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ORIGINAL ARTICLE

Motivational patterns in persistent swimmers: A serial mediation analysis

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Abstract

Objective: The main objective of the present study was to examine the associations between coach-created task-involving climate and athletes' intentions to continue practicing sport, through a serial mediation analysis that included basic psychological needs satisfaction (BPN), self-determined motivation (SDM) and enjoyment. **Methods:** Seven-hundred and ninety-nine elite swimmers (450 males, 349 females; aged 12–22 years, $M = 16.65$, $SD = 2.83$) participated in the present study. Groups were created according to age, years of experience, and gender. **Results:** Serial mediation analysis provided support for the proposed model where BPN's and enjoyment represent the most important mediators between task-involving climate and athletes' intentions to continue sport practice. **Conclusion:** Enjoyment stands out as the most relevant predictor of intention to persist and as a significant mediator in the relation between task-involvement climate, BPN, SDM, and long-term sports practice. The task-involving climate created by coaches appears to set in motion a sequence where the satisfaction of basic needs and SDM lead to more enjoyment and increased persistence among young athletes.

Keywords: Serial mediation, self-determination theory, achievement goal theory, persistence, enjoyment

Highlights

- Coach created task-involving climate is associated with basic psychological needs satisfaction in persistent swimmers.
- Enjoyment is presented as a strong predictor of intention to persist in practice, in both genders, but particularly in older and more experienced athletes.
- Motivational spillover effects are sustained by the MMCAR in persistent swimmers.

Competitive sport and the practice of physical activity represent a worldwide practice that is associated with a multitude of health benefits and overall quality of life when athletes persist (Reiner, Nierman, Jekauc, & Wolf, 2013). However, several factors may influence athletes' persistence in the practice of their sport, and should be a concern for coaches that want to prevent dropout (Jöseaar, Hein, & Hagger, 2011; Monteiro, Pelletier, Moutão, & Cid, 2018). In the present study, we propose to examine how several of these factors could be combined to create a sequence that could lead to a better understanding of persistence in physical activity.

Several studies have examined how a wide array of theoretical frameworks could be used to prevent dropout and increase maintenance of physical activities. In particular, research suggests that motivation plays a key role in understanding and predicting different outcomes such as dropout and continuous adherence to physical activities and sports (Chatzisarantis & Hagger, 2007; Monteiro, Pelletier, et al., 2018). Recently, multi-theoretical interventions have been designed to determine how these approaches could be combined in one unique perspective to prevent dropout and increase long-term sport practice (Duda, 2013; Michie, West,

Campbell, Brown, & Gainforth, 2014). The purpose of the present study was to examine the validity of a perspective that looks specifically at the associations between coach-created task-involving climate and athletes' intentions to continue sport practice, through serial mediation that included basic psychological needs satisfaction, self-determined motivation, and enjoyment.

Proposed model

In agreement with Self-Determination Theory's (SDT; Ryan & Deci, 2017) assumptions, the Motivational Model of the Coach-Athlete Relationship (MMCAR; Mageau & Vallerand, 2003) was developed to better understand the determinants and consequences of sports motivational process (Sarrazin, Boiché, & Pelletier, 2007). This model presents a motivational sequence that includes social factors (in particular, factors related to the coaching context) → needs satisfaction (as proposed by SDT) → types of motivation (SDM and NSDM) → sport-related outcomes. Several studies using this theoretical framework have provided valuable insights into cognitive, emotional and behavioural outcomes in sport participation and persistence (Álvarez, Balaguer, Castillo, & Duda, 2012; Smith et al., 2016). The combination of SDT and Achievement Goal Theory (AGT; Nicholls, 1984) has been used to make a multi-theoretical approach on sports behaviour analysis, and has suggested that social contexts influences the level of self-determination, mainly through Basic Psychological Needs (BPN) satisfaction/frustration, resulting in several outcomes such as self-determined motivation, enjoyment, and persistence (Duda, 2013; Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018; Ryan & Deci, 2017).

SDT is a macro-theory of human motivation that proposes the existence of distinct forms of behavioural regulation, differing one from another according to their degree of relative autonomy or self-determination (Ryan & Deci, 2017). This theory comprises six sub-theories, explaining different facets of motivational phenomena, namely (i) cognitive evaluation theory; (ii) organismic integration theory; (iii) causality orientation theory; (iv) basic psychological needs theory; (v) goal content theory; and, (vi) relationship motivation theory. However, for the purpose of the present study, we only used organismic integration theory (motivational continuum) and basic psychological needs theory (i.e. autonomy, competence and relatedness) since both are crucial to SDT framework (Ryan & Deci, 2017). The organismic integration theory

distinguishes two types of motivation: (a) intrinsic motivation, related with an inherent satisfaction in the performance of an activity, and: (b) extrinsic motivation, which reflects instrumental reasons such as to avoid disapproval and/or to obtain an independent activity outcome (Ryan & Deci, 2017). In turn, extrinsically motivated behaviours are further distinguished according to different types of regulations and their inherent degrees of internalization (i.e. external, introjected, identified and integrated) that reflects the transformation of a behaviour regulated by external factors to a behaviour that reflect habits and personal values (Ryan & Deci, 2017). Therefore, understanding how intrinsic motivation and more internalized extrinsic motivation (i.e. identified and integrated regulations) develop may be useful to determine to what extent the level of enjoyment for a particular behaviour plays in predicting persistence over time. It has been suggested that athletes' engagement in a particular sport activity is strongly associated with self-determined motivation, supporting several beneficial outcomes such as positive affect, effort, persistence, and enjoyment (e.g. Pope & Wilson, 2012). Nonetheless, the impact of SDM on enjoyment and behavioural intentions (both direct and indirect), has received less attention in sport research. Some studies suggest that enjoyment is associated with behavioural intentions to continue or to dropout of sports practice, and may, therefore, be a significant outcome (e.g. Gardner, Magee, & Vella, 2016; Quested et al., 2013). In addition, SDT posits that Basic Psychological Needs (BPN) satisfaction/frustration is responsible for the degree of internalization (Ryan & Deci, 2017). The satisfaction of these needs (i.e. autonomy, competence and relatedness) has been positively associated with SDM and possibly influences enjoyment of a particular behaviour (Teixeira, Silva, & Palmeira, 2018).

At a contextual level, the coach-created climate has been associated with several distinct consequences, but particularly, with motivation (Rocchi, Pelletier, & Desmarais, 2017). In order to characterize this in greater depth, AGT and several authors using this theoretical framework (e.g. Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018; Pope & Wilson, 2012) have postulated that athletes' perception of the climate created in their sport may influence their motivation to practice their sport. According to Roberts (2012), AGT applied to the sport domain could be best represented by two types of climate that are particularly relevant, namely the task-involving climate, where coaches highlight the learning and individual progress, empathizes effort as a positive outcome, and values athletes ability to learn from their

mistakes; and, the ego-involving climate, where coaches reinforces inter-athlete comparisons, focuses mainly on end-results and punishes/criticizes athletes' mistakes. Athletes' perception of those climates may induce different approaches to their sports participation, and should be an important issue to take into account. More particularly, task-involving climate has been shown to support a better motivational pattern and positive outcomes in several sport practices (e.g. Harwood, Keegan, Smith, & Raine, 2015; Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018).

Although previous studies (e.g. Álvarez et al., 2012; Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018; Pope & Wilson, 2012) have analysed the full motivational sequence proposed by Mageau and Vallerand (2003), they did not examine whether this sequence is valid in groups with different characteristics such as gender, age, and years of experience. The validation of the proposed sequence with different groups could be very important for coaches and practitioners interested in designing interventions to prevent dropout or to increase persistence in function of groups with different characteristics.

Therefore, the main objective of the present study is to examine the associations between coach-created task-involving climate and athletes' intentions to continue sports practice, through serial mediation analysis including basic psychological needs satisfaction, self-determined motivation, and enjoyment. Afterwards, the proposed model will be tested among different groups of competitive swimmers that differ with regard to gender, age, and years of experience.

Method

Participants

A total of 799 elite swimmers (450 males, 349 females, that ranged in age from 12–22 years, $M = 16.65$, $SD = 2.83$) participated in the present study. The number of years of experience in swimming ranged from 6 to 16 years ($M = 8.17$, $SD = 2.83$). The swimmers reported training between 4 and 11 times per week ($M = 6.69$; $SD = 1.72$) and their training sessions time varied between 60 and 180 min ($M = 133.08$; $SD = 34.87$). For methodological purposes, different groups were created that took in consideration (i) the swimmers gender, (ii) their age group as defined by the Development Model of Sport's Participation (≤ 12 years old; between 13 and 15 years old, and ≥ 16 years old; Côté, Baker, & Abernethy, 2007); and, (iii) years of experience (i.e. < 10 and ≥ 10) (e.g. Ericksson, 2006). For additional information see Table I.

Instruments

Motivational Climate Sport Youth Scale (MCSYS; Smith, Cumming, & Smoll, 2008) Portuguese version (Monteiro, Borrego, et al., 2018) was used to measure athlete's perception of the coach-created climate. The scale includes eight items that are rated on a 1 ("totally disagree") to 5 ("totally agree") scale. However, in the present study, only the four items measuring the task-involving climate (e.g. "Coach said that teammates should help each other improve their skills") were considered. The four items had good reliability ($\alpha = .82$).

Basic Psychological Needs Exercise Scale (BPNES; Vlachopoulos & Michailidou, 2006) Portuguese version (Monteiro, Marinho, et al., 2016) was used to assess athletes' BPN satisfaction. This scale consists of 12-items that are rated on a 5-point Likert scale that range between 1 ("totally disagree") and 5 ("totally agree"). Three factors with four items each represent the three needs proposed by SDT, the need for autonomy (e.g. "The way I training is in agreement with my choices and interests"), competence (e.g. "I am able to meet the requirements of my training session") and relatedness (e.g. "My relationships with the people I training with are very friendly"). The internal consistency of the subscales in this study were: autonomy $\alpha = .70$; competence: $\alpha = .78$; relatedness $\alpha = .85$.

Behavioural Regulation in Sport Scale (BRSQ; Lonsdale, Hodge, & Rose, 2008) Portuguese version (Monteiro, Teixeira, et al., 2019; Monteiro, Moutão, & Cid, 2018) was used to measure how athletes regulate their behaviour towards sport. Participants responded to 24 items, measuring all six SDT motivational regulations (four items each), using a 7-point Likert Scale ranging from 1 ("not true of me") to 7 ("completely true of me"). For this study, one construct was created, the Self-Determined Motivation (SDM), using the following behavioural regulations: identified regulation (e.g. "Because the benefits of sport are important to me"); integrated regulation (e.g. "Because it allows me to live in a way that is true to my values"), and intrinsic motivation (e.g. "Because it's fun") (Pelletier & Sarrazin, 2007). In the present study, the internal consistency was acceptable for all factors (identified regulation: $\alpha = .73$; integrated regulation: $\alpha = .83$; intrinsic motivation: $\alpha = .89$; and $\alpha = .74$ for the global construct of self-determined motivation).

Physical Activity Enjoyment Scale (PACES; Mullen et al., 2011) Portuguese version (Monteiro, Nunes, et al., 2017) was used to assess the level of enjoyment athletes feel during sport practice. The eight items measuring enjoyment were rated on a 5-point Likert scale ranging from 1 ("totally disagree")

Table I. Descriptive statistics of sample groups

Age groups		N	Years of experience
12 (<i>M</i> = 12.0, <i>SD</i> < .00)		206 (127 M, 79 F)	6–7 (<i>M</i> = 6.32; <i>SD</i> = .47)
13–15 (<i>M</i> = 14.05; <i>SD</i> = .76)		284 (171 M, 113 F)	6–9 (<i>M</i> = 7.18, <i>SD</i> = 1.00)
≥16 (<i>M</i> = 17.27, <i>SD</i> = 1.69)		309 (152 M, 157 F)	6–16 (<i>M</i> = 9.63, <i>SD</i> = 1.93)
<i>Gender</i>			
Males: 12–22 (<i>M</i> = 16.92, <i>SD</i> = 2.54)		450	6–16 (<i>M</i> = 8.38; <i>SD</i> = 1.98)
Females: 12–22 (<i>M</i> = 16.29; <i>SD</i> = 3.13)		349	6–16 (<i>M</i> = 7.91; <i>SD</i> = 1.66)
<i>Level of exp.</i>	<i>Swimmers age</i>		
<10 years	12–22 (<i>M</i> = 13.96, <i>SD</i> = 2.07)	534 (314 M, 220 F)	6–9 (<i>M</i> = 7.00, <i>SD</i> = .96)
≥10 years	16–22 (<i>M</i> = 17.58, <i>SD</i> = 1.53)	265 (136 M, 129 F)	10–16 (<i>M</i> = 10.83, <i>SD</i> = .98)

Note: y = years; M = Mean; SD = Standard Deviation; N = Sample size; M = Male; F = Female.

to 5 (“totally agree”) resulting in a single factor reflecting participants enjoyment (e.g. “It’s very pleasant”). The scale internal consistency was above acceptable ($\alpha = .90$).

Intentions to continue swimming. For the purpose of this study, three questions were created following Ajzen (2006) recommendations: “It is my intention to continue swimming in the next season (at the same level)”; “I want to continue swimming in the next season (at the same level)”; and, “It is in my plan to continue swimming in the next season (at the same level)”. Participants rated each item on a 5-point scale ranging from 1 (“no, not for sure”) to 5 (“yes, for sure”). The internal consistency for intention to continue swimming in this study was $\alpha = .97$.

Procedures and data collection

Through the Portuguese Swimming Federation database, swimmers were screened based on sports experience criteria (i.e. >6 years in competitive swimming from 2009 until 2015). Once identified, 1206 swimmers (or their legal guardians) were contacted individually by telephone between March and September of 2016. The 799 athletes that accepted to participate in this study (66.2% participation rate) received an e-mail with a link to access the

questionnaires on the *SurveyMonkey* platform. Consent was given by athletes or their legal guardians by clicking on the “informed consent box” provided after written explanation of the study’s purpose. Ethical approval was obtained previous to the study initiation from the committee of the Research Center in Sports Sciences, Health Sciences and Human Development (CIDESD), unit that is registered in the Portuguese National Science Foundation (FCT) under the reference UID/DTP/04045/2019. Additionally, this research was carried out in accordance with the Helsinki Declaration and its later amendments.

Statistical procedures

Descriptive statistics, general correlational, and inference procedures were made using IBM SPSS Statistics v23.0 and PROCESS macro for SPSS v3.1. For this study, mediation procedures were used to assess direct and indirect effects of the proposed variables. In agreement with the procedures proposed by Hayes (2018) and Iacobucci, Saldanha, and Deng (2007) to assess serial mediation, Ordinary Least Squares (OLS) analysis was used to estimate correctly the indirect effect of each mediator independently of other’s mediating influence. In total, eight

Table II. Descriptive and correlational analysis of the psychological variables

Constructs	<i>M</i> ± <i>SD</i>	1	2	3	4	5
1. Task-involving climate	3.98 ± .78	1	–	–	–	–
2. BPN satisfaction	3.96 ± .53	.390**	1	–	–	–
3. Self-determined motivation	5.53 ± .88	.484**	.502**	1	–	–
4. Enjoyment	4.40 ± .53	.159**	.484**	.416**	1	–
5. Intentions	4.35 ± .94	.085*	.358**	.165**	.452**	1

Note: M = Mean; SD = Standard Deviation; BPN = basic psychological needs; * $p \leq .05$; ** $p \leq .01$

models that included one antecedent variable (task-involvement climate), three mediators (basic psychological needs, self-determined motivation, and enjoyment), and one outcome (intention to continue) were tested in order to analyse the sequential influence of three mediators in the hypothesized causal relation, and to verify whether each mediator had an independent effect on the intention to continue. Bootstrap of 5000 samples was used and 95% of confidence intervals estimates were calculated for the indirect effect of the task-involvement (independent variable) on intention (dependent variable). If the 95% confidence interval did not encompass zero, the indirect effect would be considered significant.

Results

As described above in the method section, several groups were created according to gender, age (≤ 12 years, 13–15 years, and ≥ 16 years), and years of experience (< 10 or ≥ 10 years) to test the proposed model. The general information on each group and their characteristics is presented in Table I. Table II presents the correlations among the variables included in the models. All variables were positively associated (all $p < .05$) among themselves. Additionally, mean differences between groups were tested and no significant differences were found for all constructs (all $p > .05$).

A total of eight serial mediation analyses were performed considering the global sample, the three age groups (≤ 12 years, 13–15 years, and ≥ 16 years), each gender (male and female) and for the two levels of experience (< 10 and ≥ 10 years). According to the analysis, the proposed model was supported for the global sample and four groups: (≥ 16 years, ≥ 10 years practice, and the male and female models) (Figure 1A and B).

In the global sample model, total indirect effect was significant in the relation between task-involvement and intention ($\beta = .12$ [.05–.20]) and the direct effect was non-significant ($\beta = -.02$ [–.10–.07]). When analysing the three serial mediation path between task-involvement and intention, the proposed theoretical sequence was significant ($\beta = .02$ [.01–.03]). Regarding mediator's individual path analysis, the BPN indirect effect was higher in this model ($\beta = .11$ [.06–.16]). The SDM and enjoyment mediators presented negative and significant individual indirect effects ($\beta = -.04$ [–.01–.01]) and ($\beta = -.06$ [–.10–.02]), respectively. The enjoyment mediator presented the highest regression score with intention ($\beta = .69$ [.56–.82]).

The female model presented a full mediation, since total indirect effect for the relation between task-

involvement and intention to continue, and task-involvement effects on BPN and SDM mediators, were significant ($\beta = .13$ [.18–.26]). This was not the case for the enjoyment mediator. Across mediators, the expected theoretical interactions emerged, with positive significant regressions along the specified sequential paths. Among mediators, enjoyment presented the highest regression score with intention ($\beta = .62$ [.43–.81]). The BPN mediator presented a positive and significant regression interaction with intention, and SDM presented a significant negative interaction ($\beta = -.14$ [–.27–.01]). In the male model, the same trend emerged from the analysis (except for SDM-intention that in this case was not significant). The total indirect effects were slightly smaller than in the female model ($\beta = .11$ [.03–.22]), and enjoyment presented again the highest regression value of all mediators ($\beta = .74$ [.56–.91]).

Results from the ≥ 16 years model were similar and once again it is possible to observe a total mediation (indirect total: $\beta = 0.25$ [0.12–0.40]). Task-involvement effects on BPN and SDM are both positive and significant, but not significant for enjoyment. Additionally, mediators' sequential interactions are all positive and significant. BPN ($\beta = .48$ [.27–.68]) and enjoyment ($\beta = .80$ [.59–1.01]) presented positive and significant effects on intention to continue swimming, and SDM showed a negative and significant interaction with the dependent variable ($\beta = -.14$ [–.27–.01]).

The ≥ 10 years' experience model presented the highest of the total indirect effect for all models ($\beta = .45$ [.29–.64]), representing a full effect of mediation. Like in the other models tested, the relations between task-involvement and mediators, and also across mediators, presented the same trend. However, in this particular group, only BPN ($\beta = .42$ [.19–.64]) and enjoyment ($\beta = .82$ [.60–1.05]) represented mediators that had positive and significant regression effect on intention. Regarding enjoyment, the regression score was the highest among all the models tested.

In all the models tested, enjoyment stands out as the most important mediator in the relation between task-involvement and intention to continue sports practice (always $p < .05$) and as the variable with the highest regression scores in each model (between .62 and .82).

Discussion

Based on the tenets of achievement goal theory and self-determination theory, the aim of this study was to examine the associations between coach-created

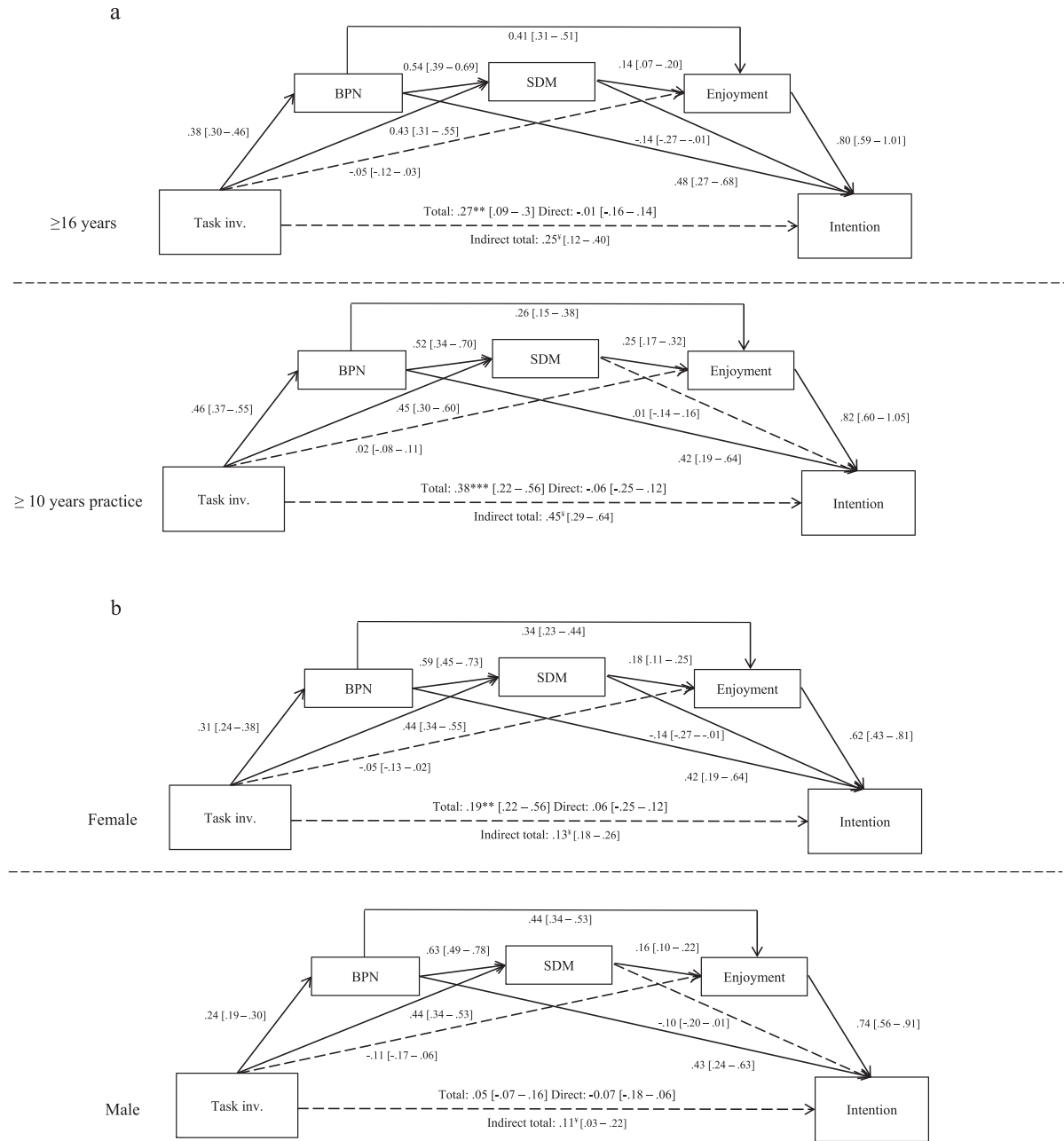


Figure 1. (A) Serial mediation models for task-involvement, BPN, SDM, enjoyment and intention to continue practice (age and levels of experience groups). (B) Serial mediation models for task-involvement, BPN, SDM, enjoyment and intention to continue practice (gender) Note. * $p < .05$; ** $p < .01$; *** $p < .001$; ¥ the 95% CI estimate indicate a significant indirect effect; significant effect \longrightarrow , non-significant effect $-\ - \longrightarrow$; BPN, basic psychological needs; SDM, self-determined motivation; Task inv., task-involving climate

task-involving climate and athletes' intentions to continue sports practice, through serial mediation including basic psychological needs satisfaction, self-determined motivation and enjoyment. The MMCAR hypothesized serial mediation model was tested with the aforementioned variables and following several methodological procedures (e.g. Álvarez et al., 2012; Monteiro, Pelletier, et al., 2018),

where the proposed model was supported with athletes that were part of four different groups.

The global sample model presents a small indirect significant effect between the proposed variables interaction ($\beta = .12$ [.05-.20]). This is mainly explained by the indirect effect of BPN in the tested interaction ($\beta = .11$ [.06-.16]). The full sequence tested through the serial mediators was aligned with

MMCAR and SDT theoretical assumptions ($\beta = .02$ [.01–.03]).

In the age groups models, the 12 years and 13–15 years groups did not present any relevant total or indirect effects. However, in the case of the athletes that were above 16 years of age, the total indirect effect ($\beta = .25$ [.12–.40]) suggested a full mediation, and among the mediators, enjoyment presented the highest regression score with intention ($\beta = .80$ [.59–1.01]). In the case of the athletes that had ≥ 10 years of experience ($M = 17.58$ years old, $SD = 1.53$; total indirect effect: $\beta = .45$ [.29–.64]), the results supported the idea that experience, like it was the case for the older athletes (i.e. older vs. younger athletes'), may represent a factor that affects how the coach-created climate and how the athletes' perception task-involvement climate, relate to BPN, SDM, enjoyment, and to their intention to continue.

Regarding the gender models, very small differences emerged between the tested models. As reported previously, these models followed the same trend as the ones observed for the older athletes and the athletes that had more experience (male: $\beta = .11$ [.03–.22]; female: $\beta = .13$ [.18–.26]). Considering that no age considerations could be made when testing these two models, and that mean ages were high for both genders (male: $M = 16.92$, $SD = 2.54$; female: $M = 16.29$), it is impossible to say if the same model could apply with younger male or female athletes.

In all the models tested that were significant, the individual sequential paths that included the three mediators were always significant, which support the theoretical sequence initially proposed. However, some differences occurred regarding their influence on the athletes' intention to continue. BPN satisfaction always represented a positive and significant mediator of the relationship between task-involvement and intention, whereas SDM was more inconsistent. In this case, the global sample ($\beta = -.04$ [–.01–.01]), and ≥ 16 years and female models presented negative and significant regressions with intention (both $\beta = -.14$ [–.27–.01]), and negative ($\beta = -.10$ [–.20–.01]) and positive ($\beta = .01$ [–.14–.16]) non-significant scores in the male and more experienced athletes' models, respectively. Finally, the enjoyment mediator, in all models, presented the highest regression scores on intention (β ranging between .62 and .82).

Some age group differences in BPN and SDM have already been reported in previous studies in sport contexts (e.g. Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018), and may reflect different contributions in competitive settings. Guzmán and Kingston (2012) in a prospective study conducted with 857

Spanish athletes, from different teams and individual sports, found similar results. It is possible to speculate that older athletes, with more sport experience than younger athletes, persist not only because they enjoy swimming but also because their BPN are satisfied and they are more self-determined (Monteiro, Pelletier, et al., 2018; Monteiro, Teixeira, et al., 2018), despite some differences in how individual paths of these constructs contribute to the intention to continue practice.

Considering the importance of self-determined motivation on pleasure and enjoyment in a given activity, a need supportive climate represents a factor of critical importance for coaches that wish to foster long-term sport practice (Duda, 2013; Pope & Wilson, 2012). Research suggests (e.g. Duda, 2013) that a need supportive climate, like a task-involving climate, plays an important role in BPN satisfaction, and that climate has direct and indirect known effects on several behavioural, affective and cognitive outcomes, through its effect on motivational regulations (Harwood et al., 2015). The fact that our results tend to show that all three mediators show paths that are significantly related between themselves as well as with the intention to continue (i.e. in older athletes; both genders), reinforces the notion that coaching affects athletes' intention to remain involved in their sport through different variables, that could be better understood with a multidimensional approach.

Needs satisfaction was significantly related to SDM, as SDT proposes. In addition, it presents significant regressions with enjoyment, which supports the complex dynamic interaction between contextual factors, individual perceptions, internalization processes, behavioural regulations and desired outcomes (Ryan & Deci, 2017). These results are in line with several studies carried out in recent years (e.g. Balish, McLaren, Rainham, & Blanchard, 2014; Crane & Temple, 2015; Gardner et al., 2016; Guzmán & Kingston, 2012; Quedsted et al., 2013). For example, Quedsted et al. (2013) in a study with 7761 soccer players from five European countries showed that BPN satisfaction and enjoyment had a negative and significant indirect effect with dropout. Moreover, Guzmán and Kingston (2012) showed that both BPN and SDM, presented significant indirect effects on intentions to continue sport practice. Lastly, Gardner et al. (2016) in a study with 393 Australian student-athletes showed that enjoyment was positively related with the intention of practicing sport, which is in line with the results of our proposed model.

Also, the results found in the present study provided further support for the theoretical (Duda, 2013) and empirical (e.g. Gardner et al., 2016; Guzmán & Kingston, 2012; Quedsted et al., 2013) link between AGT and SDT. Our results are in

accordance with Balish et al. (2014) and Crane and Temple (2015) systematic review on dropout and persistence in sport, where these authors demonstrated that enjoyment and intentions are two very important variables for future sports participation. Finally, our results are also in agreement with the idea that more self-determined athletes will more easily develop the habit of practicing their sport when their motivation is associated with increased pleasure (i.e. enjoyment) produced by the behaviour itself (Radel, Pelletier, Pjevac, & Cheval, 2017).

Although the methodological and statistical procedures followed provide support for the proposed model, our results have some limitations. First, the present study is cross-sectional, which limits the possibility of establishing causal relationships between the variables. In this sense, prospective studies are necessary in order to provide stronger evidence for the effects reported between these variables. Second, the present study did not manipulate the role of task-involvement and BPN satisfaction. These two variables should be controlled in future studies, since they represent important variables that could influence the athletes' motivation (e.g. Teixeira et al., 2018). Third, the present study suggests a possible motivational pattern among the participants, which may be associated with their prior sports participation. In other words, the proposed model was supported with the athletes that have already shown some persistence. Although this provides support for the role of the variables in predicting the intention to persist, future research should examine prospectively how these variables relate to each other over time to determine at which stage of the athlete's development these effects take place.

Nonetheless, the present study has some practical implications, especially for coach interventions (e.g. training and competition). More specifically, coaches should be encouraged to develop a task-involving climate because it could lead to favourable conditions for BPN satisfaction, and thereby promote more self-determined motivational patterns which, in turn, should lead to higher levels of enjoyment and stronger intentions to practice swimming. In addition, the role of enjoyment should be emphasized, since it was always the strongest predictor of the intention to continue sports practice. These results support previous studies, strengthening the general idea that enjoyment is one of the main factors related to long-term sports (Crane & Temple, 2015) and physical activity participation (Teixeira, Carraça, Markland, Silva, & Ryan, 2012). Therefore, coaches should promote variety during the training sessions (i.e. playfulness/enjoyment) and not focus only on the exclusive pursuit of results or performance. They should focus on the task itself (i.e. self-referenced criteria) and not on the result, as a way to satisfy basic psychological needs

and foster their athletes' autonomous motivation (i.e. guided discovery). They should set a balance between goals related to the task and the results, as well as goals defined conjunctively between the coach and the athlete, if they wish to promote more enjoyment, and ultimately, more persistence over time.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- Ajzen, I. (2006). *Constructing a TPB Questionnaire: Conceptual and methodological considerations*. Retrieved from www.people.umass.edu/ajzen/tpb.html
- Álvarez, M., Balaguer, I., Castillo, I., & Duda, J. (2012). The coach-created motivational climate, young athletes' well-being, and intentions to continue participation. *Journal of Clinical Sport Psychology, 6*(2), 166–179. doi:10.1123/jcsp.6.2.166
- Balish, S., McLaren, C., Rainham, D., & Blanchard, C. (2014). Correlates of youth sport attrition: A review and future directions. *Psychology of Sport and Exercise, 15*, 429–439. doi:10.1016/j.psychsport.2014.04.003
- Chatzisarantis, N., & Hagger, M. (2007). Intrinsic motivation and self-determination in exercise and sport. In M. Hagger & N. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 281–296). Champaign, IL: Human Kinetics.
- Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In R. Eklund & G. Tenenbaum (Eds.), *Handbook of sport psychology* (3rd ed.) (pp. 184–202). Hoboken, NJ: Wiley.
- Crane, J., & Temple, V. (2015). A systematic review of dropout from organized sport among children and youth. *European Physical Education Review, 2*(1), 1–18. doi:10.1177/1356336

- Duda, J. (2013). The conceptual and empirical foundations of Empowering Coaching™: Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology*, 11(4), 311–318. doi:10.1080/1612197X.2013.839414
- Ericksson, K. A. (2006). The influence of experience and deliberate practice on the development of superior expert performance. In K. A. Ericksson, N. Charness, R. Hoffman, & P. Feltovich (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 685–706). New York, NY: Cambridge University Press.
- Gardner, L., Magee, C., & Vella, S. (2016). Social climate profiles in adolescent sports: Associations with enjoyment and intention to continue. *Journal of Adolescence*, 52, 112–123. doi:10.1016/j.adolescence.2016.08.003
- Guzmán, J., & Kingston, K. (2012). Prospective study of sport dropout: A motivational analysis as a function of age and gender. *European Journal of Sport Science*, 12, 431–442. doi:10.1080/17461391.2011.573002
- Harwood, C., Keegan, R., Smith, J., & Raine, A. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport and Exercise*, 18, 9–25. doi:10.1016/j.psychsport.2014.11.005
- Hayes, A. (2018). *Introduction to mediation, moderation, and conditional process analysis. A regression-based approach* (2nd ed.). London: The Guilford Press.
- Iacobucci, D., Saldanha, N., & Deng, X. (2007). A mediation on mediation: Evidence that structural equation models perform better than regressions. *Journal of Consumer Psychology*, 17, 140–154.
- Jöseaar, H., Hein, V., & Hagger, M. (2011). Peer influence on young athletes need satisfaction, intrinsic motivation and persistence in sport: A 12-month prospective study. *Psychology of Sport and Exercise*, 12, 500–508. doi:10.1016/j.psychsport.2011.04.005
- Lonsdale, C., Hodge, K., & Rose, E. (2008). The Behavioral Regulation in Sport Questionnaire (BRSQ): Instrument development and initial validity evidence. *Journal of Sport & Exercise Psychology*, 30, 323–355. doi:10.1123/jsep.30.3.323
- Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences*, 21(11), 883–904. doi:10.1080/0264041031000
- Michie, S., West, R., Campbell, R., Brown, J., & Gainforth, H. (2014). *ABC of Behaviour change theories*. Silverback Publishing.
- Monteiro, D., Borrego, C., Silva, C., Moutão, J., Marinho, D. A., & Cid, L. (2018). Motivational Climate Sport Youth Scale: Measurement invariance across gender and five different sports. *Journal of Human Kinetics*, 61, 235–243. doi:10.1515/hukin-2017-0124
- Monteiro, D., Marinho, D. A., Moutão, J., Couto, N., Antunes, R., & Cid, L. (2016). Adaptation and validation of Basic Psychological Needs Exercise Scale to the sport domain and invariance across soccer and swimming. *Motricidade*, 12(4), 51–61. doi:10.6063/motricidade.9372
- Monteiro, D., Moutão, J., & Cid, L. (2018d). Validation of the Behavioral Regulation Sport Questionnaire in Portuguese athletes. *Revista de Psicologia del Deporte*, 27(1), 145–150.
- Monteiro, D., Nunes, G., Marinho, D. A., Couto, N., Antunes, R., Moutão, J., & Cid, L. (2017). Translation and adaptation of the Physical Activity Enjoyment Scale (PACES) in a sample of Portuguese athletes, invariance across genders, nature sports and swimming. *Brazilian Journal of Kinanthropometry and Human Performance*, 17(6), 631–643.
- Monteiro, D., Pelletier, L., Moutão, J., & Cid, L. (2018). Examining the motivational determinants of enjoyment and the intention to continue of persistence competitive swimmers. *International Journal of Sport Psychology*, 49, 1–00. doi:10.7352/IJSP.2018.49
- Monteiro, D., Teixeira, D. S., Travassos, B., Mendes, P., Machado, S., Moutão, J., & Cid, L. (2018). Perceived effort in football athletes: The role of achievement goal theory and self-determination theory. *Frontiers in Psychology*, 9, 1575. doi:10.3389/fpsyg.2018.01575
- Monteiro, D., Teixeira, D. S., Vitorino, A., Moutão, J., Rodrigues, F., Machado, S., & Cid, L. (2019). Behavioral Regulation Sport Questionnaire (BRSQ): Gender and sport invariance in Portuguese athletes. *Perceptual and Motor Skills*, 1–19. doi:10.1177/0031512519825700
- Mullen, S., Olson, E., Philips, S., Szabo, A., Wójcicki, T., Mailey, E., ... McAuley, E. (2011). Measuring enjoyment of physical activity in older adults: Invariance of the Physical Activity Enjoyment Scale (PACES) across groups and time. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 103. doi:10.1186/1479-5868-8-103
- Nicholls, J. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, 91(3), 328–346. doi:10.1037/0033-295X.91.3.328
- Pelletier, L., & Sarrazin, P. (2007). Measurement issues in self-determination theory and sport. In M. Hagger & N. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 143–152). Champaign, IL: Human Kinetics.
- Pope, J., & Wilson, P. (2012). Understanding motivational processes in university rugby players: A preliminary test of the hierarchical model of intrinsic and extrinsic motivation at the contextual level. *International Journal of Sports Science & Coaching*, 7(2), 89–107. doi:10.1260/1747-9541.7.1.89
- Quested, E., Ntoumanis, N., Viladrich, C., Haug, E., Ommundsen, Y., Van Hove, A., ... Duda, J. (2013). Intentions to drop-out of youth soccer: A test of the basic needs theory among European youth five countries. *International Journal of Sport and Exercise Psychology*, 11(4), 395–407. doi:10.1080/1612197X.2013.830431
- Radel, R., Pelletier, L., Pjevac, D., & Cheval, B. (2017). The links between self-determined motivations and behavioral automaticity in a variety of real-life behaviors. *Motivation and Emotion*, 41(4), 443–454. doi:10.1007/s11031-017-9618-
- Reiner, M., Nierman, C., Jekauc, D., & Wolf, A. (2013). Long-term health benefits of physical activity – A systematic review of longitudinal studies. *BMC Public Health*, 13, 813. doi:10.1186/1471-2458-13-813
- Roberts, G. (2012). Motivation in sport and exercise from an achievement goal theory. Goal theory and perspective: After 30 years, where are you? In G. Roberts & D. Treasure (Eds.), *Advances in motivation in sport and exercise* (3rd ed, pp. 7–58). Champaign: Human Kinetics.
- Rocchi, M., Pelletier, L., & Desmarais, P. (2017). The validity of the Interpersonal Behaviors Questionnaire (IBQ) in sport. *Measurement in Physical Education and Exercise Science*, 21(1), 15–25. doi:10.1080/1091367X.2016.1242488
- Ryan, R., & Deci, E. (2017). *Self-determination theory. Basic psychological needs in motivation, development and wellness*. New York, NY: The Guilford Press.
- Sarrazin, P., Boiché, J., & Pelletier, L. (2007). A self-determination theory approach to dropout in athletes. In M. Hagger & N. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 229–241). Champaign, Illinois: Human Kinetics.
- Smith, R., Cumming, S., & Smoll, F. (2008). Development and validation of the Motivational Climate Scale for youth sports. *Journal of Applied Sport Psychology*, 20, 116–136. doi:10.1080/10413200701790558
- Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., ... Duda, J. (2016). The relationship between observed and perceived assessments of the coach-created motivational environment and links to athlete motivation. *Psychology*

- of Sport and Exercise*, 23, 51–63. doi:10.1016/j.psychsport.2015.11.001
- Teixeira, P., Carraça, E., Markland, D., Silva, M., & Ryan, R. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 78. doi:10.1186/1479-5868-9-78
- Teixeira, D. S., Silva, M. N., & Palmeira, A. L. (2018). How does frustration make you feel? A motivational analysis in exercise context. *Motivation and Emotion*, 1–10. doi:10.1007/s11031-018-9690-6
- Vlachopoulos, S., & Michailidou, S. (2006). Development and initial validation of a measure of autonomy, competence and relatedness in exercise: The basic psychological needs in exercise scale. *Measurement in Physical Education and Exercise Science*, 10, 179–201. doi:10.1207/s15327841mpee1003_4