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Parental involvement in sport: Psychometric development and empirical test of a theoretical
model

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Abstract

The purposes of the present multistudy were to develop and provide initial construct validity for measures based on the model of parental involvement in sport (Study 1) and examine structural relationships among the constructs of the model (Study 2). In Study 1 ($n_{parents} = 342$, $n_{athletes} = 223$), a confirmatory factor analysis was used to verify the psychometric properties of the measures. Content and construct validity were evaluated, as well individual and composite reliability. Multi-group analysis with two independent samples provided evidence of factorial invariance. In Study 2 ($n_{parents} = 754$, $n_{athletes} = 438$), structural equation modeling analysis supported the hypothesised model in which athletes' perceptions of parents' behaviours mediated the relationship between parents' reported behaviours and the athletes' psychological variables conducive to their achievement in sport. The findings provide support for the parental involvement in sport model and demonstrate the role of perceptions of parents' behaviours on young athletes' cognitions in sport.

Keywords: parental involvement, theoretical model, athletes' perceptions, mediation

Parental involvement in sport: Psychometric development and empirical test of a theoretical model

The psychosocial benefits of participation in sports for children and adolescents are numerous, including improvements in self-confidence, emotional control, life satisfaction, psychological resilience, teamwork, cooperation, social intelligence, or social well-being (Eime, Young, Harvey, Charity, & Payne, 2013). These benefits are developmentally relevant and are contingent on social contextual factors, including young athletes' interactions with parents (Neely & Holt, 2014). For over four decades, researchers have increasingly focused on the study of parental involvement in sport (e.g., Dorsch, Smith, & Dotterer, 2016; Harwood & Knight, 2015; Holt, Tamminen, Black, Sehn, & Wall, 2008; Power & Woolger, 1994; Snyder & Speitzer, 1973). Theoretical frameworks originally developed in educational psychology have yielded useful insights into the nature of parental involvement in sport (Eccles, 1993; Harter, 1999; Nicholls, 1989) and research has taught us much about the key variables of parental influence in sport and its consequences. This research has clearly indicated that parents play an important role in socializing children into sport and in contributing to children's psychosocial development through sport participation (e.g., Dorsch, Smith, & McDonough, 2009). Parents invest in their child's sport participation through dedicating time, commitment, and financial resources (e.g., Côté, 1999). For example, parents provide transportation, attend practices and competitions, provide information, and purchase sport equipment (e.g., Green & Chalip, 1998). Moreover, through their feedback, parents can provide support and encouragement, or they can be a source of stress and anxiety by placing excessive pressure on the child (e.g., Babkes & Weiss, 1999). Through their beliefs and behaviours, parents teach children values and provide them with experiences that influence their choice of activities and goals (e.g., Fredricks & Eccles, 2005; Kavussanu, White, Jowett, & England, 2011).

The current research assists in our understanding of the psychosocial influences that operate within parents, which in turn contribute to differential child outcomes. However, more research is needed to investigate the possible interplay between various types of parental behaviors as they relate to supporting children's participation in sport (Horn & Horn, 2007), thus this research tends to address specific aspects of parental influence on the children's athletic activity.

Considering the need to observe this interplay, we recognise the potential value of the application in sport of Hoover-Dempsey and colleagues' model of parental involvement (Hoover-Dempsey & Sandler, 1995, 1997; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). Although initially developed in the school context, this model would facilitate the integration of principles and findings across disciplines in sport (Teques & Serpa, 2009, 2013). Specifically, this model (1) explains parents' decision to get involved in their children's sport, (2) identifies the behaviours used in the course of parents' involvement, and (3) clarifies how parents' behaviours influence their children's psychosocial development.

Although many models have been successfully adapted from the education setting to sport, often these have been limited to children's achievement motivation (e.g., Harter, 1999; Eccles, 1993). A primary example is the expectancy-value model (Eccles, 1993) which holds that parents influence children's motivation via their beliefs (i.e., they act as interpreters of children's experience) and behaviours (i.e., they act as providers of children's experience). However, as stated by Holt et al. (2008), "it is important to recognize that Eccles' model was originally developed to predict and explain socialized gender differences in children's achievement and motivated behaviors and does not specify or predict the nature of parents' involvement and support in competitive sport settings" (p. 667). Additionally, researchers have recognised the absence of a theoretical approach to holistically integrate and synthesise

the concept of sport parenting (Harwood & Knight, 2015). Perhaps the strongest contribution the adaptation of Hoover-Dempsey and Sandler's model has made to sport is the attention it has brought to the dynamic interplay between (a) the role of parents' perceptions of themselves in determining how much parental involvement occurs, (b) parents' interactions at the ecological core (sport institution, coaches), and (c) parents' influence on children's psychological variables and achievement in competitive sports. In addition, this model has the potential to drive the theoretical knowledge of parenting in sport as its parsimonious design allows the testing of this theory in its entirety (Teques, Serpa, Rosado & Calmeiro, 2015). We now discuss the model of parental involvement in sport based on a brief review of the conceptual work on this topic.

The model of parental involvement in sport

One model of parental involvement in sport was conceptually adapted by Teques and Serpa (2009, 2013), based on the Hoover-Dempsey and Sandler model (1995, 1997; Walker et al., 2005). Overall, this model encompasses five levels of variables that ultimately influence children's achievement in sport. Level 1 suggests that parents' decisions to become involved in their children's sport will occur when they (a) develop a specific context parental role, (b) develop a sense of self-efficacy to help the child's development, (c) are invited by the club, the child, and the coach to be involved, (d) realise that they have knowledge or skills to be involved, and (e) can manage the time and energy required to support the child's sport participation. The constructs of the model's Level 1 predict parents' involvement activities based at home (e.g., talking about their child sport) and at the club (e.g., attending practices and competitions). The second level of the model assumes that once a decision to become involved has been made, parents influence the child's development by using behaviour strategies, such as modelling, encouragement, reinforcement, and instruction. In the course of the involvement, the child's perceptions of parents' behaviours (Level 3) will mediate the

relationship between self-reported parents' behaviours and a set of psychological attributes conducive to achievement in sport: self-efficacy, intrinsic motivation, self-regulation and social self-efficacy for relating with the coach (Level 4). The model culminates in the child achievement in sport (Level 5).

Our early work has examined the relationships between Level 1 constructs of this model with the parental involvement activities in children's sport based at home and at the club (Teques et al., 2015). Findings suggested that home-based involvement was associated with parental role beliefs, parental self-efficacy, perceptions of child and coach invitations, self-perceived time and energy, and required knowledge and skills that parents consider important for their involvement in the child's sport. These same constructs, with the exception of perceptions of knowledge and skills and perceptions of coach invitations, were related to parents' club-based involvement. The present study will therefore examine the relationships between constructs in levels 2, 3, and 4. These levels address the behaviours used by parents in the course of their involvement, and the mechanisms through which these behaviours influence their children's psychological variables in sport (see Figure 1).

[INSERT FIGURE 1]

Parents' and children's perceptions of parental behaviour. Researchers suggest that parental involvement behaviours in youth sport activities influence children's attitudes towards sport and self-concept dimension that refer to athletic participation (e.g., Fredricks & Eccles, 2005; Power & Woolger, 1994; Woolger & Power, 2000; Wuerth, & Alfermann, 2004). Despite research suggesting that reports of parents and children concerning parental involvement behaviours demonstrate low-to-moderate level of agreement (e.g., Babkes & Weiss, 1999; Dorsch et al., 2016), children's perceptions of events in their social environment mediate the influence of those events on their behaviour and sport experiences (Stein, Raedeke, & Glenn, 1999). The model of parental involvement in sport identifies four major

parents' and children's perceptions of parental behaviour: modelling, reinforcement, encouragement, and instruction (Hoover-Dempsey & Sandler, 2005; Teques & Serpa, 2009, 2013).

The process of observational learning has been suggested as the underlying mechanism by which the child internalises the attitudes and behaviours of the role model (Bandura, 1997). This mechanism leads to the assumption that parents can serve as role models not only through direct interactions with their children, but also through the examples they set with their attitudes and behaviours within the school, work, home, recreational activities and sports (Woolger & Power, 2000). Studies using self-report measures on parental modelling in sport have usually focused on the children's perceptions of their parents' physical activity or sport participation levels. However, these studies have generated inconsistent results. For example, Babkes and Weiss (1999) showed that athletes who reported that their mothers and fathers were good role models had higher perceptions of competence, enjoyment and intrinsic motivation. In contrast, Fredricks and Eccles (2005) reported that parents' role modelling, operationalized as time spent playing sports, was not a significant predictor of children's sport participation. Hence, considerable research is needed to clarify the role of parental modelling in children's sport participation.

Parental encouragement and reinforcement refer to general emotionally supportive comments that parents convey to intentionally increase the likelihood of the child engaging in a particular behaviour in their sport (Holt et al., 2008). A consistent finding in the literature is that parental emotional support positively influences children's sport experiences (e.g., Dorsch et al., 2009; Knight & Holt, 2014). Wolfenden and Holt (2005) suggested that youth soccer players nominated their parents as one of the most important influences on their sport participation due to the emotional support they provide. However, rather than proposing parents' behaviours are only dictated by a general view of emotional support, we propose to

examine how parents' behaviours of encouragement and reinforcement optimise a wider range of children's psychological attributes in sport.

Parents' direct instructional behaviours refer to the degree to which parents actively instruct their child about what to do or not to do in their sport, with a particular emphasis on areas in need of improvement (Power & Woolger, 1994). Excessive directive behaviours and active instructions have been linked with children's anxiety, perceived pressure and withdrawal from sport (Bois, Lalanne, & Delforge, 2009; Wuerth, Lee, & Alfermann, 2004). Averill and Power (1995) suggested that such parental behaviours are likely to undermine the coach's authority and put a strain on the coach-athlete relationship.

Athletes' psychological variables conducive to achievement in sport. While the parental involvement literature has often focused on children's achievement goals as an outcome of primary interest, a body of research suggests that parental involvement may have its most direct influence on children's attributes that lead to achievement (e.g., Allen, 2003; Babkes & Weiss, 1999; Chan, Lonsdale, & Fung, 2012; Dorsch, King, Dunn, Osai, & Tulane, 2016; Woolger & Power, 2000). Thus, the model of parental involvement in sport (Teques & Serpa, 2009, 2013) identifies four psychological variables associated with athletes' achievement which are susceptible to the influence of parents' behaviours: self-efficacy, intrinsic motivation, self-regulation, and social self-efficacy in relating to coaches.

Self-efficacy is defined as a self-evaluation of one's competence to successfully execute a course of action required to attain designated levels of performance or achieve explicit performance outcomes within specific domains (Bandura, 1997). In sport, Chase (2001) found that children with higher self-efficacy to perform sport skills (e.g., batting, fielding, dribbling) chose to participate more often in sport tasks and expressed higher self-efficacy for future attempts at sport tasks than children with low self-efficacy. Despite the importance of self-

efficacy, no studies have yet examined the relationship between parental behaviour and children's self-efficacy in competitive sport.

Intrinsic motivation refers to engaging in an activity purely for the pleasure and satisfaction derived from its practice (Ryan & Deci, 2006). Athletes who attend practice because they find it interesting and satisfying to learn more about their sport or for the pleasure of trying to surpass themselves are intrinsically motivated toward their sport (Pelletier et al., 1995). Babkes and Weiss (1999) examined perceived and reported parental attitudes and behaviours on motivational outcomes in youth soccer. Children who perceived their parents to be positive role models, to possess more positive beliefs about their competency, and to provide more frequent positive feedback about their performances reported higher perceived competence, enjoyment, and intrinsic motivation.

Another psychological attribute conducive to achievement is self-regulation. Self-regulation is defined as the extent to which individuals are metacognitively, motivationally, and behaviourally proactive in their own learning process (Zimmerman, 2006). Researchers focusing on self-regulation in sport have shown that better developed self-regulatory skills, such as self-reflection, may result in a more effective learning environment and ultimately in increased capacity for athletic performance (Toering, Elferink-Gemser, Jordet, & Visscher, 2009). However, how children's perceptions of their parents' behaviours influence children's self-regulation skills requires further clarification.

Finally, in the absence of studies that addressed parental involvement in sport with a focus on social efficacy for relating with the coach, research in the academic context showed that social efficacy is related to students' adaptive engagement in class and academic performance (Patrick, Ryan, & Kaplan, 2007). In sport, Averill and Power (1995) showed that mothers and fathers who reported the highest level of involvement in their child's soccer experience had children reporting the lowest level of cooperation with the coach.

Aim and hypotheses

The present paper comprises two independent studies. The purpose of Study 1 is to develop and provide initial construct validity for measures based on the model of parental involvement in sport (Teques & Serpa, 2009, 2013; Teques, Serpa, Rosado, & Calmeiro, 2015). The purpose of Study 2 is to examine the mediation effects of athletes' perceptions of parents' behaviours on the relationship between parents' behaviours and athletes' psychological variables conducive to achievement in sport. Based on the literature discussed above, we hypothesise that parents' reported behaviours of (a) encouragement, (b) reinforcement, (c) instruction, and (d) modelling will be associated with the child's psychological variables conducive to achievement in sport, such as intrinsic motivation, self-efficacy, social self-efficacy in relating to the coach, and self-regulation (Hypothesis 1). Second, we hypothesise that parents reported behaviours of (a) encouragement, (b) reinforcement, (c) instruction, and (d) modelling will be related with the child's perceptions of each of the respective parental involvement behaviours, i.e., perceived encouragement, reinforcement, instruction, and modelling (Hypothesis 2). Third, we hypothesise that young athletes' perceptions of their parents' behaviours concerning (a) encouragement, (b) reinforcement, (c) instruction, and (d) modelling, will be significantly associated with the child's intrinsic motivation, self-efficacy, social self-efficacy in relating to the coach, and self-regulation (Hypothesis 3). Finally, we hypothesise that young athletes' perceptions of their parents' behaviours of (a) encouragement, (b) reinforcement, (c) instruction, and (d) modelling will mediate the relationship between parents' reported behaviours and the athletes' psychological variables conducive to achievement, such as self-efficacy, social self-efficacy, self-regulation, and intrinsic motivation (Hypothesis 4).

Study 1

Method of the Study 1

Participants¹

A total of 223 athletes aged between 10 to 16 years ($M_{age} = 14.55$, $SD = 2.15$) and 342 parents aged 29 to 59 old ($M_{age} = 39.22$, $SD = 4.67$) participated in this study. Participant athletes were 133 boys and 90 girls and participant parents were 189 mothers and 153 fathers. Only one child per family was included (preferentially the first-born). This sample was composed primarily of Caucasian and middle-class families from the coastal regions of Portugal and young athletes represented a variety of team and individual competitive sports: soccer (32.2%), basketball (25.2%), swimming (23.7%), gymnastics (10.1%), karate (3.8%), kickboxing (2.9%), and mixed martial arts (2.3%). On average, participants had 3.6 years of experience in their current sport and practiced 3 to 4 times per week.

Procedures

Ethical approval was obtained from the faculty ethical committee. For Study 1, several clubs and sport federations were contacted to suggest a workshop session for parents about parental support in sport. The session started with an explanation of the purpose and objectives of the study, followed by clarification of ethical matters including assurance of data confidentiality. After participant and parental consents were obtained, parents completed the required questionnaires. Athletes' questionnaires were administered at a different time by the first author or a research assistant either before or after the training sessions. During the administration process for both parents and athletes, the researcher was available to provide any clarification requested by the participants.

Scale development

The original scales of Hoover-Dempsey and colleagues (Hoover-Dempsey & Sandler, 2005) developed for the academic domain were translated into Portuguese and adapted to the sport context using a three-stage process (Banville, Desrosiers, & Genet-Volet, 2000). The first stage was the translation and back-translation of the original scales. This process was

conducted by two bilingual speakers and supervised by the first author to assure the translation's conceptual validity.

The second stage ascertained the content validity of the translated version. For this purpose, items were presented to a panel of experts for review (Worthington & Whittaker, 2006). The panel included three established sport and exercise psychology experts, one physical education teacher with experience in assessing implementation of youth sports programmes, and one educational psychologist specialized in family interventions. To determine face validity associated with the sport context, panel members were also invited to suggest new items specifically related to the parental involvement in sport.

In the last stage, two independent focus groups, one with eight parents and the other with eight children and adolescent athletes, evaluated the items' clarity, importance, terminology, comprehension and format. Participants were invited to ask questions and provide suggestions after completion of each measure to make items clearer and more explicit. The final version of the pilot scales used in the study totalled forty-eight items divided into twelve independent scales. Based on original scales, a six-category item was used for parents' scales (1 = "strongly disagree" to 6 = "strongly agree") and a four-category item was implemented for athletes' scales (1 = "not true" to 4 = "very true"). All dimensions and items are presented in the Table 1.

Parents' and children's perceptions of parental behaviour. Reported and perceived parental behaviour scales used in this study included: a) *encouragement*, focused on parents' explicit affective support for the athlete's experiences in sport; b) *reinforcement*, which accessed parents' reinforcing behaviours that act to develop and maintain athlete attributes associated with positive outcomes; c) *modelling*, included items developed to assess parental modelling behaviours thought to influence young athlete's experiences in sport; and d)

instruction, aimed at assessing perceptions of parents' direct instructional behaviours to their child about how he or she should play before, during and after competitive sport events.

Athlete's psychological variables conducive to achievement. Teques and Serpa (2013) identified four major athletes' psychological attributes that are susceptible to parental influence through involvement activities and likely causally related to sport achievement: a) *self-efficacy*, included athletes beliefs about their abilities to act in ways that will produce valued sport outcomes; b) *intrinsic motivation*, measured children's interest in sport practice for its own sake, in contrast with participation for the external consequences or rewards it may yield; c) *self-regulation*, defined by a set of cognitions, metacognition, and behaviours, such as self-monitoring, evaluation of performance, or adjustments in strategy use; and d) *social self-efficacy*, is related to their beliefs about the ability to establish a successful relationship with the coach which will yield positive outcomes.

[INSERT TABLE 1]

Data analysis

The appropriateness of the model was estimated through a variety of goodness-of-fit indexes. We used as guidance the cut off values (CFI and TLI > .90, RMSEA and SRMR < .08) recommended by Hair, Black, Babin, and Anderson (2010); however, due to reliance on model specification indexes, differences in model specification of the nested models will also be analysed (Marsh, Hau, & Wen, 2004). Internal consistency of the constructs was measured through composite reliability (Hair et al., 2010). The average variance extracted (AVE) was estimated to evaluate convergent validity and values greater than .50 were considered to demonstrate convergent validity (Fornell & Larcker, 1981; Hair et al., 2010). Discriminant validity was assumed when AVE of each construct was greater than the squared correlation between that construct and any other (Fornell & Larcker, 1981, Hair et al., 2010).

In addition, to examine cross validity of the measures, we tested model invariance in two independent samples. Invariance between models was assessed with chi-square (χ^2) tests significance and CFI difference (Δ CFI) values (Cheung & Rensvold, 2002). If χ^2 for model comparison is not statistically significant ($p > .05$), then the hypothesis of invariance will be retained; however, Cheung and Rensvold (2002) have acknowledged that χ^2 is influenced by sample size and therefore proposed using changes in the Δ CFI of greater than .01 as an alternate criterion. Furthermore, we sequentially tested a series of nested models in the following order: Model 1 is an unconstrained model, Model 2 imposed equality constraints on the factor loadings, and Model 3 tested the factor variances-covariances by constraining the distinctiveness of the items with invariant factor loadings.

Results of the Study 1

Preliminary analysis

An inspection of the data revealed that missing values covered 2.2% of cells in the raw data matrix related to parents and athletes, with no clear pattern of missing data. Therefore, missing data were handled using expectation maximization algorithm. No outliers were identified in the athletes' sample, while six cases in the parents' sample emerged either as univariate outliers ($z > 3.00$) or multivariate outliers (squared Mahalanobis distance = $p1 < .001$, $p2 < .001$). These participants were removed prior to conducting any further analysis. Item-level descriptive statistics indicated no deviations from univariate normality in parents (skewness ranged from -1.07 to 0.07; kurtosis ranged from -1.36 to 0.86) and athletes (skewness ranged from -1.25 to 0.38; kurtosis ranged from -1.31 to 1.37) responses. Additionally, Mardia's coefficient for multivariate kurtosis exceeded expected values for the assumption of multivariate normality either for parents' (97.77) and athletes' (82.99) samples (Byrne, 2010). Therefore, Bollen-Stine bootstrap on 2000 samples was employed for subsequent analysis (Nevitt & Hancock, 2001) using AMOS 20.

Measurement models

Parents' reported behaviours. The results from the analysis supported the four-factor hypothesised model. All standard factor loadings were moderate to strong (Table 1), and each fit index met criteria for an acceptable fitting model [$\chi^2(98) = 295.24$, B-S $p < .001$, CFI = .96, TLI = .95, RMSEA = .07 (CI = .07, .08), SRMR = .06]. Each of the reported parents' behaviours demonstrated satisfactory levels of reliability, and AVE values revealed convergent validity. Evidence of discriminant validity was accepted since none of the squared correlations exceeded the AVE values for each associated construct (Table 2).

Athletes' perceptions of parental involvement behaviours. The results obtained in the measurement model indicated an acceptable fit to the data [$\chi^2(98) = 191.49$, B-S $p < .001$, CFI = .95, TLI = .94, RMSEA = .06 (CI = .05, .07), SRMR = .05]. However, as shown in the Table 1, the path coefficient leading from perceived parental modelling as a latent variable to the children's item "*The person in my family who accompanies me in my sport... has aggressive behaviours during competitions*" (.41) was below of the cut-off criteria ($\geq .50$; Hair et al., 2010). We re-estimated the model without this item. Following item deletion, a follow-up CFA was calculated on the revised measurement model. The goodness-of-fit indicators for the revised model showed a good fit to the data [$\chi^2(84) = 174.58$, B-S $p < .001$, CFI = .95, TLI = .94, RMSEA = .06 (CI = .05, .08), SRMR = .04]. All items showed moderate to high factor loadings (Table 1). The four constructs showed reliability, convergent and discriminant validity (Table 2).

Athletes' psychological variables conducive to achievement. The hypothesised four-factor model showed an acceptable fit to the data [$\chi^2(98) = 183.37$, B-S $p < .001$, CFI = .95, TLI = .94, RMSEA = .06 (CI = .04, .07), SRMR = .05]. All estimated factor loadings exceed the cut-off point of .50 (Hair et al., 2010) (Table 1). Reliability, convergent and discriminant validity were demonstrated for all constructs (Table 2).

[INSERT TABLE 2]

Cross validation

To test factorial invariance, the samples derived from the Study 1 ($n_{parents} = 380$, $n_{athletes} = 266$) and the Study 2 ($n_{parents} = 754$, $n_{athletes} = 438$) were combined. Multi-group CFAs were performed to test measurement invariance of the levels 2, 3, and 4 of the parental involvement in sport model across the samples of the Study 1 and Study 2 simultaneously.

Table 3 shows the results of invariance tests for the models of parents' reported behaviours, athletes' perceptions of parents' behaviours, and athletes' psychological variables conducive to achievement in their sport across the two samples. Progression through each subsequent test of invariance indicated stability in goodness of fit for each model. In the three models assessed, the chi-square yielded significant results when factor variances-covariances invariance criteria were imposed (excluding athletes' psychological variables conducive to achievement). In light of the previously mentioned caution regarding the interpretation of the chi-square statistic, emphasis was placed on the ΔCFI (Cheung & Rensvold, 2002). The consideration of this indicator suggested that each model was equivalent.

[INSERT TABLE 3]

Study 2

In Study 2, we analyse the mediating effects of athletes' perceptions of parents' behaviours on the relationship between parents' behaviours and athletes' psychological variables conducive to achievement in their sport.

Method of the Study 2

Participants¹

A total of 438 young athletes aged 10 to 17 years old ($M_{age} = 14.78$, $SD = 2.97$; 46.1% girls) and 754 parents aged 28 to 66 years old ($M_{age} = 41.28$, $SD = 5.44$; 50.3% mothers), provided data for this study. This sample is from the center coastal region of Portugal and

young athletes' represented a variety of team and individual sports: soccer (24.1%), basketball (18.6%), volleyball (10.8%), handball (14.8%), swimming (20.6%), and tennis (11.1%).

Young athletes practiced between 2-4 times per week ($M_{practices} = 3.03$, $SD = 0.49$).

Measures

For Study 2, we used the versions of the scales derived from the confirmatory factor analysis completed in Study 1: parents' reported behaviours (reinforcement, encouragement, instruction and modelling), athletes' perceptions of parents' behaviours (perceived reinforcement, encouragement, instruction and modelling), and athletes' psychological variables conducive to achievement in their sport (social self-efficacy, self-efficacy, intrinsic motivation, and self-regulation). The composite reliability values for each scale used in Study 2 were above the recommended .70 threshold (Hair et al., 2010), ranging from .75 (self-efficacy) to .92 (parental reinforcement).

Procedures

For Study 2, directors and coaches from each club were directly contacted to obtain permission to approach parents for participation in the study. Questionnaires were given to every child to be completed by both parents at home and returned to the club. Only one child per family was selected (if the family had more than one child, only the oldest child was selected). Instructions were given to parents to complete the questionnaires in private. Informed consent procedures were adhered to, parental consent for athletes' participation was obtained, and confidentiality was assured. Questionnaires were collected either before or after the training sessions. Also, athletes were instructed to identify the person who attends their practices and competitions more frequently. Only those athletes who identified the mother or father were selected to participate in the study. To match parents and children's questionnaires while preserving anonymity and confidentiality, the questionnaires were identified with a code number.

Data analysis

To test the mediational effects of the model of parental involvement in sport, we selected only the complete data of triads ($n = 316$), where athlete's, father's and mother's viewpoints were assessed. We examined the mediation effects of athletes' perceptions of parents' behaviours in the relationship between parents' reported behaviours and the athletes' psychological variables conducive to achievement in their sport based on suggestions and procedures tested by Lau and Cheung (2010) for complex latent variable models. To examine the significance of direct and indirect effects we used the bootstrap resampling procedure (1000 bootstrap samples), via bias corrected 95% confidence intervals (CI). An indirect effect will be significant (at ≤ 0.05) if its 95% CI does not include zero (Williams & MacKinnon, 2008). Collinearity was tested resulting in variance inflation factors which ranged from 1.31 (parents' instruction) to 2.70 (parents' reinforcement) for parents' and athletes' variables, within the limits accepted for regression analysis (Hair et al., 2010).

Results of the Study 2

Mediation analysis

According to Baron and Kenny (1986), the first criterion to establish mediation was assuring a direct association between the independent variables (parents' reported behaviours) and the dependent variables (athlete's psychological variables). Second, the hypothesised model was tested, where significant effects were observed between the parents reported behaviours on the putative mediators (athlete's perceptions of parents' behaviours), which, in turn, were related to athlete's psychological variables. Finally, mediation effects were assumed when the significant relationship between the independent and dependent variables is significantly lowered (partial mediation) or nullified (full mediation).

Testing the direct paths between parents reported behaviours and athletes psychological variables (Hypothesis 1). A direct effects model tested the associations

between the independent variables (parents' reported behaviours) and the dependent variables (athletes' psychological variables conducive to achievement). The direct effects model presented a tolerable fit to the data [$\chi^2(442) = 1829.57$, B-S $p < .001$, CFI = .90, TLI = .89, RMSEA = .07 (CI = .06, .07), SRMR = .08]. The standardised direct paths coefficients are presented in Table 5. The paths between parents' reported behaviours of encouragement and athletes' self-regulation ($\beta = .20$; CI = .05, .35) and intrinsic motivation ($\beta = .23$; CI = .05, .37) (H1a) were significant. Parents' reported reinforcement paths were significant for athletes' self-regulation ($\beta = .24$; CI = .05, .49), intrinsic motivation ($\beta = .44$; CI = .26, .61), and social self-efficacy ($\beta = .16$; CI = .01, .36) (H1b). Further, parents' reported instruction were negatively associated with athletes' intrinsic motivation ($\beta = -.26$; CI = -.35, -.16), self-efficacy ($\beta = -.23$; CI = -.36, -.11), social-self-efficacy ($\beta = -.20$; CI = -.31, -.08), and self-regulation ($\beta = -.22$; CI = -.37, -.12) (H1c). The associations between parents reported modelling was significant with athletes' self-efficacy ($\beta = .24$; CI = .08, .30) and social self-efficacy ($\beta = .15$; CI = .03, .26) (H1d).

Testing the mediating effects of athletes' perceptions of parents' behaviours

(Hypothesis 2, 3, and 4). The hypothesised mediational model was specified in accordance with the theoretical principles of the model of parental involvement in sport (Teques & Serpa, 2013) and the results provided evidence for mediation in several relationships. The results of SEM analysis indicated an acceptable fit for the hypothesised model [$\chi^2(991) = 2925.58$, B-S $p < .001$, CFI = .90, TLI = .89, RMSEA = .06 (CI = .05, .06), SRMR = .08]. There were no significant associations between the athlete's perceptions of reinforcement to social self-efficacy ($p = .33$), self-efficacy ($p = .54$), and self-regulation ($p = .65$), athletes perceptions of instruction to self-efficacy ($p = .23$), self-regulation ($p = .31$), and intrinsic motivation ($p = .13$), and athletes perceptions of modelling to intrinsic motivation ($p = .38$) and self-regulation ($p = .40$).

As shown in the hypothesised model displayed in Figure 2, parents encouragement was associated with athletes perceptions of encouragement ($\beta = .38$; CI = .29, .51) (H2a), which, in turn, was associated with athletes' intrinsic motivation ($\beta = .71$; CI = .56, .83), self-regulation ($\beta = .42$; CI = .15, .67), self-efficacy ($\beta = .39$; CI = .17, .65), and social self-efficacy ($\beta = .21$; CI = .05, .49) (H3a). Indirect effects indicated that parents reported encouragement was positively related with intrinsic motivation ($\beta = .27$; CI = .20, .40), self-regulation ($\beta = .16$; CI = .07, .29), self-efficacy ($\beta = .15$; CI = .06, .27) and social self-efficacy ($\beta = .08$; CI = .02, .18) through athletes perceptions of parents encouragement. Calculations including athletes' perceptions of parents encouragement as a mediating variable showed that the direct effect from parents' encouragement to intrinsic motivation ($\beta = .12$; CI = -.02, .27) and self-regulation ($\beta = .15$; CI = -.01, .32) were reduced and became statistically nonsignificant (H4a). In addition, a significant direct association was observed between parents reinforcement and athletes' perceptions of reinforcement ($\beta = .34$; CI = .25, .46) (H2b), which is associated with intrinsic motivation ($\beta = .21$; CI = .06, .37) (H3b). In the hypothesised mediation between parents reinforcement and athletes' intrinsic motivation, via athletes' perceptions of parents reinforcement, results indicated significant indirect effects ($\beta = .13$; CI = .08, .21). With the addition of the mediator, the coefficient for the direct path from parents reinforcement to athlete's intrinsic motivation was decreased ($\beta = .07$; CI = .02, .13), but statistically significant (H4b). Also, parents instruction was related with athletes' perceptions of instruction ($\beta = .31$; CI = .22, .40) (H2c), which is negatively associated with social self-efficacy ($\beta = -.19$; CI = -.26, -.05) (H3c). Indirect effects indicated that parents instruction was negatively related to athletes' social self-efficacy via athletes' perceptions of their instructional behaviours ($\beta = -.15$; CI = -.23, -.03) and the direct path between the parents reported instruction and athletes' social self-efficacy dropped and became nonsignificant ($\beta = -.06$; CI = -.20, .06) (H4c). Finally, parents modelling was associated with

athletes' perceptions of modelling ($\beta = .48$; CI = .39, .69) (H2d), which is related with athletes' self-efficacy ($\beta = .58$; CI = .37, .65) and social self-efficacy ($\beta = .82$; CI = .64, .91) (H3d). Indirect effects indicated that parents reported modelling was associated with athletes' self-efficacy ($\beta = .28$; CI = .16, .58) and social self-efficacy ($\beta = .39$; CI = .27, .69). The inclusion of the athletes' perceptions of modelling as a mediating variable showed that the direct paths of the parents reported modelling to athletes' self-efficacy ($\beta = .09$; CI = -.05, .21) and social self-efficacy ($\beta = .02$; CI = -.02, .14) were reduced and became statistically nonsignificant (H4d). Table 4 presents the standardised direct and indirect effects for the hypothesised model.

[INSERT FIGURE 2]

[INSERT TABLE 4]

Discussion

The present paper comprised two studies designed to empirically test the parental involvement in sport model. In Study 1, we first developed the measures of parents' reported behaviours, athletes' perceptions of parents' behaviours, and athletes' psychological variables conducive to achievement in sport. We then provided support for the validity of such measures. In Study 2, we documented the hypothesised mediation effects of athletes' perceptions of parents' behaviours on the relationship between parents' reported behaviours and athletes' psychological attributes conducive to achievement in their sport.

Construct validity of the measurement instruments of the parental involvement model

In Study 1, the results support a multidimensional model and generally indicate the usefulness of distinguishing among multiple components of parental involvement, fulfilling the research needs to promote a global approach to parental involvement in sport (Harwood & Knight, 2015). Specifically, the results of the CFAs corroborated the four-factor measurement model among the parents' reported behaviours, athletes' perceptions of parents' behaviours,

and athletes' psychological attributes conducive to achievement. In addition, internal consistency coefficients and item properties showed that all scales were reliable. Moreover, these results provided support for the convergent and discriminant validity for the measurement models. Additionally, the model's invariance was verified across two independent samples. These results highlight some theoretical implications and opportunities for empirical study in this area.

Parents' influences on athletes' psychological variables

Although there is extensive work on some constructs of this model, very few studies include simultaneously both the distal (parents' behaviours) and proximal (perceived parents' behaviours) constructs proposed to be associated with athletes' psychological variables in sport. Much existing literature focuses on the associations of children's specific psychological variables with either the child's perceptions of parents' behaviours or parents' reported behaviours. For example, several researchers have confirmed that parental involvement practices in the form of encouragement, reinforcement, role modelling, and directedness reflect individual differences in the ways parents attempt to influence their child's psychological functioning in sport (e.g., Babkes & Weiss, 1999; Chan et al., 2012; Woolger & Power, 2000). However, these studies have rarely examined more than a few of the possible parental practices in the same study. In line with Hypothesis 1, in the present study we observed a number of simultaneous direct effects between parents' reports of encouragement, reinforcement, instruction, and modelling and their child's psychological variables in sport, such as intrinsic motivation, self-efficacy, social self-efficacy in relating to the coach, and self-regulation.

Overall, results of the present study support the utility of a multivariate model of the relationship between reported and perceived parenting practices and children's psychological variables in sport. As proposed by Teques and Serpa (2013), young athletes' psychological

characteristics are likely to be influenced by the interaction of several practices, which mediate children's motivation and behaviours. Specifically, while parents' and children's perceptions are associated (Hypothesis 2), they may also reflect different expectations and perspectives on events experienced in common (Stein et al., 1999). Thus, in accordance with Hypothesis 3, when examining the relationship between athletes' perceptions of parents' behaviours with athletes' psychological variables, we found significant positive direct effects between perceived parents' use of encouragement, reinforcement, and modelling on athletes' intrinsic motivation, self-efficacy, social self-efficacy, and self-regulation. Specifically, as conceptually hypothesised by Teques and Serpa (2013), these results suggest that young athletes who perceived more encouragement from their parents had stronger self-efficacy beliefs, stronger social efficacy beliefs, experienced greater interest to play their sport, and used more self-regulation strategies. Furthermore, athletes who perceived more parental reinforcement were also more intrinsically motivated to play their sport. Finally, athletes who perceived greater frequency of role modelling reported stronger self-efficacy and social self-efficacy beliefs.

In addition, the negative effect of perceived parental instructional behaviours on athletes' social self-efficacy in relating with coaches raises concerns about the potential negative role of parents when they want to control their child's behavior in sport (Averill & Power, 1995). High frequency of parental technical instruction may lead to a child's maladaptive social behaviours undermining the coach's role, leading to problems between coach and child.

Mediational effects of the athlete's perceptions of parent's behaviours

One of the main findings of this study was that athletes' perceptions of parents' use of encouragement, reinforcement, instruction and modelling mediated the relationship between parents reported behaviours and athletes psychological attributes, such as self-efficacy, social

self-efficacy, intrinsic motivation and self-regulation (Hypothesis 4). Therefore, the results of the mediation analyses further support the parental involvement model in sport (Teques & Serpa, 2009, 2013). Based on Baron and Kenny's (1986) propositions, the results showed total and partial mediation effects emerging via the child's perceptions of their parent's behaviours (see Table 4). Specifically, the child's perceptions of parental encouragement had important indirect effects in children's self-efficacy, social self-efficacy, intrinsic motivation, and self-regulation. The present findings are consistent with reports of positive associations between parents' encouragement and children's motivation in sport (e.g., Power & Woolger, 1994; Haye, Heer, Wilkinson, & Koehly, 2014; Woolger & Power, 2000).

In addition, perceived parents' reinforcement was a critical factor for children's intrinsic motivation; however, this result is somewhat controversial in the literature (Henderlong & Lepper, 2002). In fact, Ryan and Deci (2006) indicated that parental reinforcement can often be ineffective and sometimes even dysfunctional for children's intrinsic motivation. However, many different conditions have been proposed to account for the effects of reinforcement on intrinsic motivation. As noted by Henderlong and Lepper (2002), depending on the circumstances, reinforcement can encourage either adaptive or maladaptive attributions for performance, and motivational consequences of reinforcement can be moderated by characteristics of the children concerned, such as age, gender, and culture.

The present findings also suggest that athletes' perceptions of technical instruction from their parents were negatively associated with athletes' social self-efficacy concerning the effectiveness of their interactions with coaches. In line with Averill and Power (1995), the results suggest that high amounts of parents' directive behaviours may undermine a child's interpersonal relationship with their coach. Furthermore, athletes' perceptions of their parents' modelling behaviours were associated with the athletes' self-efficacy and social self-efficacy, highlighting the process of observational learning as the underlying mechanism by which the

child internalises the attributes and behaviours of the role model (Bandura, 1997).

Nevertheless, studies that focus on the influence of parental role modelling on children's athletic participation are inconclusive. For example, some studies have found no significant associations between parents' modelling behaviours and children's participation in physical activities (e.g., Fredricks & Eccles, 2005); other studies have indicated that athletes' perceived parental role modelling was related with competence, enjoyment, and intrinsic motivation in soccer (e.g., Babkes & Weiss, 1999). However, it is important to note that these studies were conducted in different sporting contexts (e.g., competitive sports, recreational physical activity), and therefore it would be useful for future researchers to study the invariance of parental role modelling across different type of sport contexts.

Contributions and practical recommendations

The findings from this study illustrate that athletes' perceptions of parents' behaviours mediate the relationship between parents' reported behaviours and achievement variables. It is therefore paramount that parents maximize their supportive behaviours (e.g., encouragement and reinforcement), whilst minimizing instructional behaviours before, during and after competitions. That is, in response to desirable or undesirable performances, parents should respond with praise and encouragement, but refrain from providing information on how to improve. Moreover, results of the present study identify parents' behaviours that more adequately encourage the child to feel confident about their ability to master their sport and to relate effectively with their coaches.

Although it is desirable to maximize all aspects of the parent-child relationship, very few researchers in sport have adopted such an integrated view of the study of parenting practices. Even considering theoretical frameworks to support their studies, most researchers include only a limited subset of parenting constructs and many still use regression-based statistical techniques that estimate the unique contribution of each predictor rather than

assessing a more holistic view of the parenting processes. SEM allows testing simultaneous pathways of relationships and this approach can be used to put theoretical models to empirical test. In fact, until now there were no studies that tested the conceptual relationships of a model of parental involvement in its entirety; the present paper tests one such model in full.

Limitations and future research

This paper has a number of limitations. First, due to the cross sectional design of the study, causality between variables cannot be established. Second, because participants were from a western European country and the sample consisted mainly of athletes from two-parent middle-class families, the results are not generalizable to athletes with different family structures (e.g., single-parent). Third, the present study did not consider bidirectional effects between parents and children's attributes. The relevance of this issue has been demonstrated by Dorsch et al. (2009) who reported that children are not only influenced by parents, but also elicit certain thoughts, feelings and actions in parents. Fourth, due to the need to develop brief scales for sport, the indicators of involvement measured in this study were not exhaustive. Further studies should endeavor to provide a more comprehensive assessment of the reported and perceived parental involvement behaviours in sport. Fifth, questionnaires were distributed either before or after training sessions depending on participants' availability and without control regarding which participants' data were collected before and after training. Consequently, it is not possible to determine whether results may differ, depending on the timing of data collection. Future studies should consider the standardization of data collection procedures. Sixth, the parental involvement model in sport is dynamic in nature (Teques & Serpa, 2013; Walker et al., 2005). Thus, children's sport-related cognitions, emotions, and behaviours, as well as the beliefs, expectations, and other behaviours of their parents (e.g., recrimination, criticism), could be studied under the scope of the parental involvement in sport model. Seventh, potential antecedents of parents' behaviours should be considered. To

illustrate, Dorsch et al. (2016) evidenced that parental warmth, positive affect, and mastery climate were positively associated with support, whereas conflict, negative affect, and ego climate were positively associated with pressure from both fathers and mothers. Conflict and positive affect were positively associated with support and pressure in some functions, suggesting complexity in interpretations of parent involvement. For example, conflict was positively associated with both support and pressure in fathers' self-reports while positive affect was positively associated with both support and pressure in mothers' reports of fathers' behaviours. Finally, studies using the same design and conducted in different cultures have identified a distinct pattern of parental involvement in sport (cf., Moraes, Rabelo, & Salmela, 2004; Wolfenden & Holt, 2005). It would be helpful to extend the study to culturally diverse demographic regions that are likely to promote different parental involvement practices.

In conclusion, athletes' perceptions of parents' behaviours mediate the relationship between parents' reported behaviours and athletes' psychological variables. Further, parental encouragement emerged as a pivotal variable indicating mediation effects with children's self-efficacy, social self-efficacy, intrinsic motivation, and self-regulation. Also, perceived parental reinforcement was a critical factor for children's intrinsic motivation. Although parental modelling was positively associated with self-efficacy and social efficacy with coaches, athletes' perceptions of technical instruction from their parents were negatively associated with athletes' self-efficacy beliefs in interacting interactions with their coaches. Finally, this is one of the first studies to test empirically a full theoretical framework of parental involvement, providing a comprehensive view of the relationships between parental behaviours and children's psychological attributes in sport.

Note

1. This investigation is a part of a larger project, data from which partially has been published in a previous manuscript (Teques, Serpa, Rosado, & Calmeiro, 2015). The reader should note that parents of Study 1 ($n = 386$) of the current paper were integrated in the data of the first study of other submission ($n = 206$ of $n = 386$). Parents of Study 2 ($n = 754$) of the current paper were integrated in the data of the second study of the other submission ($n = 280$ of $n = 754$). However, the present manuscript evaluates different constructs of Teques et al. (2015). In fact, it is related to the same model, but this manuscript focuses the variables of the second, third and fourth levels and the other emphasized the first level.

Compliance with Ethical Standards

Conflict of Interest. The authors declare that they have no conflict of interest.

Ethical Approval. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent. Informed consent was obtained from all individual participants included in the study.

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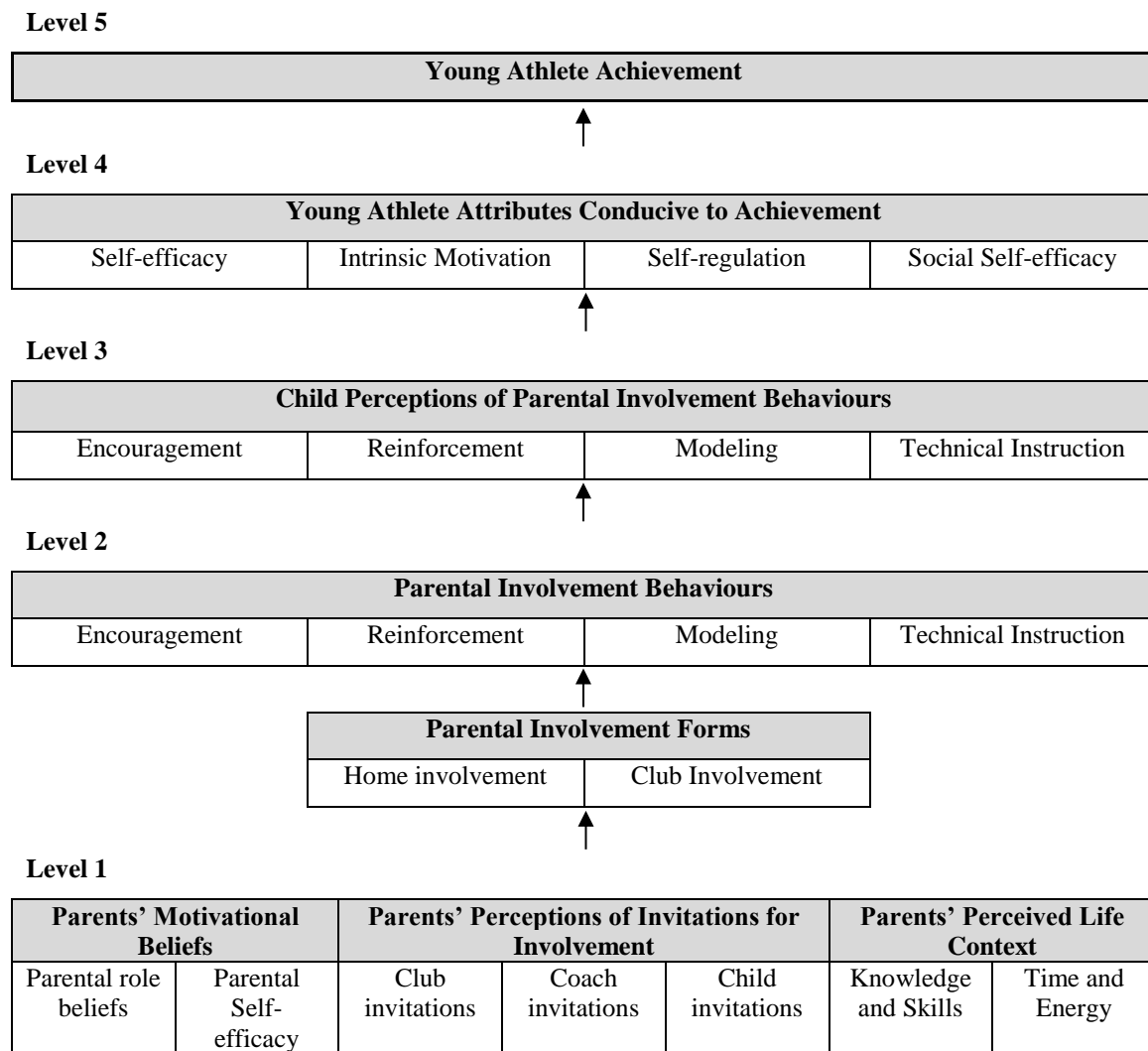


Figure 1. Model of parental involvement in sport (Teques & Serpa, 2009, 2013). Adapted from Hoover-Dempsey and colleagues (Walker et al., 2005).

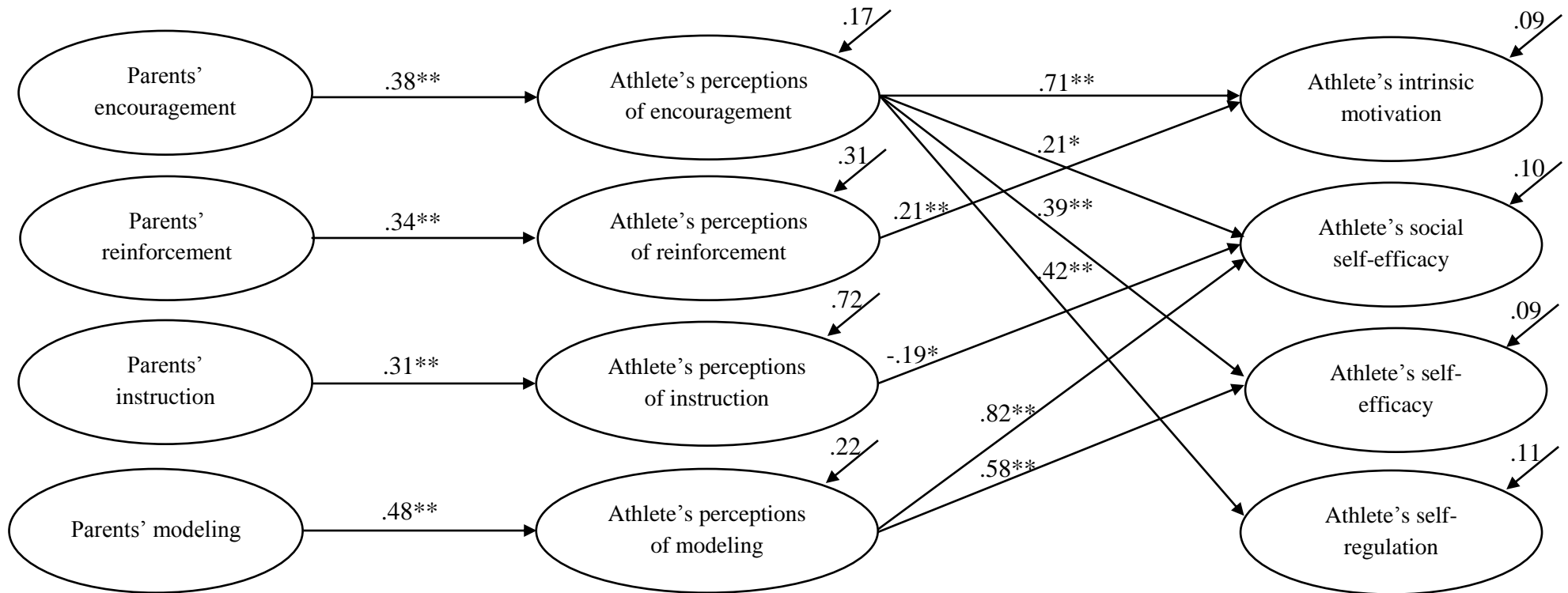


Figure 2. The revised model of interrelationships between parents reported behaviors, athletes' perceptions of parents' behaviors, and athletes' psychological variables conducive to achievement in sport. Note. * $p < .05$, ** $p < .01$. All variances were significant ($p < .001$). For visual simplicity, deleted paths are not presented, but all were not significant ($p > .05$).

Table 1

Regression weights (B), standard errors (SE), standardized regression weights (β), and squared multiple correlations (R^2) for the items of the dimensions included in the model of parental involvement in sport.

Variable	Items	B	SE	β	R^2
PRB					
<i>Encouragement: I encourage this child...</i>					
PRB1	to strive in practices and competitions	1.00	–	0.86	.73
PRB2	to believe that he/she can do well in (...)	1.06	0.25	0.89	.79
PRB3	to stick with problems until he/she solves it	1.09	0.23	0.86	.73
PRB4	to believe that he/she can learn new things (...)	1.08	0.15	0.87	.74
<i>Reinforcement: I show this child we like it when he/she...</i>					
PRB5	gives maximum effort in practices (...)	1.00	–	0.92	.84
PRB6	has a good attitude in practices and competitions	.88	0.13	0.90	.82
PRB7	has a good performance*	.89	0.12	0.86	.74
PRB8	has fair play during practices and competitions*	.85	0.17	0.78	.61
<i>Instruction: I tell this child...</i>					
PRB9	instructions during competitions*	1.00	–	0.82	.67
PRB10	how to do things before competitions*	1.16	0.15	0.91	.82
PRB11	how to do to be better*	0.99	0.31	0.87	.76
PRB12	what he/she did wrong or right after (...)*	1.04	0.16	0.79	.63
<i>Modeling: I show to this child that...</i>					
PRB13	I do not give up in face of difficulties	1.00	–	0.82	.67
PRB14	I have aggressive behaviors during (...)*	0.95	0.42	0.77	.58
PRB15	I respect their opponents*	0.82	0.15	0.80	.64
PRB16	I give importance to the effort to achieve (...)	1.12	0.26	0.76	.80
APPB					
<i>Encouragement: The person in my family who accompanied me in my sport encourages me...</i>					
APPB1	to strive in practices and competitions	1.00	–	0.86	.57
APPB2	to believe that I can do well in (...)	1.06	0.25	0.89	.81
APPB3	to stick with my problems until I solves it	1.09	0.23	0.86	.30
APPB4	to believe that I can learn new things (...)	1.08	0.15	0.87	.39
<i>Reinforcement: The person in my family who accompanied me in my sport show me that he/she likes it when I...</i>					
APPB5	give maximum effort in practices (...)	1.00	–	0.73	.54
APPB6	have a good performance*	0.76	0.47	0.61	.51
APPB7	have a good attitude in practices (...)	0.98	0.18	0.74	.56
APPB8	have fair play during practices and competitions	0.97	0.19	0.63	.53
<i>Instruction: The person in my family who accompanied me in my sport tells me...</i>					
APPB9	instructions during competitions*	1.00	–	0.82	.63
APPB10	how to do things before competitions*	1.16	0.15	0.91	.72
APPB11	how to do to be better*	0.99	0.31	0.87	.66
APPB12	what I did wrong or right after (...)*	1.04	0.16	0.79	.46
<i>Modeling: The person in my family who accompanied me in my sport...</i>					
APPB13	do not give up in face of difficulties	1.00	–	0.76	.57
APPB14	have aggressive behaviors during (...)*	0.87	0.14	0.41	.17
APPB15	respect my opponents*	0.94	0.18	0.69	.48
APPB16	give importance to the effort to achieve (...)	1.07	0.08	0.83	.69

Table 1 (continued)

APV					
<i>Intrinsic motivation</i>					
APV1	it is important to me to do things well (...)	1.00	–	0.72	0.51
APV2	I want to learn new things in my sport	1.05	0.12	0.77	0.59
APV3	I give maximum effort when I practice my sport*	1.04	0.10	0.66	0.45
APV4	I want to develop my sport abilities*	1.04	0.09	0.76	0.58
<i>Social Self-efficacy with the Coach</i>					
APV5	I can get along with most of my coaches	1.00	–	0.53	0.28
APV6	I can explain what I think to most of my coaches	1.57	0.28	0.84	0.71
APV7	I can get my coaches to help me if I have (...)	1.47	0.18	0.83	0.69
APV8	I can get my coaches to help me develop (...)*	1.29	0.16	0.72	0.52
<i>Self-efficacy</i>					
APV9	I can do the exercises taught in practices	1.00	–	0.66	0.44
APV10	I can figure out difficult situations that (...)	1.04	0.21	0.71	0.51
APV11	I can study and practice my sport at the (...)*	1.05	0.11	0.73	0.52
APV12	I can develop my sport abilities*	1.08	0.12	0.72	0.53
<i>Self-regulation</i>					
APV13	I try to organize my time to play my sport*	1.00	–	0.74	0.55
APV14	I try to evaluate my self-performance (...)*	1.05	0.32	0.72	0.53
APV15	I try to find advices to help me develop in (...)*	0.94	0.09	0.69	0.48
APV16	I try to correct my mistakes in practices	0.89	0.08	0.71	0.51

Note. *Items suggested by the panel of experts

Table 2

Descriptive statistics, internal reliabilities, squared correlations, convergent and discriminant validity among study variables.

Variable	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>AVE</i>	1	2	3	5	6	7	9	10	11
PRB													
1 Reinforcement	5.02	.92	.91	.75	1.00			–	–	–	–	–	–
2 Encouragement	5.32	.72	.91	.75	.32**	1.00		–	–	–	–	–	–
3 Instruction	3.43	1.44	.90	.72	.18**	.05**	1.00	–	–	–	–	–	–
4 Modelling	4.92	.97	.87	.68	.23**	.20**	.01*	–	–	–	–	–	–
APPB													
5 Reinforcement	3.26	.65	.82	.54	–	–	–	1.00			–	–	–
6 Encouragement	3.18	.61	.79	.52	–	–	–	.20**	1.00		–	–	–
7 Instruction	2.79	.86	.86	.62	–	–	–	.12**	.21**	1.00	–	–	–
8 Modelling	3.41	.55	.80	.59	–	–	–	.14**	.23**	.18**	–	–	–
APV													
9 Self-efficacy	3.29	.59	.79	.50	–	–	–	–	–	–	1.00		
10 Social self-efficacy	3.18	.53	.82	.56	–	–	–	–	–	–	.17**	1.00	
11 Intrinsic motivation	3.49	.47	.81	.54	–	–	–	–	–	–	.13**	.23**	1.00
12 Self-regulation	3.30	.53	.81	.52	–	–	–	–	–	–	.17**	.29**	.28**

Note. Within each of the pairs of constructs, squared correlation observed were lower than the AVE values, indicating discriminant validity. PRB = Parent's reported behavior, APPB = Athletes perceptions of parents' behaviors, APV = Athletes psychological variables, CR = Composite reliability, AVE = Average Variance Extracted.

* $p < .05$, ** $p < .01$

Table 3

Fit indexes and test of invariance across the two samples and gender of parents.

Models	$\chi^2(df)$	CFI	TLI	RMSEA (CI _{90%})	$\Delta \chi^2(\Delta df)$	ΔCFI
PRB – Cross validity						
Study 1 (<i>n</i> =380)	295(98)	.957	.948	.074(.065, .084)		
Study 2 (<i>n</i> =754)	429(98)	.964	.956	.067(.061, .074)		
M1: unconstrained	741(196)	.960	.951	.049(.046, .053)		
M2: factor loadings	759(208)	.960	.953	.048(.045, .052)	18(12)	.000
M3: factor covariances	789(218)	.958	.954	.048(.044, .052)	48(22)*	-.002
APPB – Cross validity						
Study 1 (<i>n</i> =266)	174(84)	.950	.937	.064(.050, .077)		
Study 2 (<i>n</i> =438)	212(84)	.960	.950	.059(.049, .069)		
M1: unconstrained	386(168)	.956	.945	.043(.037, .049)		
M2: factor loadings	397(179)	.956	.949	.042(.036, .047)	11(11)	.000
M3: factor covariances	447(189)	.948	.942	.044(.039, .049)	61(21)*	-.008
APV – Cross validity						
Study 1 (<i>n</i> =266)	183(98)	.951	.940	.057(.044, .070)		
Study 2 (<i>n</i> =438)	258(98)	.951	.941	.061(.052, .070)		
M1: unconstrained	442(196)	.951	.940	.042(.037, .048)		
M2: factor loadings	452(208)	.952	.944	.041(.036, .046)	10(12)	.001
M3: factor covariances	466(218)	.951	.946	.040(.035, .045)	25(22)	.000
Parents' gender invariance						
Fathers (<i>n</i> =316)	1858(991)	.904	.895	.053(.049, .056)		
Mothers (<i>n</i> =316)	1855(991)	.909	.900	.053(.049, .057)		
M1: unconstrained	3840(1984)	.900	.898	.039(.037, .040)		
M2: factor loadings	3860(2019)	.900	.898	.038(.036, .040)	20(35)	.000
M3: structural weights	3926(2055)	.899	.894	.038(.036, .040)	85(71)	-.001
M4: factor covariances	3935(2065)	.899	.893	.038(.036, .040)	95(81)	-.001

Note. PRB = Parent's reported behaviors, APPB = Athletes perceptions of parents' behaviors, APV = Athletes psychological variables. * $p \leq .001$, ** $p < .01$.

Table 4

Direct and indirect effects of parents' reported behaviors on athletes' psychological variables via athletes' perceptions of parents' behaviors.

Independent variable	Dependent variable	Direct effect	ENC	Indirect effect		
				REF	INS	MOD
PRB						
Encouragement	Self-efficacy	.17	.15**	–	–	–
	Social self-efficacy	.07	.08*	–	–	–
	Intrinsic motivation	.23* ^a	.27**	–	–	–
	Self-regulation	.20* ^a	.16**	–	–	–
Reinforcement	Self-efficacy	.17	–	.02	–	–
	Social self-efficacy	.16*	–	.03	–	–
	Intrinsic motivation	.44** ^b	–	.13**	–	–
	Self-regulation	.24*	–	.02	–	–
Instruction	Self-efficacy	-.23**	–	–	-.03	–
	Social self-efficacy	-.20** ^a	–	–	-.15*	–
	Intrinsic motivation	-.26**	–	–	-.02	–
	Self-regulation	-.22**	–	–	-.02	–
Modeling	Self-efficacy	.24** ^a	–	–	–	.28**
	Social self-efficacy	.15** ^a	–	–	–	.39**
	Intrinsic motivation	.05	–	–	–	.02
	Self-regulation	.01	–	–	–	.01

Note. * $p < .05$, ** $p < .01$. ^aWith the inclusion of the mediator, direct effect is nullified (full mediation). ^bWith the inclusion of the mediator, direct effect is significantly lowered, but significantly different from zero (partial mediation), as advocated by Baron and Kenny (1986). PRB = Parents reported behaviors, REF = Athletes perceptions of reinforcement, ENC = Athletes perceptions of encouragement, INS = Athletes perceptions of instruction, MOD = Athletes perceptions of modelling.