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# RELATIONSHIP BETWEEN MOTIVATIONAL MECHANISMS, EXPECTED SPORTS PERFORMANCE AND PERCEIVED HEALTH STATUS IN LONG-DISTANCE RUNNERS: A MEDIATION MODEL

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***ABSTRACT***

*This study intended to identify motives for participation in long-distance running races, and how they relate to athletes' perceived health status and expected race time. The purposive sample consisted of 1849 athletes between the ages of 18 and 74. The instruments included the Behavioural Regulation in Exercise Questionnaire-3 (BREQ-3), the expected outcome of the long-distance runners in the race, and their perceived health status. A mediation analysis was conducted to examine the mediation effect of intrinsic and extrinsic motivation on the athletes' expected outcome and their perceived health. Mediation Model 1 had a significant indirect effect on the expected outcome of the runners and their perceived health status. The opposite was found in Model 2, where there was no significant indirect effect. Psychological and motivational factors were found to have an effect on sports performance. The study identified a mediating effect of intrinsic motivation on the relationship between the expected outcome of the athletes in the race and the perceived health status of long-distance runners. It was not possible to demonstrate that extrinsic motivation had the same effect. The discussion seeks to gain better knowledge of the motivational factors that contribute to the best performance of long-distance runners.*

***Keywords***: Extrinsic motivation; Intrinsic motivation; Expected performance; Perceived health status; Long-distance runners.

## INTRODUCTION

The number of people who run regularly (including marathon and/or half marathon road runners) has been increasing continuously and significantly since the 1972 Olympic Games (Ruiz-Juan *et al*., 2015). This increase has been particularly noticeable in Spain after the 1992 Olympic Games held in Barcelona, to the extent that the Spanish Athletics Federation (*Real Federación Española de Atletismo*) (RFEA, 2014) has expanded the racing schedule throughout the country. Since the small number of races in the 1980s, the number of participants was practically only symbolic, while today there are currently at least a dozen marathon and/or half marathon races, and a 10km-road race circuit every month. Almost 20,000 runners participate in the most popular marathons in Madrid and Barcelona (Ruiz-Juan *et al*., 2015), whereas over

30,000 runners take part in popular races, such as the half-marathon in Behobia-San Sebastián (Alberdi *et al*., 2018).

The study of what motivates long-distance runners has been approached from various theoretical perspectives. Several studies have used Self-Determination Theory (SDT) (Deci & Ryan, 1985, 2000; Chantal & Vallerand, 2000; Chantal *et al*., 2005) and Achievement Goal Theory (Nicholls, 1984; Guivernau & Duda, 2002; Kavussanu & Ntoumanis, 2003; Boixadós *et al*., 2004; Kavussanu, 2006) as a basis for analysing the motivations for the growing population of runners in Spain. The purpose of this research has been to investigate the social influences associated with the motivational processes underpinning athletes' well-being (Adie & Bartholomew, 2013; Mellalieu & Hanton, 2015).

Self-Determination Theory (SDT) (Deci & Ryan, 2000) has been used to note the influence of motivation in shaping physical activity patterns, and has contributed compelling evidence to support and understand the utility of motivation to increase physical activity (Teixeira *et al*., 2012). At its most basic level, SDT divides the types of motivations into intrinsic motivation (behaviour as inherently enjoyable), extrinsic motivation (behaviour as a means to an end), and amotivation (lack of motivation). Extrinsic motivation is further divided into categories placed along an underlying continuum, reflecting the degree to which the source of motivation is external (reward/punishment) or internal (valuing its outcomes). Amotivation is associated with behaviours that produce disorganised activity and with feelings of incompetence or frustration (Deci & Ryan, 2000). Various programmes have been developed to increase motivation in sports. For example, a study by Hodge *et al*., (2013) found that life skills programmes affected change in athletes through the provision of support for basic psychological needs by coaches and other programme leaders based on SDT (Deci & Ryan, 2000).

Similarly, Roebuck *et al.* (2018) conducted a systematic review of evaluating the effects of social psychological or psychosocial interventions on the factors related to sports performance. Their study concluded that interventions based on psychological and psychosocial techniques had a positive moderating effect on the performance of athletes. A study by Ruiz-Juan and Zarauz-Sancho (2014) confirmed that intrinsic motivation was one of the main reasons that lead people to become long-distance runners and one of the reasons that compel Spanish adults and youth to engage in running (Castañeda & Campos, 2012; Granero-Gallegos & Baena-Extremera, 2014). High scores for intrinsic motivation largely explain why long-distance runners continue to run for a large part of their lives (Masters *et al*., 1993). Other studies found that motives such as health (weight control, cardiovascular health) had the highest scores, followed by motives related to achieving personal goals and entering competitive events (Ogles & Masters, 2003; Llopis & Llopis, 2006; Zarauz-Sancho *et al*., 2016). This suggests that this population is generally inclined towards intrinsic motivation, rather than extrinsic motivation (Zarauz & Ruiz-Juan, 2013).

The results of the study by Zarauz-Sancho *et al.* (2016) reflected significantly higher scores for intrinsic motivation than for extrinsic motivation. It found that reaching personal goals or objectives, self-esteem and health were the most influential motivations for long-distance runners (Roebuck *et al*., 2018). Most studies in sports psychology to date have aimed to identify motivational variables that affect performance of athletes (Roebuck *et al*., 2018). They have shown that increasing the levels of motivation of long-distance runners has a positive impact on sports performance (Roebuck *et al*., 2018) and health status (Llopis & Llopis, 2006; Ruiz-Juan & Zarauz Sancho, 2014). However, it would be important to explain how or why motivational mechanisms produce a specific effect on endurance runners.

The following objectives were proposed in this study: (1) to analyse the relationship between the expected outcome and the perceived health status of long-distance runners and (2) to identify the mediating effect that intrinsic and extrinsic motivation has on endurance athletes. In relation to the proposed objectives, two models were tested. Model 1 assumes that athletes' expected outcome in a sports event increases their intrinsic motivation, which positively influences their perceived health status. Model 2 holds that athletes' expected outcome in a sports event increases their extrinsic motivation, which positively influences their perceived health status.

## METHODOLOGY

### Participants and study design

A quantitative correlation study aimed to determine the relationship between one dependent variable, namely performance (expected outcome) and two independent variables, namely perceived health status and motivation of long-distance runners. A purposive sample of 1849 athletes registered in the Behobia San Sebastian race (Spain) were selected to participate in the study. The questionnaire was administered to athletes aged between 18 and 74 (42.69±9.73), of whom 1343 were male (43.44±9.95) and 506 were female (40.34±9.45).

Participants voluntarily decided to participate in the study and were assured of the confidentiality and anonymity of the data. Moreover, participants were informed about the nature and purpose of the study and gave their written informed consent, which they signed before completing the questionnaire. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the University of Extremadura. The assessment and statistical analysis were done by specialists in physical activity and sports.

### Instruments

#### *Motivation*

The Exercise Behaviour Regulation Questionnaire (BREQ-3) (Wilson *et al*., 2007) was used to assess the motivation level of participants. This questionnaire was validated for use in Spain by González-Cutre, Sicilia and Fernández (2010). The instrument starts with the sentence 'I do physical exercise ...' followed by 23 items: four for intrinsic regulation ('I exercise because it is fun'); four for integrated regulation ('I exercise because it fits my way of life'); three for identified regulation ('I value the benefits of exercise'); four for introjected regulation ('I feel guilty when I don't exercise'); four for external regulation ('I exercise because my friends and family say I should'); and four for demotivation ('I do not see why I have to do it'). Extrinsic motivation was measured by averaging the items: integrated regulation ($\alpha$=0.809), identified regulation ($\alpha$=0.600), introjected regulation ($\alpha$=0.719) and external regulation ($\alpha$=0.700). Intrinsic motivation matched the score obtained for intrinsic regulation ($\alpha$=0.848).

#### *Expected outcome*

This was evaluated to identify the sporting result that each runner expected to achieve in the race. Each runner was individually asked about their expected finishing time, expressed in hours and minutes.

***Perceived health status***

Perceived health status was measured with one item, 'In general, would you say that your health is . . .? 1=very poor, 2=poor, 3=fair, 4=good, 5=very good'. Several studies have reported good reliability for this item to assess the state of health for adults in large population samples (Potthoff *et al.*, 1999; Mikolajczyk *et al*., 2008; Pengpid *et al.*, 2015).

**Ethical considerations**

The study was carried out in compliance with the Declaration of Helsinki and with the consent of the Bioethical Committee and the relevant authorities at the University of Extremadura (Reference number: 89/2016). All participants gave their written consent.

**Data collection procedure**

In 2017, the Fortuna club and the Behobia-SS organisers were contacted to discuss the research project. A formal document was subsequently sent to them to explain the objectives, the different variables and data collection tools. A letter was sent to the event organisers to ask for their authorisation to conduct the study. It outlined the objectives and procedure to execute the study and was accompanied by a model of the instrument. Once the authorisation of the organisers and participants had been obtained, the Behobia-SS organisers distributed the questionnaires to the race participants. The questionnaire package was hosted by the Google Forms application (Šmigelskas *et al*., 2019). An Email address was provided for participants to ask any questions they might have about the questionnaire.

**Statistical analysis**

Firstly, the descriptive statistics (mean and standard deviation) of the variables included in the study were calculated for the total sample and grouped by gender. Differences between genders were tested using the Student's t-test and Chi-square tests for continuous and categorical variables, respectively.

The bootstrapping method (Hayes & Little, 2017) was employed to examine the mediation effect of intrinsic and extrinsic motivation on the association of athletes' expected outcome with their perceived health, using PROCESS Macro SPSS (version 3). PROCESS model 4 (with 10000 interactions) was used to test two models. Model 1 consisted of the athletes' expected outcome (independent variable); their perceived health status (dependent variable); and intrinsic motivation (mediating variable). For Model 2, the independent variable was the sporting outcome, perceived health status was the dependent variable, and extrinsic motivation was the mediating variable. Regression coefficients and the percentage of the total effect (β) were estimated. Finally, the indirect effect was examined by % bootstrapped confidence intervals (CIs) (95%), using 10000 bootstrapped samples. A confidence interval is significant if it does not contain zero (Muller *et al*., 2005).

## RESULTS

Table 1 and Table 2 show the characteristics of the expected outcome (finishing time in the race), perceived health status and the regulations that estimated the intrinsic and extrinsic motivation for both gender groups. Significant gender differences were found in favour of males ($p<0.001$) when compared to the expected outcome of the female participants. There were no

significant gender group differences for the levels of extrinsic motivation ($p>0.05$). However, the levels of intrinsic motivation were significant in favour of females ($p<0.001$). There was no significant gender group difference ($p>0.05$) for perceived health status.

***Table 1.*** **DESCRIPTIVE ANALYSIS OF STUDY VARIABLES AND GENDER GROUP DIFFERENCES**

| **Variables** | **Total** (n=1849) M±SD | **Male** (n=1343) M±SD | **Female** (n=506) M±SD | p | t |
|---|---|---|---|---|---|
| Age (years) | 42.69±9.73 | 43.44±9.95 | 40.34±9.45 | 0.751 | 6.05 |
| Expected outcome | 1.56±0.44 | 1.48±0.26 | 1.77±0.35 | 0.000 | – |
| R. Integrated[1] | 4.56±0.57 | 4.53±0.59 | 4.65±0.51 | 0.007 | -3.85 |
| R. Identified[2] | 4.70±0.47 | 4.66±0.50 | 4.79±0.36 | 0.000 | -5.12 |
| R. Introjected[3] | 2.48±0.94 | 2.45±0.93 | 2.57±0.95 | 0.546 | -2.58 |
| R. External[4] | 1.29±0.55 | 1.30±0.54 | 1.26±0.55 | 0.086 | 1.53 |
| M. Extrinsic[5] | 3.26±0.37 | 3.23±0.38 | 3.32±0.35 | 0.420 | -4.15 |
| M. Intrinsic[6] | 4.62±0.53 | 4.59±0.54 | 4.69±0.47 | 0.001 | -3.40 |

1=Integrated Regulation 2=Identified Regulation 3=Introjected Regulation
4=External Regulation 5=Extrinsic Motivation 6=Intrinsic Motivation.

***Table 2.*** **PERCEIVED HEALTH STATUS AND GENDER GROUP DIFFERENCES**

| **Perceived health status** | **Total** (n=1849) n (%) | **Male** (n=1343) n (%) | **Female** (n=506) n (%) | $\mathbf{X^2}$ |
|---|---|---|---|---|
| Very poor | 3 (0.2) | 2 (0.1) | 1 (0.2) | |
| Poor | 3 (0.2) | 3 (0.2) | – | |
| Fair | 91 (4.9) | 68 (5.1) | 23 (4.5) | 0.831 |
| Good | 1125 (60.8) | 818 (60.9) | 307 (60.7) | |
| Very good | 627 (33.9) | 452 (33.7) | 175 (34.6) | |

The results from a simple mediation Model 1 (Figure 1) had a significant indirect effect on the sporting outcome that the runners expected to achieve and their perceived health status ($\beta=-0.013$, CI=-0.026. to -0.002). In addition, the results indicated that the direct effect of the sporting outcome on perceived health status continued to be significant even when controlling for intrinsic motivation ($\beta=-0.242$, $t=-5.754$, $p<0.001$). There was a positive correlation between the runners' intrinsic motivation and their perceived health status ($\beta=0.142$, $t=5.629$, $p<0.001$).

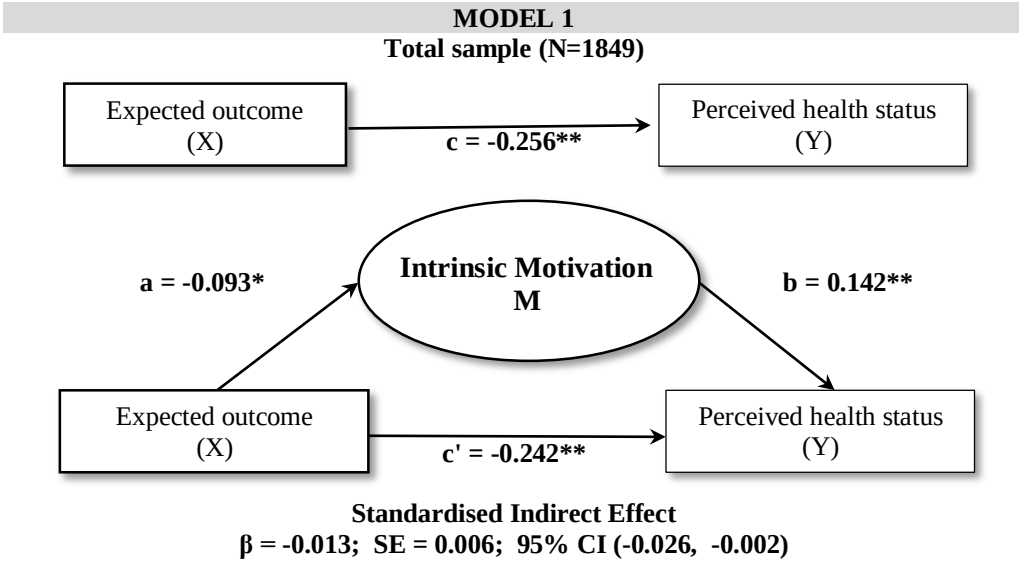


***Figure 1.*** **MEDIATION MODEL 1**

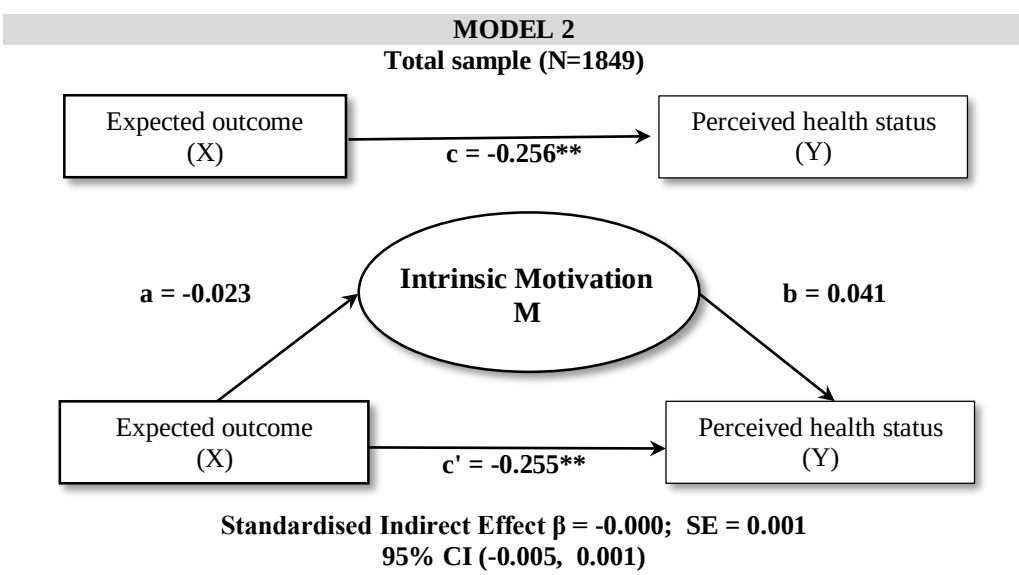


***Figure 2.*** **MEDIATION MODEL 2**

However, correlations were negative between the expected outcome of the race and for both their intrinsic motivation ($\beta$ = -.093, t = -2.404, p <.05) and perceived health status ($\beta$=-0.256, t=-6.029, p<0.001). The results obtained from a simple mediation Model 2 (Figure 2) demonstrated that the expected sporting outcome had a non-significant indirect effect on the perceived health status ($\beta$=0.000, CI=-0.005 to 0.001) of participants. However, the direct effect of the expected outcome on their perceived health status was significant ($\beta$=-0.255, t=-6.006, p<0.001). Correlations between perceived health status and expected sporting outcome ($\beta$=0.041, t=1.145, p>0.05) were positive. In contrast, correlations between expected sporting outcome and extrinsic motivation ($\beta$=-0.023, t=-0.834, p>0.05), and the runners' perceived health status ($\beta$=-0.256, t=-6.029, p<0.001) were negative.

## DISCUSSION

The aim of this study was to determine the relationship between the outcome that long-distance runners expected to achieve and their perceived health status. The mediating effect of intrinsic and extrinsic motivation was also analysed. The results showed that the expected sporting outcome, mediated by intrinsic motivation, influenced the perception of health status. However, it was not possible to demonstrate that the effect of the expected sporting outcome, mediated by extrinsic motivation, influenced the perception of health status. Therefore, long-distance runners who expected to achieve a better finishing time in a race and had a better perceived health status seemed to have higher intrinsic motivation levels.

The results obtained by mediation Model 1, corroborated the fact that long-distance runners who expected to achieve a better finishing time in a race and who were more intrinsically motivated, perceived their health status to be better. Similarly, Model 1 showed that athletes with higher intrinsic motivation and perceived good health were more likely to follow through with a race rather than stopping before completing it (Ogles & Masters, 2003; Llopis & Llopis, 2006; Zarauz-Sancho & Ruiz-Juan, 2013; Ruiz-Juan and Zarauz-Sancho, 2014). A new health-oriented approach to motivation developed in recent years explains the mediated effect of intrinsic motivation in achieving better perceived health status among long-distance runners (Ruiz-Juan & Zarauz Sancho, 2014), which confirms the first model proposed.

Regarding mediation Model 2, the correlation between the runners' expected outcome in the race and their perceived health status was as expected. It was not possible to demonstrate it for extrinsic motivation, so Model 2 was rejected. Several studies have highlighted the importance of the sports objectives set by long-distance runners themselves as the main reason that led them to take up the sport (Llopis & Llopis, 2006).

Recent research has contradicted these results, since evidence has been presented that the people involved in this type of sport are increasingly more influenced by intrinsic reasons than by sporting outcomes (Ferrer *et al.*, 2015; Roebuck *et al.*, 2018). This could be explained by the difficulty that it entails for runners, given the great effort required to complete long-distance races. Most amateur runners set their own goal of finishing the marathon in optimal conditions, rather than achieving an overly demanding race time that prevents them from finishing the marathon.

It has been shown that psychological and motivational factors also influence sports performance (Ferrer *et al*., 2015). Similarly, it has been proven that intrinsic motivation directly influences the levels of physical activity, as well as adherence to sports practice maintained over time (Hardcastle & Hagger, 2011). SDT increases athletes' intrinsic motivation by meeting the runners' basic psychological needs (competence, autonomy and relatedness) (Deci & Ryan,

2000; Markland *et al*., 2005; Markland & Vansteenkiste, 2007). Having these psychological needs covered they have a direct influence on intrinsic motivation especially among runners. This in turn encourages participation, and helps ensure adherence to physical activity (Hardcastle &Hagger, 2011), as well as influencing sports performance (Baumann & Wetter, 2010; Ferrer *et al*., 2015).

Age has been an important variable to consider when analysing the impact of motivation on sports performance and perceived health (Ferrer *et al*., 2015). However, age was not taken into account as a confounding variable. In other words, their motivation towards competition depended more on extrinsic reasons, such as achieving a good result than running to keep fit (Ferrer *et al*., 2015; Roebuck *et al*., 2018). However, it was not possible to verify that age is a covariate associated with performance (Ferrer *et al*., 2015). A possible explanation could be that endurance decreases with age due to the reduction in $VO_{2max}$. As a result, the elderly can concentrate less on the competitive objective to achieve a specific goal and are more oriented towards the health benefits of training (Roebuck *et al*., 2018).

In conclusion, the study has shown that intrinsic motivation had a mediating effect on the relationship between the runners' expected outcome in a race and their perceived health status, while extrinsic motivation did not have the same effect. Therefore, most of the interventions aimed at long-distance runners' health status should focus on improving their levels of intrinsic motivation. It was possible to verify that those long-distance runners, who race for fun or enjoyment, expect to obtain a better finishing time in addition to improving their perceived health status.

Programmes seeking to enhance long-distance runners' health (whose main objective is to improve levels related to health variables) must fundamentally focus on increasing the levels of intrinsic motivation. This involves encouraging participants to do physical activity for enjoyment or for the mere pleasure of doing sports, instead of offering economic or external rewards. These runners will be more motivated to obtain a better finishing time in a competition and would even see their perceived health status increased.

Future research could focus on assessing if intrinsically motivated runners who do sport for enjoyment or fun have higher levels of self-sacrifice and effort than those who do it for extrinsic reasons, such as an economic reward. It would also be interesting to study the reasons that cause long-distance runners to withdraw from a race, and see if the reasons for doing so are more closely related to intrinsic or extrinsic motivation. According to the present study, those endurance runners with the highest dropout rate would be expected to be extrinsically motivated.

The cross-sectional design of the study was a limitation as it did not allow causal relationships between the study variables to be established. Another limitation was not using age as a covariate, despite the numerous studies that have acknowledged its influence on the motivations of long-distance runners. In addition, the frequency and duration of training was not taken into account as an influential element on the motivation levels of participants. Therefore, in future research, the frequency and duration of training could be a variable to consider in order to assess the mediating effect that this could have on motivation and sporting outcomes.

Despite the limitations, very few studies have succeeded in explaining that extrinsic motivation has a positive effect on the relationship between expected performance and the perceived health status of long-distance runners, thus providing further understanding of the mechanisms or processes that help explain this association.

## CONCLUSION

In conclusion, long-distance runners who expect to achieve a better sport outcome and at the same time feel healthier, have higher levels of intrinsic motivation. Most research has associated intrinsic motivation with the benefits of participating in a race, such as mental distraction, feeling better, improving one's health or life, and ultimately, self-esteem. Therefore, it could be said that intrinsic motivation helps to explain the reasons for the variations in the expected sporting outcomes and the perceived health status of long-distance runners.

### Conflict of interest

The authors declare no conflict of interest.

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