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# Ultra-obligatory running among ultramarathon runners

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## ABSTRACT

Participants in the Ultrarunners Longitudinal TRacking (ULTRA) Study were asked to answer “yes” or “no” to the question “If you were to learn, with absolute certainty, that ultramarathon running is bad for your health, would you stop your ultramarathon training and participation?” Among the 1349 runners, 74.1% answered “no”. Compared with those answering “yes”, they were younger ( $p < 0.0001$ ), less likely to be married ( $p = 0.019$ ), had less children ( $p = 0.0095$ ), had a lower health orientation ( $p < 0.0001$ ) though still high, and higher personal goal achievement ( $p = 0.0066$ ), psychological coping ( $p < 0.0001$ ) and life meaning ( $p = 0.0002$ ) scores on the Motivations of Marathoners Scales. Despite a high health orientation, most ultramarathon runners would not stop running if they learned it was bad for their health as it appears to serve their psychological and personal achievement motivations and their task orientation such that they must perceive enhanced benefits that are worth retaining at the risk of their health.

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## KEYWORDS

Mental health; mood; psychological factors; running; self esteem

## Introduction

Ultramarathons are foot races longer than the standard 42.195-km marathon distance. Race distances are typically 50 km, 50 miles (80 km), 100 km, 100 miles (161 km) and 200 miles (322 km). These can also be multiple day continuous races and stage races, or competitions to cover the most distance in a specified amount of time (e.g. 12 or 24 h). These races are generally on trails rather than on roads or tracks, and it is not unusual for the courses to pass through quite remote environments. Participation in ultramarathons has grown exponentially in recent years (Hoffman, Ong, & Wang, 2010). For instance, there were a reported 276,535 people completing ultramarathons throughout the world in 2016 which was more than twice the number in 2011 (Deutsche Ultramarathon Vereinigung e.V. [DUV], n.d.). Yet, for comparison, the current number of ultramarathon finishes in the United States is only around 15% of the number of marathons finishes (DUV, n.d.; Running USA, 2016). Therefore, ultramarathon runners represent a relatively small and unique subset of runners.

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With the increasing participation in ultramarathons, it becomes more relevant to understand the characteristics of those participating in these events. Some information has been published about their sociodemographics (Hoffman & Fogard, 2012; Rauch, Tharion, Strowman, & Shukitt, 1988; Thompson & Nequin, 1983), body characteristics (Hoffman, 2008a; Hoffman, Chen, & Krishnan, 2014; Hoffman, Lebus, Ganong, Casazza, & Van Loan, 2010; Knechtle, Knechtle, Rosemann, & Lepers, 2011; Rüst, Knechtle, Knechtle, Wirth, & Rosemann, 2012; Schütz et al., 2012), exercise-related injuries (Hoffman & Fogard, 2011), general health (Hoffman & Krishnan, 2014), exercise behaviours (Hoffman & Krishnan, 2013), and nutritional (Stuempfle, Hoffman, & Hew-Butler, 2013; Stuempfle, Hoffman, Weschler, Rogers, & Hew-Butler, 2011) and medical needs (Bruso et al., 2010; Graham et al., 2012; Hoffman & Fogard, 2012; Holtzhausen et al., 1994; Khodae & Ansari, 2012; Krabak, Waite, & Schiff, 2011; Sandell, Pascoe, & Noakes, 1988; Scheer & Murray, 2011) during events. But, little attention has been directed at what motivates ultramarathon runners to choose an activity that requires running for hours (Acevedo, Dzewaltowski, Gill, & Noble, 1992; Gill, Williams, Dowd, Beaudoin, & Martin, 1996; Hughes, Case, Stuempfle, & Evans, 2003).

It has long been known that people can experience important mental or emotional benefits from running, such as relief of tension, improved mood and self-image, and creative episodes (Callen, 1983). The acute mood enhancement may even be greater among ultramarathon runners compared with more moderate exercisers (Hoffman & Hoffman, 2008). Some runners become obligatory runners, and consequently they have a compulsive drive to run that pre-empts fulfilment in other areas of life, and they will continue to run despite physical injury or obvious personal contraindications (Yates, Shisslak, Allender, Crago, & Leehey, 1992). Ultramarathon runners may be more afflicted with this acquired dependence behaviour than marathon runners (Pierce, McGowan, & Lynn, 1993).

The Ultrarunners Longitudinal TRacking (ULTRA) Study is a longitudinal study monitoring the health status of individuals who have completed an ultramarathon. The primary purpose of the study is to assess for potential health consequences related to the high levels of exercise typical of this group. In doing so, various characteristics of the group have been examined and have been reported elsewhere (Hoffman et al., 2014; Hoffman & Krishnan, 2013, 2014). In the present work, we examine the level of motivation for running among active ultramarathon runners. It was hypothesized that most would be sufficiently driven to continue their sport even if they learned it was unhealthy and that such a need could be explained through insight into their motivation and goal orientation.

## Methods

Recruitment for the ULTRA Study began in 2011 through direct electronic mailing to over 3000 ultramarathon runners, postings on various ultramarathon-related web sites and blogs, advertisements in magazines related to ultramarathon running and distribution of flyers at a number of the largest ultramarathons in the United States. Completion of at least one ultramarathon of 50-km distance or longer at some point in their life was required for enrolment. Information collected at enrolment included self-report on a wide range of personal characteristics and exercise history. Participants were also asked

to indicate if they had ever been told by a physician or other health care professional that they had a wide range of physical and mental health disorders. The present data are largely from the first follow-up questionnaire distributed in 2014 to prior study enrollees. The study was approved by Institutional Review Boards of the Veterans Affairs Northern California Health Care System and Stanford University, and each subject provided informed consent at the time of enrolment through electronic means.

The present report focuses on the ULTRA Study participants who had completed an ultramarathon since study enrolment or had completed an ultramarathon in 2010 or 2011 and were regularly running and intending to run ultramarathons in the future. These runners received the question “If you were to learn, with absolute certainty, that ultramarathon running is bad for your health, would you stop your ultramarathon training and participation?” with answer options of “yes” or “no”. Updated information was also obtained on a number of personal characteristics and behaviours. Each runner also completed the Motivations of Marathoners Scales (Masters, Ogles, & Jolton, 1993), Perception of Success Questionnaire (Roberts, Treasure, & Balague, 1998) and the Sensation Seeking Scale Form V (Zuckerman, Eysenck, & Eysenck, 1978).

The Motivations of Marathoners Scales consists of 56 items that examine nine dimensions of motivation for running. Averaged scores in each dimension are generated from four to nine items rated on a scale of 1 (“not a reason” for running) to 7 (“very important reason” for running). The questionnaire has been shown to be valid and reliable for marathon runners with sufficient internal consistency (Cronbach’s alpha range of 0.80–0.93), test re-test reliability (interclass  $r$  values range of 0.71–0.90), and factorial validity of the scales (Masters et al., 1993).

The Perception of Success Questionnaire was used to assess goal orientation for success in an ultramarathon. The phrase “When running in an event, I feel most successful when” was followed by a series of 12 questions designed to define the extent of ego and task orientation. Each question is measured on a 5-point Likert scale with 1 assigned “strongly agreed”, 3 being “neutral” and 5 assigned “strongly disagreed.” For scoring, the questions are separated into a task or ego category, and a low mean score represents a strong orientation. Content validity for this questionnaire was established through evaluations by an expert panel of motivation researchers and sport psychologists who were accomplished in achievement goal theory. Cronbach’s alphas for the task and ego scales were 0.89 and 0.90, and test re-test reliability has been reported at  $r$  values of 0.97 and 0.98 (Roberts et al., 1998).

The Sensation Seeking Scale was designed to assess personality traits on the four subscales of susceptibility to boredom, disinhibition, experience seeking, and thrill and adventure seeking. It is a 40-item forced-choice format questionnaire yielding a score range on each subscale of 0–10, with a high score representing a stronger propensity towards that trait. Construct validity for this questionnaire has been demonstrated using factor analyses indicating consistency between the scale composition and the four-factor model of sensation seeking, and a variety of studies also demonstrate the criterion-related validity of the questionnaire using reports of behaviour and personal history (Zuckerman, 1994; Zuckerman et al., 1978). Cronbach’s alphas of 0.75 or greater have been reported for the subscales (Roberti, Storch, & Bravata, 2003), and test-retest coefficients as high as 0.94 have been reported (Zuckerman, 1994).

All continuous data were found to be skewed by normality testing with the D'Agostino-Pearson normality test and could not be successfully normalized with standard functions. Therefore, the Mann Whitney test was used to compare continuous data between groups answering the question differently. The Fisher's exact test or the Chi-square test was used to compare categorical data. Results are presented as median and interquartile range, or as percentages.

## Results

There were 1349 active ultramarathon runners who received the question "If you were to learn, with absolute certainty, that ultramarathon running is bad for your health, would you stop your ultramarathon training and participation?" Of this group, 349 (25.9%) answered "yes" and 1000 (74.1%) answered "no" to the question. As shown in Table 1, those answering "yes" compared with those answering "no" were older ( $p < 0.0001$ ), were more likely to be married ( $p = 0.019$ ), had more children ( $p = 0.0095$ ), ran less in training during the prior year ( $p < 0.0001$ ), had been regularly running longer ( $p = 0.0006$ ) and had started less ultramarathons in the prior year ( $p < 0.0001$ ), but did not differ in other characteristics examined. The frequency distribution of age for the groups is shown in Figure 1 and demonstrates the differing extent of skewing between groups.

The Motivations of Marathoners Scales showed significant group differences with those answering "yes" to the question having a higher health orientation (median 5.7

**Table 1.** Comparison of select subject characteristics between those answering "yes" and "no" to the question "If you were to learn, with absolute certainty, that ultramarathon running is bad for your health, would you stop your ultramarathon training and participation?" Data are expressed as median and interquartile range, or percentage.

Subject characteristic	"Yes" group	"No" group	<i>p</i> -Value
Age (years)	47.3 (40.1–55.3)	43.3 (36.0–51.4)	<0.0001
Sex (% men)	70.5	67.6	0.35
Marital status (% married)	76.2	69.6	0.019
Spouse or partner exercises regularly (%) <sup>a</sup>	72.6	72.1	0.94
Number of biological children ( <i>n</i> )	2 (0–2)	1 (0–2)	0.0095
Highest year of school completed <sup>b</sup>	18 (16–18)	18 (16–18)	0.095
Highest educational degree <sup>c</sup>	5 (4–5)	4 (4–5)	0.074
Average weekly working time (hours)	40 (40–50)	40 (40–50)	0.35
Average weekly TV watching time (hours)	5 (3–10)	6 (3–10)	0.89
Average sleep time per 24 h (hours)	7 (7–8)	7 (6–8)	0.16
Average weekly running distance in prior year (km)	48 (32–64)	56 (40–79)	<0.0001
Duration of regular running (years)	18 (10–31)	15 (8–26)	0.0006
Duration since first ultramarathon (years)	7 (4–11)	6 (4–11)	0.13
Number of ultramarathons started in prior year ( <i>n</i> )	2 (0–4)	3 (0–6)	<0.0001
Ultramarathon placings in top 10% in prior year (%) <sup>d</sup>	0 (0–50)	0 (0–38)	0.71
Anxiety diagnosis (%) <sup>e</sup>	9.9	7.6	0.21
Depression diagnosis (%) <sup>e</sup>	13.1	12.8	0.93
Cancer diagnosis (%) <sup>e</sup>	6.6	4.5	0.18
Alcoholism or drug abuse (%) <sup>e</sup>	4.3	3.3	0.40
Smoking history (%)	8.9	11.2	0.27

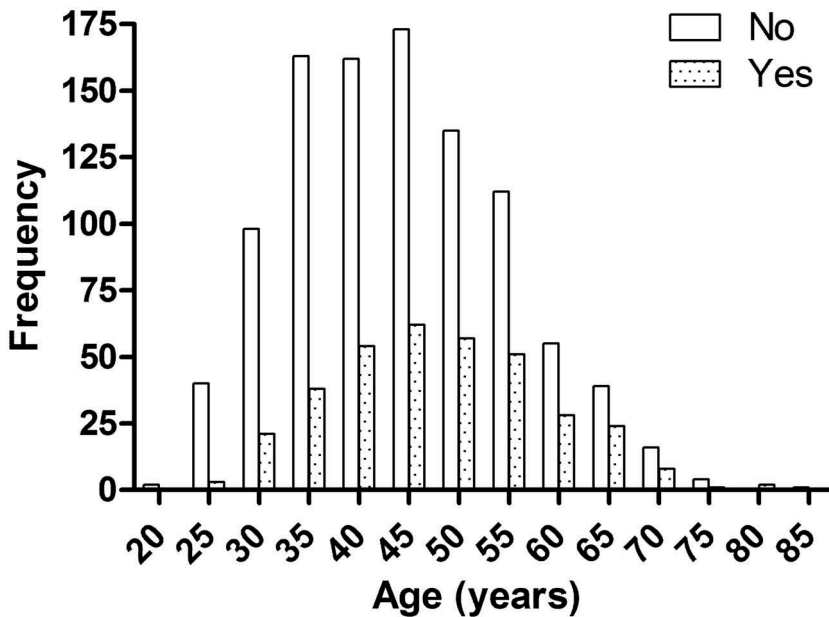
<sup>a</sup>Among those who are married or have a partner

<sup>b</sup>12 years equates to completion of high school and scale was capped at 18 years (6 years or more post-high school).

<sup>c</sup>4 equates to bachelor's degree and 5 equates to a master's degree.

<sup>d</sup>Placing relative to age and sex group.

<sup>e</sup>From self-report in enrolment survey.



**Figure 1.** Frequency distribution of age for the two groups answering the question differently with bins centred at the indicated age. The two study groups showed a statistically significant ( $p = 0.0006$ ) difference in frequency distribution with the chi-square test.

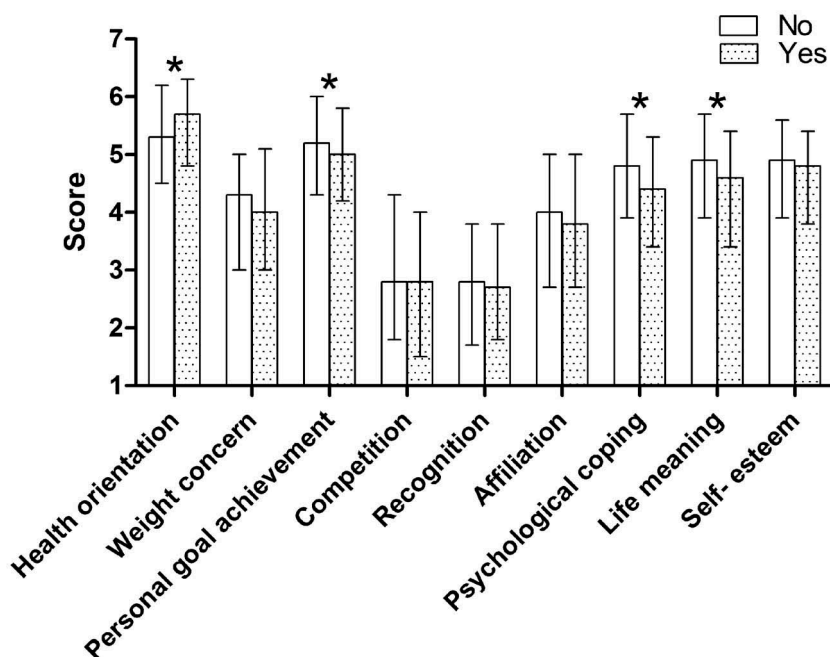
vs. 5.3,  $p < 0.0001$ ), and lower personal goal achievement (median 5.0 vs. 5.2,  $p = 0.0066$ ), psychological coping (median 4.4 vs. 4.8,  $p < 0.0001$ ), and life meaning (median 4.6 vs. 4.9,  $p = 0.0002$ ) scores (Figure 2). Overall, scores were relatively high for health orientation, personal goal achievement and psychological motives (psychological coping, life meaning, self-esteem), and low for achievement motives (competition, recognition).

The results for the Perception of Success Questionnaire are shown in Figure 3. There was no group difference for either task orientation. But, the low score on task orientation (median score 1.3 for both groups) indicates these runners were highly task oriented towards their running. Ego scores (median scores 3.5 and 3.7 for “yes” and “no” groups, respectively) indicate that the runners were towards the low side for ego orientation.

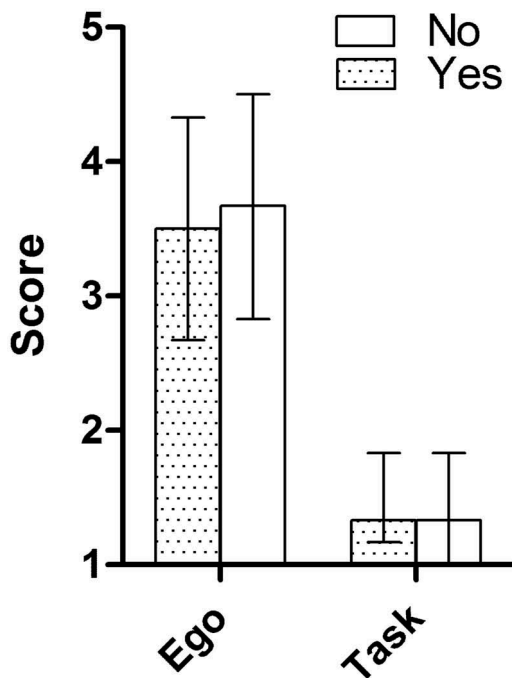
Analyses of the scores on the Sensation Seeking Scale showed a group difference ( $p = 0.03$ ) in susceptibility to boredom, with those answering “yes” having the lower score (Figure 4). But overall, both groups of runners scored low on boredom susceptibility as well as with the disinhibition subscale, and modest on the experience seeking, and the thrill and adventure seeking subscales.

## Discussion

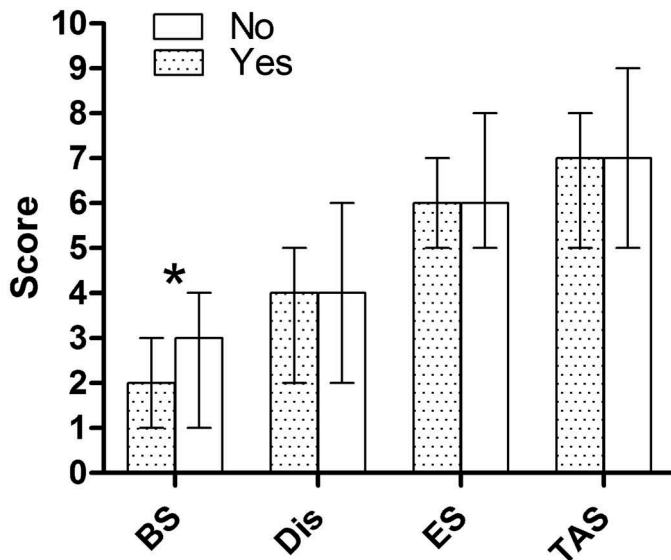
The present work reveals that ultramarathon runners find benefit from participating in ultramarathon running to the extent that most (74.1%) in this study group indicated they would not stop ultramarathon training and participation even if they became aware that it is harmful to their health. This finding might initially trigger a conclusion that this



**Figure 2.** Comparison between groups on the nine Motivations of Marathoners Scales. Scores are on a 1 ("not a reason" for running) to 7 ("very important reason" for running) scale. Data are median values, and brackets represent the interquartile range.  $*p < 0.01$ .



**Figure 3.** Group comparison for ego and task orientation as assessed with the Perception of Success Questionnaire. Scores are on a 1–5 scale with lower scores representing a stronger orientation. Data are median values, and brackets represent the interquartile range. There were no statistical differences between groups.



**Figure 4.** Group comparison for boredom susceptibility (BS), disinhibition (Dis), experience seeking (ES), and thrill and adventure seeking (TAS) on the Sensation Seeking Scale. Scores range from 0 to 10, with a high score representing a stronger propensity towards that trait. Data are median values, and brackets represent the interquartile range. \* $p < 0.05$ .

group largely consists of individuals with addictive behaviour or other psychopathology. However, reassessment may be warranted after reflection on some of the other findings of this work.

When considering the full group of ultramarathon runners examined in this study, they were mostly in their mid-30s to mid-50s, most were men, and most were married. They were also generally well educated and had a relatively low incidence of various self-reported medical and psychological diagnoses. In terms of their running, most were running 30–80 km per week, and many were not highly competitive at ultramarathon running. These characteristics are consistent with other reports in which ultramarathon runners have been characterized as mostly men, who largely tend to be middle-aged, well educated and more likely to be married than the general public (DUV, *n.d.*; Hoffman, 2008a, 2008b, 2010; Hoffman & Fogard, 2011, 2012; Hoffman et al., 2010a, 2010b; Hoffman & Wegelin, 2009).

Those ultramarathon runners indicating they would not stop ultramarathon running if they learned it would harm their health were found to be slightly younger, less likely to be married, had less children, and were running and racing more than those indicating they would stop. The finding that those who would not stop ultramarathon running were less likely to be married and had less children seems to support an anticipated relationship between one's feeling about the relative value of ultramarathon participation and the extent of other personal commitments. Beyond these characteristics, the two groups were similar for the examined characteristics. Specifically, they were similar in terms of percentage with history of drug or alcohol addiction, and with select medical and psychological diagnoses. They also appeared comparable in terms of investment in their profession based upon level of education and time spent working.



Overall, the full group of ultramarathon runners examined in this study was found to have high levels of intrinsic motivation in that recognition was not a strong motivation for their running based on scores from the Motivations of Marathoners Scales. Social connection (affiliation) and weight control (weight concern) were modest reasons for running. The greatest motivators were improving and maintaining general health (health orientation), personal goal achievement, and psychological reasons (psychological coping and life meaning). These findings are not surprising given that, despite being a heterogeneous group, most marathon runners have been found to endorse a health orientation and personal goal achievement (Ogles & Masters, 2003).

Goal orientation, as measured by the Perception of Success Questionnaire, showed that the full group of ultramarathon runners in this study was highly task oriented and relatively low for ego orientation with their running. Given that intrinsic motivation is a key element in task goal orientation, this finding of a high task orientation among the ultramarathon runners offers further evidence that the group has a high level of intrinsic motivation and that they are goal directed. Ultramarathon runners have previously been found to be very goal directed, but not win oriented (Acevedo et al., 1992; Gill et al., 1996). Task orientation is likely important in terms of the pleasure derived from participation and the sustainability for participating in ultramarathon running, particularly for a group in which their competitive performance does not typically place them in the top 10% for their sex and age group.

The Sensation Seeking Scale demonstrates that the full group of ultramarathon runners scored low on boredom susceptibility, low on the disinhibition subscale, and modest on the experience seeking, and the thrill and adventure seeking subscales. These findings are not surprising given that lower boredom susceptibility, lower disinhibition and higher experience seeking scores when compared with a normal sample have previously been found among ultramarathon participants (Hughes et al., 2003). A low boredom susceptibility score would be expected of individuals who choose to participate in an activity that they perform for hours at a time. The low disinhibition score, which reflects a reluctance to seek situations in which drugs, alcohol or social norms are used to reduce inhibitions, may be accounted for by a desire to avoid situations that could have an adverse effect on health and training. That this group scored modest on the thrill and adventure seeking subscale indicates that they are generally not high risk takers who would pointlessly behave in ways that would adversely affect their health.

Given that this group of ultramarathon runners did not appear to be high risk takers and was highly health oriented, it might seem incongruous that such a high percentage would indicate they would not stop running ultramarathons if they learned it was harmful to their health. Those indicating they would not stop running ultramarathons if it was harmful were statistically less health oriented than the others. They were also more achievement oriented, and had greater psychological motivations for running than the others. So, while this group still had high health orientation motives, it would appear that the greater benefits they perceive from ultramarathon running in terms of personal goal achievement, psychological coping and life meaning might supersede their motivation for improving and maintaining general health.

With regard to the high task orientation for running among this group of ultramarathon runners, it is likely that such a goal orientation is not specific to their running, but

carries over into professional and other personal activities. Task orientation involves improvement or mastery of a skill. Therefore, the finding that task orientation was high may reflect a focus on optimizing their function and productivity in other areas of life. This may also help explain how most of this sample of ultramarathon runners would appear to be willing to risk health to continue ultramarathon running. In other words, they may perceive enough value from ultramarathon running in terms of their overall function that they would be willing to take some health risks in order to retain such functional benefits. As noted above, their high psychological motivations for running demonstrate that they receive an important psychological benefit from ultramarathon running. It is anticipated that there would also be a perceived benefit in terms of overall physical function from ultramarathon running.

This investigation is not without some limitations which include those imposed by self-selection recruitment methods, and data collection by self-report. Self-selection bias likely exists in this study since the study population had volunteered to participate in a longitudinal study of ultramarathon runners, and it is anticipated that those with a stronger affinity towards the activity would choose to participate in such a study. Though, it can be noted that the basic demographic characteristics of this sample were comparable to prior reports of ultramarathon runners (DUV, *n.d.*; Hoffman, 2008a, 2008b, 2010; Hoffman & Fogard, 2011, 2012; Hoffman et al., 2010a, 2010b; Hoffman & Wegelin, 2009). On the other hand, the extent of self-report and recall bias cannot be quantified and may have affected the results with regard to running and medical history. In terms of the latter, we would expect some under-reporting of medical and psychological diagnoses since some subjects might now want to share such information, and because some subjects might have psychopathology without formal diagnoses. We are less concerned about incorrect entries in that data were examined for outliers and corrected after confirmation from the study participant. Finally, a systematic comparison of ultramarathon runners with participants in other sports would provide additional perspective to the findings.

In conclusion, the present work shows that this group of ultramarathon runners was highly health oriented and were not high risk takers, yet a large proportion indicated that they would not stop ultramarathon running if they learned it was harmful to their health. This apparent discrepancy seems to be well accounted for by evidence that ultramarathon runners are motivated by psychological and personal achievement which directly relates to their task orientation goal style. In essences, it appears that these runners perceive enhanced benefits from ultramarathon running that are worth retaining even at the risk of their health. Clinicians caring for ultramarathon runners would benefit from an awareness of these psychological characteristics of ultramarathon runners, particularly when medical interventions necessitate an alteration in exercise behavior.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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