framework the model arrives at four distinct categories. The four are pleasant and functionally optimal (P+), unpleasant and functionally optimal (N+), pleasant and dysfunctional (P-), and finally unpleasant and dysfunctional (N-).

Based off of the individual zones of optimal functioning model the psychobiosocial state scale (PBS-S) was constructed in order to have a scale to use in research and practice with individual athletes (Ruiz et al., 2015). The scale is intended, as is captured in title of the scale, to measure an athlete's psychological, biological and social states prior to a competition, training or performance. Additionally, there are also items of the scale which ask motivational and volitional states. Furthermore, it is intended be used repeatedly with individual athletes to identify and define the optimal zones and non-optimal zones of performance. While this scale is designed to be used with athletes over time to develop and firmly establish these various zones of functioning, it does not always need to be. Even though the viability of retrospective recall on psychobiosocial states has been criticized, it has continued to be used to define an athlete's individual zones of optimal functioning as it is non-invasive, and is not as intensive and expensive as is real time assessment. While research in this study was conducted retrospectively

on recreational marathon runners in a real world setting this still is a practice that has been used to examine athletes' individual zones of optimal functioning and their psychobiosocial states prior to performances. While the real world setting can be viewed as a drawback or a limitation, the overall this was viewed as an opportunity to employ the scale to better examine how a real world setting could be explored using this relatively new tool.

Broadening the scope from the psychobiosocial states and the individual zones of optimal functioning model, a second area of particular interest in the quest to better understand the psychological constructs of marathon runners is the area of goal orientations, and for this it is important to gain a solid understanding of the literature on goal perspective theory. Goal perspective theory originally was investigated in a classroom settings (Nicholls, 1984a; 1984b) to examine the goal orientations of students to better comprehend their motivations, and subsequently has been applied to and examined in both physical activity and sport settings as well. Goal perspective theory has been used widely to investigate health behaviors and health lifestyles, and why many students lack motivation to participate in regular exercise (Treasure & Roberts, 1995). The objective of goal perspective theory in the sport setting was initially, subsequent to the classroom, to study the in what capacity goal orientations either foster or hinder intrinsic motivation (Duda, Newton, Walling, & Catley, 1995). Furthermore, this literature is importantly integrated and aligned with research on intrinsic motivation, which will be further discussed later in the literature review.

Nicholls (1984a; 1984b), who was one of the pioneers in goal achievement research, asserted that two conceptions of ability represent two different personal theories of achievement, and are rooted within two independent achievement goal orientations. How athletes think, feel and act in relation to their achievement goals, in connection

with their own perceived ability, gives meaning and significance to a particular event, and therefore directly influences the athlete's behavior. The two types of achievement goals that exist in the sport setting that are of relevance to this research are task and ego orientation. The two different types then relate to how athletes judge their own competence, or perceived ability, and how they can define/characterize successful achievement of their goals (Nicholls, 1989). Task orientation, refers to being highly involved in the execution of a task, and personal success or achievement is then based mainly on personal or self-referenced improvement, learning and task mastery. On the other hand ego orientation refers to being highly involved in comparing one's personal performance and/or effort to the performance and/or effort of others in order to determine personal success or achievement. Ego orientation is referenced to the output or performance of others, rather than being self-referenced as is task orientation. Ego orientation therefore is not concerned with individual improvement or learning, but rather is concerned with proving an athlete's adequacy or capability is superior to others. Ego oriented athletes may also feel successful if they are able to accomplish the same results as their competitors without using as much effort. Consequently, if you are ego oriented you feel successful only when you have outperformed or, in any manner, outdone others. Moreover, goal perspective theory suggests task orientation should correlate with adaptive cognitions and adaptive achievement behaviors. Conversely, ego orientation is expected to result in negative cognitions and negative achievement behaviors. Research in goal perspective theory in sport settings has established that these two constructs, task and ego orientations, do exist (Duda, 1993). A study by Lochbaum & Roberts (1993) of around 300 high school athletes found that the individuals who endorsed task orientation also endorsed adaptive achievement strategies, believing success to be tied to persistence and effort, and moreover the

athletes who were more task oriented enjoyed more personal satisfaction. Furthermore, in relation to motivation which will be discussed shortly, it was reported in a study by Papaioannou and Duda (1993) that a positive relationship existed between a task orientation and intrinsic motivation for participation, within a sample of Greek adolescent physical education students. While the last study used a physical education context, the results were supported in sport in a recent study (Chin, Khoo & Low, 2012) which examined competitive youth track and field athletes. The results revealed a positive and significant correlation between task orientation and intrinsic motivation ($r=0.55$, $p<0.01$) within the track and field athletes. It is expected that the results in this study would support Chin, Khoo & Low's (2012) recent findings, albeit that the participants in this study are categorized as recreational rather than competitive.

Goal perspective theory can be tied to cognitive evaluation theory (Deci & Ryan, 1985) in a manner that supports the assumptions of both theories, thereby not only relating the theories, but additionally making them both stronger. The way in which these two theories are connected lies in the understanding of intrinsic motivation and how it operates. One of the main theories influencing and informing research in this area of sport psychology is cognitive evaluation theory (Vallerand, Deci & Ryan, 1987). This theory is of tremendous significance to this research based on how it ties both goal achievement orientations and motivation/regulation together. So it is necessary here to look at cognitive evaluation theory, and additionally self-determination theory from which it stems, which have been studied extensively in sport psychology settings. Cognitive evaluation theory seeks to describe motivation and how it operates, and defines two distinct types of motivation called extrinsic and intrinsic motivation. Cognitive evaluation theory operates within the larger framework of self-determination theory (Deci & Ryan, 1985). A very brief understanding of self-determination theory

can be arrived at by grasping a basic knowledge of the three main components. Self-determination theory assumes that there are three basic or innate psychological needs that, if fulfilled, will allow for the optimal growth of an athlete. These three components are present and require fulfilling across different cultures and sports. The three components or needs are competence, relatedness and autonomy. Competence refers to the human need, or an athlete's need, to feel in control of an outcome and to feel like they are experiencing mastery. Relatedness refers to the desire to interact with and to connect with similar others. Autonomy refers to the universal need to feel like a person is in control of their life's decisions and actions. These components and the theory of self-determination theory provide a unique framework for viewing motivation. From here intrinsic and extrinsic motivation, components of the cognitive evaluation theory sub-theory of self-determination theory, can be defined. Intrinsic motivation in sport suggests that an athlete undertakes or engages in a sporting behavior or activity for its own sake, because it is in itself inherently enjoyable or interesting and not because of an external reward or because some type of restraint is attached to the activity. Extrinsic motivation in sport refers to undertaking or engaging in an activity because it leads to a specific and separate outcome, like a receiving a reward or avoiding a punishment.

Intrinsic motivation can be linked with goal perspective theory in that it is expected that task orientation will be positively correlated with intrinsic motivation, as was the case in the Chin, Khoo & Low (2012) study of track and field athletes. This expected relationship is further explained by Nicholls (1989), where being task oriented means being focused on the process and not on the outcome, which aligns with focusing on the intrinsic aspects, hence a positive relationship is expected between these two constructs (Dweck, 1985; Nicholls, 1989). Ego oriented athletes engage in sport as a means to an end, as the goal is to prove that they are better/superior to the others. The other reasons

for engaging, such inherent enjoyment and personal satisfaction, are not the main focus. Task oriented athletes are engaging in sport as an experience to which itself is an end, with the focus on the process being central, and the competitive outcome being secondary. Hence ego orientation, due to being heavily tied to social comparison and therefore providing athletes with less personal control over the outcome, is expected to either have a negative relationship to intrinsic motivation (Duda, 1995). A recent study conducted relating ego orientation and intrinsic motivation in team sport (Jõesaar, Hein & Hagger, 2011) exhibited a negative and significant correlation between the two constructs. It is expected that the relationship between ego orientation and intrinsic motivation in the current study will be similar.

Intrinsic motivation is one type of motivation, which used to be viewed as a unidimensional construct, but more recently it has undergone a change in perspective in which now it falls onto a motivation continuum. There of course are other motivating factors that need to be discussed in terms of how athletes' regulate their emotions, as well as their other psychological, biological and social states. The spectrum of how athletes regulate their behavior stems from the aforementioned self-determination theory (Deci & Ryan, 1985). Within the framework of self-determination theory there are two different categories of behavior, dependent on their degree of self-determination. Autonomously motivated behaviors are regulated internally by self-determined processes. Non-autonomous, or controlled behaviors, are conversely regulated by non-self-determined forces. Within these two wider categories are different types of behavioral regulation and are organized within self-determination on a continuum or spectrum of motivation/regulation, please see figure 1 below for a discriminating visual of this continuum. This representation is taken from the Lonsdale,

Hodge and Rose (2008) research study on the behavioral regulation in sport questionnaire, which will be described later.

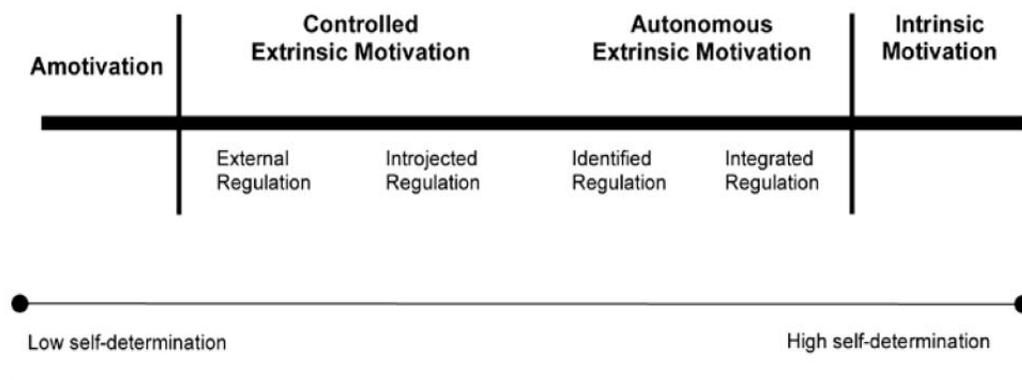


Figure 1 — The self-determination continuum.

Deci and Ryan (1985) regarded intrinsic motivation as a construct unto itself, but as mentioned before it has been shown consistently to be positively related to task orientation/mastery (Ames & Archer, 1988; Archer, 1994; Duda & Nicholls, 1992; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Miller, Behrens, Greene, & Newman, 1993; Nicholls, Patashnick, & Nolen, 1985). Extrinsic motivation on the spectrum pictured above (Figure 1) is divided into four distinct categories. Moving away from intrinsic motivation on the spectrum the next two categories fall under the autonomous regulatory classification. Integrated regulation is the most autonomous form of extrinsic motivation, and is characterized by an athlete viewing his sport as in congruence with his genuinely held values and also his sense of self. Identified regulation is characterized by an athlete valuing and judging the distinct outcomes of their sport as personally important. Again moving away from intrinsic motivation on the spectrum the subsequent two categories fall under the controlled regulatory classification. External regulation is the least self-determined or self-governed and is

characterized by an athlete participating to obtain rewards, avoid punishment, or fulfill an external demand. This process of external regulation over time can be partially internalized in order that external controls are no longer compulsory to maintain a behavior. When an athlete participates to avoid feeling guilt or shame, or to enhance ego or self-worth, it falls under the last category of extrinsic motivation, which is called introjected. For the purposes of this study intrinsic motivation, integrated regulation and identified regulation were considered to be forms self-determined regulation. In the other direction, external regulation and amotivation were considered to be non-self-determined, or controlled, forms of regulation.

Furthermore, and of interest in this research paper, achievement goal orientations have effects that can alter or shape other affective, cognitive and behavioral consequences, such as psychobiosocial state modalities and the athlete's experience of them (Biddle et al. 2003). Of particular interest here is how goal achievement orientations can affect athletes' emotions and psychobiological states. A meta-analysis by Ntoumanis and Biddle (1999) found that task orientation was both positively associated with positive affect, and additionally negatively associated with negative affect. On the other hand, ego orientation was found to be unrelated to positive and negative affect. In relation to motivation, a recent study task orientated children were found to be more likely to be intrinsically motivated regardless of either their perceived or actual abilities (Papaioannou, Ampatzoglou, Kalogiannis, & Sagovits, 2008).

The subsequent concept, which is related to the both goal perspective theory and self-determination theory, is the concept of cognitive appraisals, as is drawn from the transactional theory of stress. The concept was first introduced by Lazarus & Folkman (1984) and attempts to understand & accurately assess athletes' stress reactions. From the standpoint of this model distress experienced by an athlete results from the

interaction between an event (stressor), the athlete's personal coping mechanisms, their cognitive appraisal of the event, and finally their coping response. Importantly, here Lazarus & Folkman (1984) contend that an individual's appraisal of an event's significance to their own well-being is what causes a stress appraisal, rather than the event itself being stressful. Within this model of appraising a given situation there are two general types of appraisals, which are threat and challenge appraisals. A cognitive threat appraisal occurs when an athlete lacks sufficient coping mechanisms, or resources to cope, with a stressor or stressful event and they therefore view the event or situation as a danger or threat. A cognitive challenge appraisal occurs when an athlete views an event or situation as an opportunity to prove themselves, and therefore view the opportunity to gain experience, or to work on mastery or personal growth. Challenge appraisals mobilize physical and psychological activity. Challenge appraisals have been and continue to be associated with higher intrinsic motivation, as was the case in a recent study which found that challenge appraisals were correlated with high intrinsic motivation (Putwain & Symes, 2014).

Furthermore, and of interest in this research paper, achievement goal orientations have effects that can alter or shape other affective, cognitive and behavioral consequences, such as psychobiosocial state modalities and the athlete's experience of them (Biddle et al. 2003). Of particular interest here is how goal achievement orientations can affect athletes' emotions and psychobiological states. A meta-analysis by Ntoumanis and Biddle (1999) found that task orientation was both positively associated with positive affect, and additionally negatively associated with negative affect. On the other hand ego orientation was found to be unrelated to positive and negative affect. In a recent study task orientated children were found to be more likely to be intrinsically motivated

regardless of either their perceived or actual abilities (Papaioannou, Ampatzoglou, Kalogiannis, & Sagovits, 2008).

The relationship between these variables and the psychobiosocial state scale has only been investigated in one study to date. In a recent study by Bortoli, Bertollo & Robazza (2009) the relationships between goal orientations, perceived motivational climate and psychobiosocial states in youth athletes were examined. While the study was similar conceptually to the current research, the Bortoli study used a different scale to measure pleasant and unpleasant emotions (Perceived Motivational Climate in Sport Questionnaire). Whereas Bortoli and colleagues (2009) used youth athletes in their study, and they were between 13 and 14 years old, it is expected that the correlation between task orientation and helpful psychobiosocial states would be similar in size and significance. The correlation found with the youth athletes between task orientation and pleasant affects was moderately positive and significant.

In sum, the variables of interest in this research study have been shown to be related and correlated within sport settings. The recent shift towards idiographic approaches and understanding the performance related experiences of athletes begs to have these constructs related to each other in a new way. This study has done that through examining the direction and magnitude of the correlations between the variables and the psychobiosocial states prior to personal best performance. Better understanding the performance related experiences of athletes, elite recreational or other, can serve to better help athletes as a whole. Before the purpose of the study is stated, a well-expressed quote from his book entitled *A Guide to Third Generation Coaching*, sport and coaching psychologist Reinhard Stelter puts into perspective why this study is important; "Reality needs to be explored anew, as it takes shape for the coachee as meaningful and with a particular worth that may have gone undiscovered and

inexperienced. The person's self is challenged in its view of reality – a need for further exploration arises” (Stelter, 2012, p.5).

PURPOSE

The first purpose of the study was to investigate how the variables measured by each of the four scales employed did or did not correlate with each other. It was expected that there would be positive relationships between the constructs of challenge appraisal, task orientation, intrinsic motivation and theoretically helpful psychobiosocial state modalities prior to personal best performance. The positive relationships between the aforementioned variables is expected to be true for both the helpful psychobiosocial state modality intensity scores, as well as the impact scores. Conversely, it was expected that the constructs of threat appraisal, ego-involvement, external regulation and amotivation would be negatively correlated with the theoretically helpful psychobiosocial state modalities prior to personal best performance. The negative relationships between the aforementioned variables is expected to be true for both the helpful psychobiosocial state modality intensity scores as well as the impact scores.

METHODS

PARTICIPANTS

Participants were 67 marathon runners (42 male, 25 female) ranging in age from 17 to 67 years ($M=41.90$, $SD=13.56$). Additionally four descriptive questions were asked of the participants. Number of marathons run ranged from 0 to 283 ($M=29.76$, $SD=56.04$). Years running ranged from 0 to 44 ($M=14.93$, $SD=12.21$). Year running marathons ranged from 0 to 40 ($M=8.93$, $SD=11.18$). 51 of the 67 participants provided their Personal Best marathon time, which ranged from 2:39:02 to 5:34:00 ($M=3:51:21$, $SD=42:17$).

INSTRUMENTS

Psychobiosocial State Scale

The psychobiosocial state scale was developed by Ruiz, Hanin and Robazza (2011). This scale assesses various psychobiosocial state modalities, both in their perceived intensities and perceived impacts. The revised scale is composed of ten different state modalities, each one having both a helpful and harmful (theoretically), or positive and negative valence, which creates twenty distinct modalities. The ten modalities are as follows: cognitive, affective pleasant, affective unpleasant anxiety, affective unpleasant anger, motivational, volitional, bodily, motor behavioral, operational, and communicative. The twenty items are ranked from 0 to 11 on intensity, ranging from the complete absence of any intensity (0) to the maximum intensity one could feel (11). This intensity scale ranging from 0 to 11 is based off of Borg's modified category ratio 10 scale, which is similar to a Likert scale and is often used in sport and exercise research. For each of the twenty items there are three to four synonyms for each modality, requiring the participants to select one. Finally, all twenty items are then

ranked on the perceived impact the participant believed they had on the subsequent performance. For perceived impact the scale ranged from having a very harmful impact (-3) to having a very helpful impact (3), where 0 represents having no impact.

Task & Ego Orientation in Sport

The Task and Ego Orientation in Sports Questionnaire (TEOSQ) was originally designed by Duda and Nicholls in 1989, and later revised in 1992. It consists of 13 items which are designed to assess athletes' task and ego orientations, which relates to Nicholls' (1989) achievement motivation model. There are 7 questions concerning task orientation and 6 questions concerning ego orientation. Participants are asked to think of when they felt the most successful in their sport and indicate their agreement on the items either reflecting task-oriented or ego-oriented statements. A sample of task-oriented item is "I learn something that is fun to do" and a sample of ego-oriented items is "I can do better than my friends." The items are answered on a 5-point Likert scale, which ranged from *strongly disagree* (1) to *strongly agree* (5). A recent study by Duda and colleagues (Castillo, Tomas, Balaguer, Fonseca, Dias & Duda, 2010) with Spanish and Portuguese junior high athletes found internal consistency with Cronbach's alpha ranging from .78 to .85. Although an older study, but importantly using an English version of the questionnaire, Duda and White (1992) found acceptable internal consistency measures with Cronbach's alpha measured at .79 for task orientation and .81 for ego orientation among a sample of elite inter-collegiate skiers.

Behavioral Regulation in Sport Questionnaire

The behavioral regulation in sport questionnaire (BRSQ) is used to assess competitive athletes' intrinsic motivation, extrinsic motivation and amotivation. The scale used for this survey was finalized by Lonsdale, Rose, & Hodge in 2008. The BRSQ can be

broken down into six different parts or areas of motivation, ranging from intrinsic motivation to amotivation. Of these six, the four in the middle, which separate intrinsic motivation from amotivation, make up the spectrum of extrinsic motivation. Here the four are integrated regulation, identified regulation, introjected regulation and external regulation. The BRSQ is made up of 24 items, with each subcategory of motivation/regulation containing four questions. The items begin with the statement “I participate in my sport because...” and are then followed with the second half of the assorted statements. A sample of an intrinsic motivation item is “because I find it pleasurable.” A sample of an integrated regulation item is “because it’s part of who I am.” A sample of an identified regulation item is “because it teaches me self-discipline.” A sample of an introjected regulation item is “because I feel obligated to continue.” A sample of an external regulation item is “because people push me to play/participate.” A sample of an amotivation item is “but I question why I continue.” The scale uses a 7-point Likert scale, which ranges from *not at all true* (1) to *very true* (7). The Lonsdale et al. (2008) initial development and validity paper found Cronbach’s alpha ranging from .76 (integrated regulation) to .91 (external regulation and amotivation).

Cognitive Appraisals of Sport Competition

This scale is based on challenge versus threat appraisals of a hypothetical competitive situation. It was adapted from a scale (McGregor & Elliot, 2002) which collects students’ appraisals before a class exam. The scale was adapted by Adie, Duda & Ntoumanis (2008). This 10-item scale was used to assess the participants’ dispositions in appraising a hypothetical sport situation. The scale asks participants to imagine an upcoming and important competition, in which they had performed twice before against a tough opponent/team. Once they performed poorly and the other time had performed

well. Faced with the same competition situation again they were asked questions regarding if they perceived the ensuing competition as either threatening or challenging. Definitions of appraisals were then presented regarding how athletes might respond to the specified situation. The participants were then asked to recall if they had faced similar circumstances in their sport and were told to respond to the following; “How would you typically think before such a competition?” A sample item for the challenge scale is “I look forward to being challenged in the competition.” A sample item from the threat scale is “I often think about what it would be like if I did badly in this competition.” The items were answered on a 7-point Likert scale, which ranged from *not at all true of me* (1) to *very true of me* (7). These challenge and threat constructs measure yielded high internal consistency and predictive validity in both a classroom setting (McGregor & Elliot, 2002) and in a study of various team athletes from the UK (Adie et al., 2008). The internal reliability in the latter study yielded a Cronbach’s alpha of .78 for the challenge scale and .73 for the threat scale.

PROCEDURE

Obtaining participants was done through attending two marathons in the United States during the summer of 2014. Race directors were contacted via email in regards to conducting the study at their events. The two marathons where data was collected were the HFM Maritime Marathon in Manitowoc, Wisconsin and the Paavo Nurmi Marathon in Hurley, Wisconsin. Both race directors were accommodating and let a small table and chairs be set up at their race number pick-ups. The race number pick-ups were held either the day before the race or both of the two days prior to the race. Potential participants were informed that their participation was in no way mandatory to run in their event, but rather was completely voluntary. Participants were furthermore informed that the survey took approximately fifteen minutes to fill out and that in return for their time they would receive either a Cliff energy bar or a Gu power-gel. Lastly, if participants asked for more information concerning the topic of the survey they were told that it was made-up of four sports scales and the results would be used as data for a master's thesis regarding marathon runners. Participants were also encouraged to ask if they had any questions on any of the four scales used in the survey. The researcher was unable to sit and watch each participant while they were filling out their surveys, which did result in some surveys not being filled out correctly or in their entirety, which is reviewed in the discussion. Lastly, the consent form, which was the first page of the survey, briefly described the nature of the study, named the supervising professors and the University (Jyväskylä) to which the research was affiliated with, in order to fully inform the participants. The consent form also made it clear to the participants' that they could withdraw or choose not to continue at any point during the survey.

Ethical issues were discussed with the supervising professors prior to collecting data.

One of the reasons it was decided to ask the participants about their psychobiosocial

states prior to their most successful performance rather than their least successful performance was to have them think about and recall an optimal performance, rather than a non-optimal performance, in order to avoid potentially negatively affecting their performance the next day. By asking the participants about their best performance the level of risk is minimized to an extent. While asking about certain variables of interest in the study could have encouraged participants to think about negative aspects of the upcoming event (that it could be threatening, or that they could lack motivation) it was deemed appropriate for the following reasons. As stated previously, the participants were aware of the nature of the study and the level of risk which could come along with voluntarily agreeing to partake in it. Secondly, the level of risk was considered to be justified based on the relevance of the study. Participants in this research study have helped to better inform recreational marathon runners in the future through their participation. Again, the participants' retained the right to withdraw from the survey at any point and for any reason, which would certainly include needing to think about or recall negative aspects of their psychological experiences related to marathon running. Lastly, the gift given in exchange for filling out the survey (energy bar or gel, as described in procedure section) was deemed appropriate as it did not represent anything more than a small thank you for the participants time and participation.

DATA ANALYSIS

Data analysis began with averaging participants data for the variables of interest with the program by IBM, SPSS statistics 22. Additionally, minimums, maximums and standard deviations were explored, and Cronbach's alpha was established for the variables of interest. Since not all assumptions were met for parametric tests, nonparametric tests were used to conduct testing after simple correlations were established. However, both Pearson's bivariate correlations (parametric) and Spearman's rho (nonparametric) correlations are presented to exhibit the similarities in the two types of analyses. Preliminary T-tests were conducted, as linear regression could not be used due to assumptions not being met, to examine potential grouping differences. A lack of significant group differences (novice and expert, men and women) determined that the t-tests would not be presented, but rather the group was treated as a whole due to their overwhelming similarity.

RESULTS

The following table (Table 1) displays the average ratings for the each of the variables measured by the four scales used. Helpful state modalities intensity and impact scores were normally distributed, but the other measures were not. Normal distribution was not expected amongst this group of participants as measures have not been normally distributed in past studies using the same scales. Cronbach's alpha is included to establish the internal consistency of each measure.

Table 1

Competitive appraisal, sport orientation, regulation & biopsychosocial modality ratings

Measure	N	Min.	Max.	M	SD	Chronbach's α
1. Threat Appraisal	58	1.00	5.40	2.44	1.11	0.82
2. Challenge Appraisal	58	3.80	7.00	6.06	0.73	0.75
3. Task Orientation	58	3.00	5.00	4.31	0.54	0.84
4. Ego Orientation	58	1.00	4.67	2.49	0.86	0.81
5. Intrinsic Motivation	58	4.25	7.00	6.45	0.63	0.87
6. Integrated Regulation	58	3.75	7.00	5.81	0.87	0.79
7. Identified Regulation	58	4.25	7.00	6.16	0.76	0.69
8. Introjected Regulation	58	1.00	6.75	3.46	1.59	0.84
9. External Regulation	58	1.00	5.50	2.00	1.22	0.88
10. Amotivation	58	1.00	6.50	2.25	1.17	0.80
11. Helpful Modality Intensity	57	2.75	9.20	6.69	1.50	0.81
12. Helpful Modality Impact	57	-0.20	2.90	1.57	0.65	0.78
13. Harmful Modality Intensity	57	0.00	6.40	2.74	1.62	0.82

14. Harmful Modality Impact	57	-2.40	2.10	0.06	0.92	0.86
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The following correlation tables (Table 2 & 3) display the correlations between the various self-report ratings made by the participants. As stated previously, it was anticipated that there would be significant correlations between the scale ratings, based on previous literature demonstrating relationships between the underlying constructs measured by the scales. Of particular interest was which scale(s) would be the most highly correlated with the experience of helpful intensities and impacts of the psychobiosocial modalities.

Table 2

Correlations between study variables (Spearman's rho: nonparametric)

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.TA	-													
2.CA	-.06	-												
3.TO	-.21	.31**	-											
4.EO	.16	.06	-.04	-										
5.IM	-.37**	.37**	.42**	-.09	-									
6.InteR	-.25*	.46**	.46**	-.07	.65**	-								
7.IdenR	-.18	.39**	.46**	-.19	.52**	.52**	-							
8.IntrR	.30*	.08	-.15	.39**	-.27*	-.11	-.16	-						
9.ExR	.33**	-.02	-.08	.37**	-.24	-.11	-.01	.41**	-					
10.Amo	.27*	-.26*	-.30*	.15	-.61**	-.36**	-.28*	.33**	.43**	-				
11.HelInt	-.23	.38**	.37**	-.02	.35**	.32**	.35**	-.03	-.15	-.11	-			
12.HelImp	-.31*	.41**	.30**	.00	.31*	.35**	.20	-.14	-.21	-.22	.69**	-		
13.HarInt	.25*	-.03	.04	.27*	-.12	-.05	.16	.39**	.27*	.36**	.28*	.01	-	
14.HarImp	-.09	.11	.09	-.10	.19	.28*	.15	-.02	.02	-.02	.14	.33**	.02	-

**p < .01; *p < .05.

1) Threat Appraisal (TA) 2) Challenge Appraisal (CA) 3) Task Orientation (TO) 4) Ego Orientation (EO) 5) Intrinsic Motivation (IM) 6) Integrated Regulation (InteR) 7) Identified Regulation (IdenR) 8) Introjected Regulation (IntrR) 9) External Regulation (ExR) 10) Amotivation (Amo) 11) Helpful State Intensity (HelInt) 12) Helpful State Impact (HelImp) 13) Harmful State Intensity (HarInt) 14) Harmful State Impact (HarImp)

Table 3

Correlations between study variables (Pearson's product-moment: parametric)

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.TA	-													
2.CA	-.09	-												
3.TO	-.26*	.29*	-											
4.EO	.23	.06	-.05	-										
5.IM	-.36**	.33**	.43**	-.03	-									
6.InteR	-.22	.41**	.47**	-.06	.59**	-								
7.IdenR	-.13	.43**	.45**	-.15	.46**	.48**	-							
8.IntrR	.28*	.01	-.18	.37**	-.22	-.08	-.11	-						
9.ExR	.48**	.07	-.15	.39**	-.12	-.07	.11	.40**	-					
10.Amo	.30*	-.21*	-.35**	.11	-.67**	-.32**	-.25*	.29*	.35**	-				
11.HelInt	-.20	.41**	.36**	-.04	.30**	.33**	.38**	-.06	-.14	-.13	-			
12.HelImp	-.25*	.46**	.33**	-.04	.24	.31*	.24	-.13	-.15	-.19	.74**	-		
13.HarInt	.29*	-.03	-.01	.20	-.18	-.02	.17	.34**	.33**	.39**	.26*	.03	-	
14.HarImp	-.05	.12	.11	-.03	.15	.22	.13	.11	.09	-.04	.08	.31*	.06	-

** . $p < .01$.

* . $p < .05$.

1) Threat Appraisal (TA) 2) Challenge Appraisal (CA) 3) Task Orientation (TO) 4) Ego Orientation (EO) 5) Intrinsic Motivation (IM) 6) Integrated Regulation (InteR) 7) Identified Regulation (IdenR) 8) Introjected Regulation (IntrR) 9) External Regulation (ExR) 10) Amotivation

(Amo)11) Helpful State Intensity (HelInt) 12) Helpful State Impact (HelImp)13) Harmful State Intensity (HarInt) 14) Harmful State Impact (HarImp)

The following table (Table 4) shows the means and standard deviations of all ten state modality intensity and impact ratings; within these types of modalities there ten theoretically helpful and ten theoretically harmful. In general, the participants averaged higher intensity ratings for the theoretically helpful state modalities, ranging from 4.94-8.07. Conversely, the theoretically harmful state modalities had lower intensity ratings from the participants, ranging from 1.05-6.24. Theoretically helpful modalities generally were rated by the participants as having higher positive impacts on their performance than were the theoretically harmful modalities. The affective pleasant harmful state modality mean impact score rating of 1.37 was the only exception, as it was rated as having a higher positive impact score than was affective unpleasant anxiety helpful (0.49), operational helpful (1.14), and communicative helpful(1.35). All ten of the theoretically helpful state modalities had positively valences for the impact scores, suggesting that for most participants all ten had a positive impact on their performance. Five of the ten theoretically harmful state modalities had mean impact scores with positive valences.

Table 4

Means, Standard Deviations, Minimums, and Maximums of State Modalities Experienced by Participants Prior to Most Successful Performance

State Modality	<u>Intensity Score Ratings</u>				<u>Impact Score Ratings</u>			
	M	SD	Min.	Max.	M	SD	Min.	Max.
<u>Helpful States</u>								
cognitive	7.40	1.94	1	10	1.84	1.01	-1	3
affective	7.28	2.25	1	10	2.11	1.01	-1	3
pleasant								
affective	4.94	3.26	0	10	0.49	1.55	-3	3
unpleasant								
anxiety								
affective	5.97	2.89	0	10	1.37	1.46	-3	3
unpleasant anger								
motivational	8.07	1.87	2	10	2.06	0.88	0	3
volitional	8.04	2.04	0	10	2.05	0.88	0	3
bodily	7.18	2.26	.5	10	1.63	1.19	-3	3
motor behavioral	6.16	2.42	1	10	1.63	1.08	-2	3
operational	6.05	2.45	0	10	1.14	1.04	-1	3
communicative	5.82	2.76	0	10	1.35	1.01	0	3
<u>Harmful States</u>								
cognitive	2.48	2.57	0	9	0.07	1.20	-3	3
affective	6.24	2.87	0	10	1.36	1.24	-3	3
pleasant								
affective	3.88	3.17	0	10	0.35	1.44	-3	3
unpleasant								
anxiety								
affective	1.05	1.74	0	8	-0.44	1.46	-3	3
unpleasant anger								
motivational	1.28	2.22	0	10	-0.27	1.55	-3	3
volitional	1.45	2.18	0	7	-0.42	1.49	-3	3
bodily	4.49	3.24	0	10	0.35	1.49	-3	3
motor behavioral	1.66	2.02	0	7	-0.09	1.47	-3	3
operational	1.59	2.32	0	10	-0.29	1.38	-3	3
communicative	2.64	2.95	0	10	0.13	1.40	-3	3

DISCUSSION

Referring back to the purpose of this research study, the intent was to gain a deeper understanding, or better perspective, on how the variables measured by the four scales used interacted with each other. While this research study was relatively small in size, it was large enough to explore the interactions of the variables, and several of the correlations established significance despite the sample size. The first correlation to be discussed here is the correlation between challenge appraisal and task orientation. The correlation was moderate (.31) and was significant. This correlation was expected, and falls in line with previous research (Adie et al., 2008). In this previous study the researchers found that mastery approach, which refers to the attainment of task-involving competence and helps constitute task orientation, was significantly and positively associated with challenge appraisal. While the effect size in this study (.31) was lower than it was in the study by Adie, Duda and Ntoumanis (.51) this would actually be expected. Mastery approach became one of four categories within achievement goal theory when recently researchers split up the previously dichotomous theory by adding approach and avoidance dimensions. While the task and ego orientation in sport questionnaire only uses the dichotomous structure the correlation between task (or mastery) orientation and challenge appraisal is still present, as would be expected, as mastery goals are postulated to promote challenge appraisals.

The second correlation was between task orientation and intrinsic motivation. Since intrinsic motivation is constituted by enjoying an activity in and of itself it was expected that the two should be positively correlated. A quote that stood out to me in my reading of the literature was “Most achievement goal and intrinsic motivation theorists... contend that mastery goals (related to task orientation) facilitate intrinsic motivation

(Elliot, 1996, p.471).” While this statement cannot be fully established from this study, the two were positively correlated (.42) and significant.

A third correlation of interest was established between challenge appraisal and intrinsic motivation. This was also positively and significantly correlated (.37) which would be expected based on the previous literature.

Now we will look at how the three aforementioned variables, challenge appraisal, task orientation and intrinsic motivation, correlated with the psychobiosocial state modalities. Challenge appraisal was positively and significantly correlated with psychobiosocial helpful state intensities (.38) and impact ratings (.41). Task orientation additionally was also correlated positively and significantly with both helpful psychobiosocial state intensities (.36) and impact ratings (.33) prior to best performances. Intrinsic motivation finally was correlated positively and significantly to both PBS helpful state intensities (.35) and impact ratings (.31). The correlation was slightly higher with task orientation and intensity ratings of helpful psychobiosocial states (.37) than it was between task orientation and impact ratings of psychobiosocial states (.30), but both correlations were significant at the .01 level.

Moving to the second area of interest the hypotheses concerning threat appraisal, ego orientation, controlled regulation and the helpful psychobiosocial states were a bit less straight forward. Threat appraisal was negatively correlated with both the helpful psychobiosocial states intensity scores (-.23) and impacts scores (-.31), but only significant in the case of the impact scores. Ego orientation was shown to have little to no correlation with the helpful psychobiosocial states intensity and impact scores (-.02 and .00 respectively). This finding could be explained by the fact that ego orientation had been found either have a negative relationship with intrinsic motivation, or to be

unrelated (Jõesaar, Hein & Hagger, 2011). Lastly, the controlled regulation constructs (external regulation and amotivation) were negatively correlated with helpful psychobiosocial states intensity and impact scores. The amotivation correlations (-.03 and -.14 respectively) were slightly higher than those of external regulation (-.15 and -.21 respectively), which would be support the spectrum of self-determination stance despite these correlation not being significantly significant.

There are certainly a number of limitations of this study, as is the case with any study. The participants in this study, while they were competing in a timed marathon either one or two days after filling out the research survey, could best be described as a group as recreational runners. While this is not a problem, some of the sport scales used have been tested on either competitive athletes or even elite athletes. Since competitive athletes and elite athletes in general face competitive situations with greater frequency than do recreational athletes they may have a greater knowledge base or understanding of their own psychological tendencies and how they operate in competitive situations based on experience. In particular, the behavioral regulation in sport questionnaire and the psychobiosocial state scale emphasize that they have been studied using competitive or elite athletes, again based on the fact that these types of athletes have a greater familiarity with competitive situations. In the Lonsdale et al. (2008) research paper section in the discussion called Using the BRSQ (behavior regulation in sport questionnaire) the first sentence reads; “We must emphasize that we developed the BRSQ specifically for use with competitive sport participants.” (Lonsdale, 2008, p.348) While these marathon runners could best be described as recreational, they all were signed up for a competitive and timed event. Many of these participants have years of experience in both running and running marathons, so to say that they have little experience when it comes to competition and how their emotions and psychological

states operate would be false as well. On the whole, the group is quite diverse when it comes to experience, but this is not to say they have insignificant or negligible knowledge is not true, which is why it was deemed appropriate to use these scales, despite them being used largely by competitive or elite sport research in the past.

Another limitation of the study was the inability for the researcher to sit with each participant and ensure that they filled out each of the scales correctly and completely. While participants were encouraged to approach the survey table and ask questions regarding any of the questionnaires if they found anything to be unclear or confusing, especially regarding the instructions, yet there were still a number of surveys that were either not filled properly or entirely. One common mistake made by participants was not filling out the psychobiosocial state scale completely properly. The scale asks participants to select one word for each state modality that best describes how they feel, and then are given three or four synonyms to choose from. As the words to select from are synonyms some participants did not select one, but rather made intensity and impact score ratings based on the words taken collectively. Since the descriptors are synonyms the participants who had not selected a word, but did rate their intensity and perceived impact, were still used in the analysis upon discussion with the researchers supervising professor. While these instruments were not filled out entirely correctly, they still were serviceable when it came to being able to analyze the intensity and impact ratings and use for correlation and regression analyses.

Another limitation to be mentioned regards the psychobiosocial state scale and the manner in which it was employed. The scale is designed to be used to take repeated measures of an athlete over time, in order to find their opt-in and opt-out zones of function, in line with the IZOF model which provides the framework that the psychobiosocial builds upon. In the case of this research study this was not feasible, and

therefore the data collected was limited to how they felt prior to their most successful performance. For some of the participants' accurate recall may have been an issue as well. For instance, if the participant had their personal best race or most successful marathon many years ago, accurately recalling how they felt before the race may have been difficult or even recalled incorrectly, as of course time is a limiting factor in recall.

One final limitation, as is the case in any study where the participants are limited, is the size and scope of this study. As convenience sampling was used, the marathons selected to gather perspective participants were close in proximity and within the few month period on interest. The results and findings of this study of recreational marathon runners may not extend to other groupings and competitive levels of marathon runners or other recreational athletes in general. Further research would be needed to confirm these findings. It would be of interest to see if the correlations found within this research would extrapolate to other groups of marathon runners or in types of endurance sports, or entirely other sports, such as team sports.

There are strengths of this study to speak to as well. As mentioned earlier, while the psychological constructs studied here had been studied very much as a whole, this study unified a distinctive combination of scales and questionnaires which had not been employed collectively before. In this manner, the study could not be verified by or compared to previous studies using the same set of scales. Of course, a direction for future research could be to replicate this study to observe if similar findings would appear. Whether the study is replicated with marathon runners or other types of athletes, the results could and would build upon what was found in this study. A second strength of this study is that it was conducted in a real world setting, and thus did not attempt to alter or change participants' viewpoints or characteristics, but rather attempted to collect how these viewpoints and characteristics. A last difference between this study and

others cited was that it was conducted on what would be considered largely adult athletes, with the potential exception of the 17 year old participant. Adult athletes should not have had any problems understanding the questions, as youth athletes sometimes encounter when filling out such scales and questionnaires.

CONCLUSION

In conclusion, the hypotheses proposed were in large part support by the self-reports gathered from the marathon running participants. Adaptive psychological constructs such as challenge appraisal, task orientation and intrinsic motivation were all positively correlated with the helpful psychobiosocial states intensity and impact scores. The constructs of threat appraisal and controlled sport participation regulation were negatively correlated with the helpful psychobiosocial states intensity and impact scores. Ego orientation however showed little to no correlation with the helpful psychobiosocial states intensity and impact scores. Directions for future research include replicating or conducting a similar type study to enhance or confirm the findings of this research. Qualitative research could be done to further examine how marathon runners view these constructs to play a role in their performance related experiences, and to what extent. In light of these findings coaches, sport psychologists and athletes alike can use this information to make sense of their athletes, or their own psychology, and work towards their own performance optimization.

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APPENDICES

APPENDIX A



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I am a master's degree student in sport and exercise psychology at Jyväskylä University in Finland. I am conducting research regarding the psychological characteristics/constituents of marathon runners. The self-report scales that follow will be analyzed in order to better understand how the various constructs are related.

All the information will be kept confidential, and the data will be stored in a secure office with restricted access. Only the faculty supervisors mentioned above and myself as the lead researcher will have access to this information. Upon completion of this project, all data will be filed and archived, and destroyed after ten years.

Participant's Agreement:

I am aware that my participation in this research study is voluntary. If, for any reason, at any time, I wish to stop, I may do so without having to give an explanation. I understand the intent and purpose of this research.

I have the right to review, comment on, and/or withdraw my information at any time. The data gathered in this study are confidential and anonymous with respect to my personal identity.

I have read the above form, and, with the understanding that I can withdraw at any time, and for whatever reason, I consent to participate in the study.

Participant's signature

Date