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ORIGINAL RESEARCH

Motivation in ultra-marathon runners

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Background: In ultra-marathon running the proper motivation of the athlete is one of the milestones, not only during the races, but also during the practice sessions, which are long and very exhausting.
Purpose: The aim of this study was to examine the relationship of sport experience (expressed as number of finishes in ultra-marathons) with motivation characteristics of ultra-marathon runners.
Subjects and methods: The Motivation of Marathoners Scale examined the motivation of ultra-marathon runners compared to endurance runners of shorter distances (control group). Participants were 1,539 Polish runners, 382 women (24.7%) and 1,157 men (75.3%). Ultra-marathoners (N=425; 26.7%) finished at least one ultra-marathon, whereas the control group consisted of runners of shorter distances (N=1,114, 72.3%).
Results: Ultra-marathoners had higher scores in affiliation (3.55±1.60 vs 3.34±1.62, $P<0.05$), life meaning (4.20±1.40 vs 4.03±1.44, $P<0.05$) and lower in the areas of weight concern (4.33±1.68 vs 4.64±1.65, $P<0.01$), personal goal achievement (5.09±1.25 vs 4.64±1.65, $P<0.001$) and self-esteem (4.44±1.36 vs 4.68±1.38, $P<0.01$), than runners in the control group. The number of completed ultra-marathons was negatively related to the personal goal achievement, competition and recognition scale. The level of training experience was negatively correlated with the personal goal achievement scale in all participants, and with the self-esteem scale in the control group. In summary, ultra-marathoners had different motivations compared to runners of shorter race distance.
Conclusions: These findings should be considered by sport psychologists and other professionals to develop performance-tailored interventions for ultra-marathoners.
Keywords: psychological profile, questionnaire, survey, ultra-endurance

Introduction

Traditional recreational running is very popular around the world but parallel to this interest in running of moderate intensity, there is a growing participation in very intense running,[1] such as ultra-marathon events, which demand very good physical conditions and great mental preparation.[2] Indeed, the number of runners participating in ultra-marathon events reaches more than one hundred thousand participants in more than a thousand races around the world.[3] The number of people who finished an ultra-marathon race in the world in 2016 was 276,535, an amount that has doubled since 2011.[4]

Ultra-marathon running includes all running events exceeding 42,195 km ie, the classical Olympic marathon distance. An ultra-marathon starts from 50 km and finishes in multi-day races, which may last 10 days. Races are held most often on trails with special events in high mountains, while others are held on asphalt roads lasting from 2–10 days.[5–8] Given the increase in participation to such highly demanding races, it is important to understand what motivates ultra-marathon runners.

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The originality and specificity of ultra-endurance races has attracted the attention of scientists from many areas from social sciences to sports medicine.

Extreme conditions and exhausting efforts allow the human body to attain very high levels of abilities for physical performance and mental toughness. Most recent studies analyzed energetic, dietary and water intake influence on runners,[9] heart rate variability, cardiac autonomic modulation and psychological correlates,[10] articular cartilage assessment,[11] use of non-steroidal anti-inflammatory drugs,[12] diarrhea problems,[13] injuries and health considerations,[14] nausea,[15] and gastrointestinal symptoms.[16] Relatively well-known already are the somatic characteristics of ultra-marathon participants'[17] or the influence of ultra-running on different biomarkers characterizing the decreased body homeostasis,[18–20] or even skin manifestation of systemic disease during races.[21] Scientists also tried to understand the intentions and behavior of athletes during competition, nationality aspects,[22] gender differences,[23] how the habitual motives change during the life[24] and the use of medication during the competition.[25]

However, a relatively small number of research projects have examined the motivation of ultra-marathoners during the races and preparatory periods. The most popular is the Motivation of Marathoners Scale (MOMS),[26,27] which measures different motives of marathon runners. There is a specific gap in the existing scientific literature related to experience of athletes, their weekly training involvement and its influence on motivation structure and detailed characteristics. There is also a lack of in-depth analysis if participation in marathons and ultra-marathon changes personal models of motivation for running and practicing.

Motivation is one of the most important issues in sport psychology. In many sports well-motivated athletes may reach levels of performance higher than expected based on medical testing. In ultra-marathon running the proper motivation of the athlete is one of the milestones, not only during the races, but also during the practice sessions, which are long and very exhausting. The proper knowledge about the motives, which push them to their limits, would be very fruitful for athletes, coaches and sport psychology experts.

The aim of this study was to determine the relationship between ultra-marathon experience (ie, described as participation in ultra-marathons) and the motivation characteristics of the subjects. There was also an attempt to describe the relationship between both running experience and training frequency with motivation in ultra-marathon finishers (UMF) and people who had training experience but never started in an ultra-marathon. It was hypothesized that runners with ultra-marathon experience would have different level of motivation scales and the longer running history with higher frequency of training would change the relationship with the motivational characteristic of the subjects.

Methods

This is a comparative cohort study involving two groups of nonprofessional runners. This study examines whether sport experience is related to runners' motivation.

Survey respondents

Respondents were 1,539 Polish runners with 382 women (24.7%) and 1,157 men (75.3%). Most of them ie, 1,114 (72.3%) never participated in any ultra-marathon (control group, CG), while 425 (26.7%) finished at least one. UMF consisted of 243 runners who finished from one to three ultra-marathons (57.2%), 127 with four to ten participations (29.9%) and 55 runners who finished more than ten ultra-marathons (12.9%). As an ultra-marathon race we accepted any event with a distance longer than Olympic marathon distance ie, 42.195 km. The number of runners in specific age groups is presented in Table 1.

Procedures

The participants were reached by the professional running web pages and by the websites of the marathon organizers. All of them were provided with information describing the study subject. Respondents who agreed to participate in the research used the link to the online questionnaire and were then transferred to the Google Docs system, where they anonymously answered the questions. It took the participants approximately 10–15 minutes to complete the full questionnaire. Respondents were also informed that they took part voluntarily in the study and that withdrawal was allowed at any time. Regarding the questionnaire, all information about the intended research was included in an invitation paragraph, which appeared on the welcome screen of the questionnaire and included all the necessary elements of traditional information sheet. The survey was anonymous and confidential.

Table 1 Control group and ultra-marathon finishers group distributions depending on age

Age (years)	Control group		Ultra-marathon finishers	
	N	%	N	%
<30	305	27.4	62	14.6
31–40	399	35.8	146	34.4
41–50	310	27.8	160	37.6
51–65	94	8.4	54	12.7
>65	6	0.5	3	0.7

Questionnaire and Reliability of MOMS

MOMS is a questionnaire, which allows determining the motivation of runners.[26,27] It includes 56 questions divided into four main categories, which contain nine scales. Psychological category includes life meaning, psychological coping, and self-esteem. Achievement contains competition and personal goal achievement scale. The last two main areas cover social (ie, affiliation and recognition) and physical components (ie, health orientation and weight concern).[26] The 56 questions of the MOMS are rated on a 7-point Likert-type scale where "1" means "not a reason", while "7" is valued as "a most important reason". Masters et al (1993) evaluated the reliability on the basis of internal consistency from 0.80 to 0.93 and temporal stability of the nine factors after 3 months delayed evaluation ranged from 0.71 to 0.90.

Statistical methods

The basic descriptive statistics and Kolmogorov–Smirnov tests were performed to describe the sample and test the normality of distribution of all motives. In order to determine the relationships between training experience and motives, Mann–Whitney U test and Spearman rank correlation coefficients were calculated. The significance of the association (contingency) between the two kinds of classification was examined using Fisher's Z test. Statistical significance was set at α=0.05 level. All statistical calculations were performed using SPSS Statistics 24 (IBM Corporation, Armonk, NY, USA).

Ethical approval

All the procedures were performed according to Polish law and were evaluated by the Bioethical Committee at Jerzy Kukuczka Academy of Physical Education in Katowice, which granted official approval (KB/47/17).

Results

The characteristic of non-starters and UMF frequencies in specific characteristics related to training experience and starting performance is presented in Table 2. It showed that UMF have a longer training experience, train more frequently and finished more marathons than non-starters.

Descriptive statistics of MOMS are provided in Table 3. The Kolmogorov–Smirnov tests showed that the distributions of the variables differed from the normal distribution. It can be assumed that the distribution is not significantly asymmetrical because the skewness values are included in the range between –2 and +2. Cronbach's alpha coefficients showed that the reliability of the subscales of the MOMS were good. Specifically, coefficients were 0.87 in case of life meaning, 0.92 for psychological coping and 0.88 for self-esteem. Concerning achievement, the competition subscale presented a coefficient of 0.87, and 0.81 for personal goal achievement. Affiliation scale had an alpha coefficient of 0.92, and recognition 0.89. Similar levels of alpha coefficients were observed for health orientation (0.81) and weight concern (0.83).

Table 2 Non-starters and ultra-marathon finishers frequencies in specific characteristics related to training experience and starting performance

Number	Non-starters		Ultra-marathon finishers	
	N	%	N	%
Number of marathons				
0	276	24.8	20	4.7
1–3	529	47.5	117	27.5
4–10	238	21.4	159	37.4
11–30	60	5.4	86	20.2
>30	11	1.0	43	10.1
Number of ultra-marathons				
1–3	–	–	243	57.2
4–10	–	–	127	29.9
>10	–	–	55	12.9
Training experience (years)				
<1 year	60	5.4	1	0.2
1–3 years	467	41.9	84	19.8
4–10 years	502	45.1	245	57.6
>10 years	84	7.5	95	22.4
Training frequency				
1–3 times per week	485	43.5	111	26.1
4–6 times per week	582	52.2	274	64.4
Every day	47	4.2	40	9.4

Because of the highly unequal samples in the two compared groups, non-parametric analyses were performed using the Mann–Whitney U test. As can be seen in Figure 1, there were five statistically significant differences. People running ultra-marathons reported higher scores on affiliation and life meaning than person not running ultra-marathons (CG), and lower scores in the areas of weight concern, personal goal achievement and self-esteem.

In the next step, we checked whether the number of completed races was related to motivation for CG and UMF Group (Figure 2). Spearman's rank (Spearman's Rho) correlation analyses were performed and four statistically significant correlations were recorded. The number of completed marathons was negatively related to the personal goal achievement in CG (r=−0.073, P=0.015) and in UMF (r=−0.098, P=0.048). In addition, the number of finished marathons in UMF correlated positively with the health orientation

Table 3 Basic descriptive statistics of MOMS scales in control group and ultra-marathon finishers group

Statistics	Health orientation	Weight concern	Personal goal achievement	Competition	Recognition	Affiliation	Psychological coping	Life meaning	Self-esteem
Control group									
Mean	4.662	4.639	5.411	3.353	2.728	3.342	4.407	4.025	4.675
Median	4.833	5.000	5.667	3.250	2.400	3.333	4.444	4.143	4.750
SD	1.150	1.648	1.159	1.661	1.450	1.623	1.492	1.442	1.376
Skewness	–0.623	–0.462	–0.946	0.343	0.712	0.283	–0.256	–0.091	–0.471
Skewness SE	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073
Kurtosis	0.059	–0.642	0.899	–0.813	–0.333	–0.877	–0.702	–0.611	–0.335
Kurtosis SE	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146	0.146
Ultra-marathon finishers									
Mean	4.546	4.327	5.091	3.359	2.641	3.555	4.266	4.201	4.441
Median	4.667	4.333	5.167	3.250	2.400	3.500	4.444	4.286	4.500
SD	1.150	1.679	1.250	1.636	1.388	1.598	1.468	1.400	1.364
Skewness	–0.490	–0.211	–0.683	0.406	0.710	0.192	–0.275	–0.243	–0.372
Skewness SE	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Kurtosis	–0.495	–0.937	0.139	–0.735	–0.288	–0.824	–0.617	–0.570	–0.475
Kurtosis SE	0.236	0.236	0.236	0.236	0.236	0.236	0.236	0.236	0.236

Abbreviations: MOMS, Motivation of Marathoners Scale; SE, standard error.

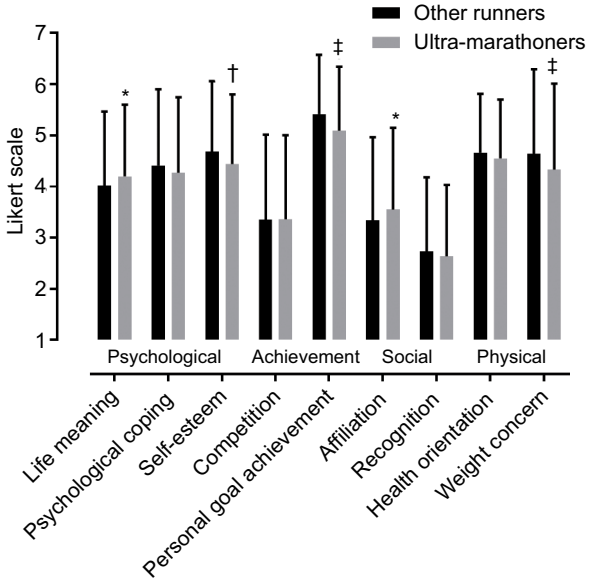

Figure 1 Comparison of motivations between ultra-marathon runners and control group.
Notes: *P<0.05, †P<0.01, ‡P<0.001. Error bars indicate the mean SD.

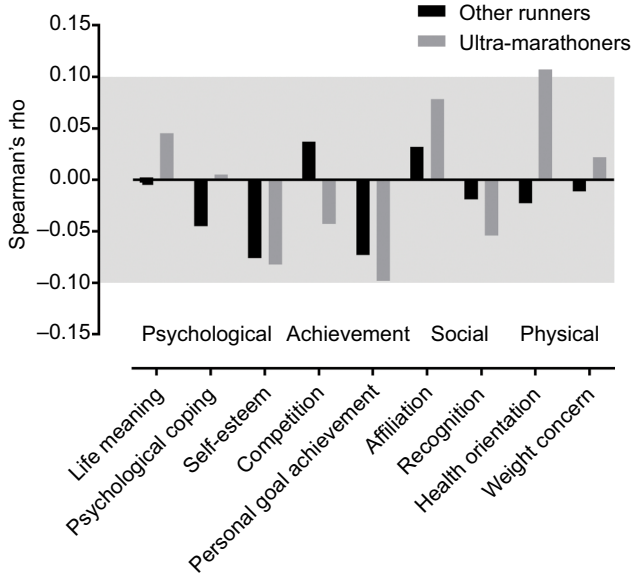

Figure 2 Relationship between motivations and number of finished marathon races.
Note: The shadows denote correlation of trivial magnitude.

scale (r=0.107, P=0.028) and in CG negatively with the self-esteem scale (r=−0.076, P=0.011). Fisher's tests carried out in the next step showed again the existence of only one statistically significant difference (Z=−2.28, P=0.023). The relationship of the number of marathons completed with the health orientation scale was positive in UMF, while in CG it was negative and the value of the correlation coefficient was close to zero. Also the number of completed ultra-marathons was negatively related to the personal goal achievement (r=−0.134, P=0.006), competition (r=−0.097, P=0.046) and recognition scale (r=−0.104, P=0.033).

The next correlation analysis allowed checking whether the training experience was related to the level of motivation in the ultra-marathon (Figure 3). In both groups—UMF (r=−0.068, P=0.023) and CG (r=−0.150, P=0.002)—the level of training experience was negatively correlated with

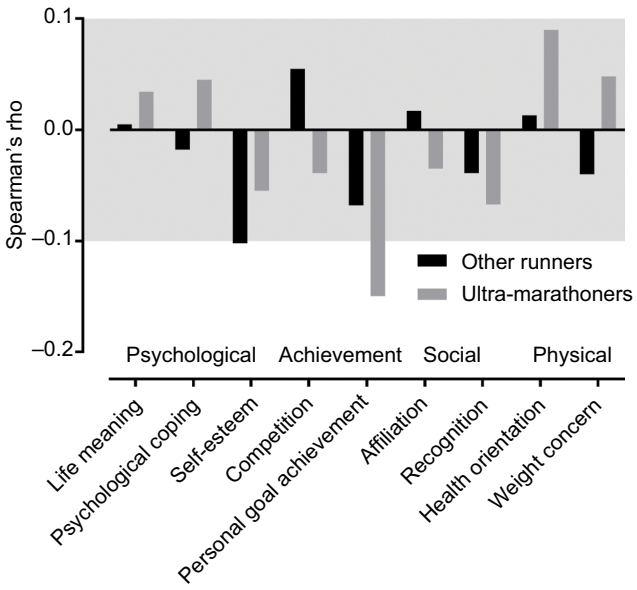

Figure 3 Relationship between motivations and years of training experience.
Note: The shadows denote correlation of trivial magnitude.

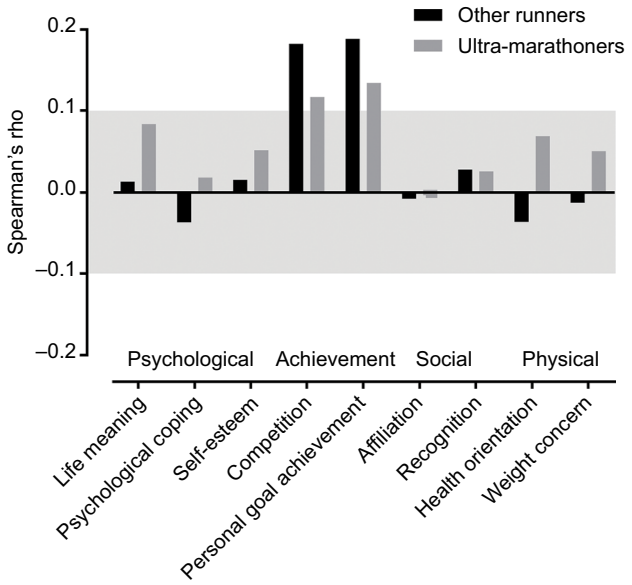

Figure 4 Relationship between motivations and number of weekly training days.
Note: The shadows denote correlation of trivial magnitude.

the personal goal achievement scale, while in the non-starters group also with the self-esteem scale (r=–0.102, P=0.001). In the case of the remaining pairs of variables, no close correlation of statistical significance was noted. Fisher's tests carried out showed no statistically significant differences or even close to statistical significance. CG and UMF frequencies analysis showed that UMF are more experienced runners especially with more than 10 years of experience (22.4% vs 7.5%) and in "four to ten years" categories (57.6% vs 45.1%). CG were more often represented in group practicing "less, than a year" (5.4% vs 0.2%) and "one to three years" (41.9% vs 19.8%)

The examination whether the frequency of training sessions is related to the level of motivation in the tested groups showed four statistically significant correlations (Figure 4). In both groups, there were positive relationships between the training frequency (r=0.188, P<0.001 and r=0.134, P=0.006) and the personal goal achievement (r=0.182, P<0.001 and r=0.117, P=0.016) and competition scales. CG and UMF frequencies analysis showed, that UMF were practicing more often, than CG especially in groups of runners with four to six training sessions per week (64.4% vs 52.2) and everyday trainings (9.4% vs 4.2%). CG runners practiced more often only in one to three training sessions per week (43.3% vs 26.1).

Discussion

It is clearly visible that the results of the correlation coefficients, and hence the strength of the relationships, were small, but the relationships described in the results were statistically significant. Statistical inference in accordance with the research methodology, based on a statistically significant correlation can be done, especially when the great advantage of our research was the sample size owing to which it is possible to prove the statistical significance of even weak links between variables, which is particularly important when analyzing relationships for data about often-subjective characteristics that are quantified in the form of rank scales.

The acquired data and its analysis showed that successful finishers in an ultra-marathon were characterized by statistically significant higher scores on affiliation and life meaning, and lower than the CG in the areas of weight concern, personal goal achievement and self-esteem. The number of completed marathons was negatively related to the personal goal achievement in both groups, while in successful finishers in an ultra-marathon it correlated positively with the health orientation scale and in the CG negatively with the self-esteem scale. The number of completed ultra-marathons was negatively related to the personal goal achievement, competition and recognition scale. In both groups—successful finishers in an ultra-marathon and CG—the level of training experience was negatively correlated with the personal goal achievement scale, and also in the CG with the self-esteem scale. In both groups, there were positive relationships between the training frequency and both the personal goal achievement and competition scales.

The main finding of the present study was that successful ultra-marathoners differed in motivation from runners of shorter distance. This was in agreement with a previous study comparing finishers in the "Marathon des Sables" (230 km) and other endurance and ultra-endurance runners.[28] For instance, finishers in the "Marathon des Sables" scored lower for competition and higher for nature and life meaning than marathon runners. It seems that runners competing in longer ultra-marathons compete more for life meaning than their shorter distance counterparts.

This is not the first study to examine psychological characteristics in ultra-marathoners compared to runners of shorter distance. For instance, a comparison among ultra-marathon runners, runners of less than 10 miles and non-runners indicated no difference in personality traits.[29]

Only two papers focused on motivation in ultra-marathon, but they also have some limitations. Hanson et al[30] contrasted ultra-runners with half and full marathon runners. They found that ultra-marathoners showed significantly lower on health orientation and weight concern while higher on life meaning in relation to both diagnosed group and lower on personal goal achievement in relation to full marathoners. Krouse et al[31] used MOMS to evaluate ultra-runners' motivation, but they administered the test only to female athletes. They found that highest motives for running were related to personal goal achievement and health orientation followed by self-esteem.

This study provides new insights in the difference between successful UMF and runners competing in shorter race distances. Little is known about non-finishers in ultra-marathons[32] but we have no knowledge about runners competing in shorter race distances and non-finishers. Often, successful UMF have a large previous experience in ultra-marathon running.[33] In particular, successful ultra-marathoners have a fast personal-best marathon time.[34]

A limitation of the present study was that ultra-marathon running was considered as a single sport event and differences in motivation among runners in events varying for distance or time were not examined. It has been previously observed that the age of ultra-marathoners increases as the distance gets longer[34] thus, it is reasonable to assume that motivation might vary among ultra-marathon runners of different distances. Consequently, our findings should be generalized with caution from one ultra-endurance distance to another. There is also a limitation, which may be an interesting direction for future research, to determine the motivation in ultra-marathoners and runners in shorter distances in relation to their sex. In our study there was some imbalance with the quantity of men and women so we decided not to split results to sex groups. Furthermore, the strength of the study was its novelty; there are only two scientific papers examining motivation in such a large number of endurance and ultra-endurance runners. Considering the increased number of ultra-marathon races and finishers during previous years,[35,36] and the importance of motivation for performance in this sport,[37] the findings have practical applications for practitioners in this field, such as sports scientists and psychologists.

Conclusion

This study showed that successful ultra-marathoners had higher scores in affiliation and life meaning, and lower scores in the areas of weight concern, personal goal achievement and self-esteem than runners competing in shorter race distances. The number of completed marathons was negatively related to the personal goal achievement in both groups, correlated positively with the health orientation scale in ultra-marathoners and negatively with the self-esteem scale in runners competing in shorter race distances. The number of completed ultra-marathons was negatively related to the personal goal achievement, competition and recognition scale. In summary, ultra-marathon runners had different motivations from runners of shorter race distance. Sport psychologists and other professionals preparing runners for ultra-marathon should consider these findings.

Disclosure

The authors report no conflicts of interest in this work.

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