

Examining motivational correlates of mental toughness in Spanish athletes

Examinando correlatos motivacionales de la dureza mental en deportistas españoles

Examinando correlatos motivacionais de resistência mental em atletas espanhóis

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Abstract: Based on Self Determination and Achievement Goal theories, in this study we tested the relationship between perceptions of coaches' interpersonal styles, athlete's goal orientations, mental toughness (MT) and future intention of sport practice, as well as self-perception of achievement in sport in a sample of 155 athletes (82 men and 73 women) with a mean age of 22.64 ± 3.91 years, from 13 teams who completed a questionnaire with the variables of interest for the study. Results revealed that athlete's perceptions of autonomy supportive interpersonal style positively predicted task orientation, while athlete's perceptions of controlling interpersonal style positively predicted ego orientation. Additionally, task orientation and self-perception of achievement in sport positively predicted MT, which in turn predicted future intention of sport practice. Results emphasize the importance of having coaches promoting autonomy supportive atmospheres to facilitate the development of MT in athletes.

Key words: Coach interpersonal styles, goal orientations, mental toughness, practice intention.

Resumen: Tomando como marco teórico las teorías motivacionales de la Autodeterminación y de las Metas de logro, en este estudio se examinaron las relaciones entre los estilos interpersonales mostrados por el entrenador, las orientaciones de meta, la dureza mental (DM) y la intención futura de práctica deportiva, así como la autopercepción de rendimiento en el deporte en 155 deportistas (82 hombres y 73 mujeres) con una media de edad de 22.64 ± 3.91 años, procedentes de 13 equipos quienes completaron un cuestionario con las variables de interés. Los resultados revelaron que la percepción de un estilo de apoyo a la autonomía predijo positivamente la

orientación a la tarea, mientras que la percepción de un estilo controlador predijo positivamente la orientación al ego. La orientación a la tarea y la percepción de rendimiento en el deporte predijeron la DM, que a su vez predijo la intención futura de práctica deportiva. Los resultados enfatizan la importancia de utilizar estilos interpersonales de apoyo a la autonomía que faciliten el desarrollo de la DM en los deportistas.

Palabras clave: Estilos interpersonales entrenador, orientaciones de meta, dureza mental, intención futura de práctica.

Resumo: Com base nas teorias de autodeterminação e metas de realização, neste estudo, testamos a relação entre as percepções dos estilos interpessoais dos treinadores, as orientações dos objetivos do atleta, a tenacidade mental (MT) e a intenção futura da prática esportiva, bem como a autopercepção da conquista no esporte em uma amostra de 155 atletas (82 homens e 73 mulheres) com idade média de $22,64 \pm 3,91$ anos, de 13 equipes que completaram um questionário com as variáveis de interesse para o estudo. Os resultados revelaram que as percepções do atleta sobre o estilo interpessoal de apoio à autonomia predisseram positivamente a orientação das tarefas, enquanto as percepções do atleta sobre o controle do estilo interpessoal previam positivamente a orientação do ego. Além disso, a orientação da tarefa e a autopercepção da realização no esporte previam positivamente MT, o que, por sua vez, previu a intenção futura da prática esportiva. Os resultados enfatizam a importância de ter treinadores que promovam a autonomia de ambiente de apoio para facilitar o desenvolvimento de MT em atletas.

Palavras chave: Estilos interpessoais do treinador, orientações de objetivos, tenacidade mental, intenção de prática.

In achievement contexts (i.e., academic, business and sport) people have to face challenges that test self-resources. Many times, the difference between success and failure due to maintaining striving, handling failure and pressure (surviving) and live those experiences with high levels of vitality and an open mind (thriving) (Mahoney, Ntoumanis, Mallett, & Gucciardi, 2014). For example, a good varsity athlete has to do his/her best in studies too. Some people experience this like a challenge; and others like a *nightmare*, eventually, breaking their will. A personal

resource to face those situations is called *mental toughness* (MT). MT is 'a personal capacity to deliver high performance on a regular basis despite varying degrees of situational demands' (Gucciardi & Hanton, 2016, p. 442), and has been identified by researchers as one of the main factors that contributes to peak performance in sports (Anthony, Gucciardi, & Gordon, 2016; Gould, Dieffenbach, & Moffett, 2002). Literature suggested that elite athletes are more mentally tough than non-elite athletes (for a review see Crust, 2007) and that competitive experience could be an important factor in the development of MT among athletes (Connaughton, Wadey, Hanton, & Jones, 2008). Furthermore, previous research indicated that males reported higher levels of MT than females (Gerber et al., 2012;

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Nicholls, Polman, Levy, & Backhouse, 2009), although in other studies these differences were not manifest (e.g., Crust, 2009).

To date, researchers have tended to focus on defining and describing MT (for more detail see Mahoney, Ntoumanis et al., 2014), however currently the main interest of researchers is centered in how MT is developed, and the context in which MT is enhanced (e.g., Anthony et al., 2016; Gucciardi, Jackson, Hanton, & Reid, 2015). Literature pointed out the importance of understanding how athletes interact with their social environment throughout well-established motivational theories (Anthony et al., 2016; Gucciardi, 2010; Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015; Mahoney, Ntoumanis et al., 2014; Mahoney, Gucciardi, Ntoumanis, & Mallet, 2014). Self-determination theory (SDT; Deci & Ryan, 2002) and achievement goal theory (AGT; Ames, 1992; Nicholls, 1989) provides a conceptual lens by which to study the motivational antecedents of MT (Gucciardi, 2010; Gucciardi et al., 2015; Mahoney, Ntoumanis et al., 2014). These two contemporary theories of motivation identify key dimensions of coach behaviors and the motivational mechanism by which these dimensions impact how athletes think, feel, and act.

SDT (Deci & Ryan, 2002) is a macro theory of human motivation that describes the effects of social contexts on athletes' motivation. SDT distinguished two dimensions of coaches' behaviors, the autonomy supportive and controlling features of their interpersonal style. *Autonomy supportive* coaches try to take the athlete's perspective, acknowledge athletes' thoughts and feelings, provide pertinent information and opportunities for choice and minimize the use of pressures and demands to control others (Mageau & Vallerand, 2003). This interactive style will lead to positive affective, cognitive and behavioral responses (Deci & Ryan, 2000), such as autonomous motivation, enjoyment, MT and athletes' intention to continue the sport in the future (e.g., Álvarez, Balaguer, Castillo, & Duda, 2012; Amorose & Anderson-Butcher, 2015). Conversely, coaches using a *controlling* interpersonal style pressure athletes to act, think and feel in a manner consistent with the needs and wants of the coaches, use rewards to manipulate athletes behaviors, and intimidate when interacting with athletes (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). It is assumed that this interpersonal style will lead athletes to exhibit negative and maladaptive outcomes (Deci & Ryan, 2000), such as more controlled reasons for participating in sport, burnout and dropping out of sport (e.g., Amorose & Anderson-Butcher, 2015; Balaguer et al., 2012; Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). In accordance with previous researches (e.g., Balaguer et al., 2012; Smith, Ntoumanis, & Duda, 2010) and in order to have a more complete understanding of coaches' behaviors, it is important to consider both social environmental di-

mensions (controlling versus autonomy-supportive behaviors) when we study how the coach-created social context influences the experiences of athletes.

AGT (Ames, 1992; Nicholls, 1989) centers on the variability in the degree to which individuals tend to judge their competence and define success and its impact in how they interpret and respond to achievement-related activities. Athletes with a predominant mastery or *task orientation* tend to judge their competence with respect to personal improvement and hard work, trying to develop mastery at the task. In contrast, athletes with a predominant performance or *ego orientation* tend to define success using normative criteria (comparing with others), and thus feelings of competence are derived from the demonstration of superior ability over others. AGT suggests that task-oriented athletes have the most adaptive responses (e.g., persistence, enjoyment) and that athletes that are ego-oriented are most likely to exhibit maladaptive responses (e.g., burnout and drop-out of participation). And research has confirmed the benefits of being task oriented and the negative effects of being ego oriented. In general, task orientation is associated with positive outcomes such as perceived competence, behavioral persistence, whereas ego orientation is associated with negative outcomes such as ill-being and dropping out of an activity (e.g., Elliot, Cury, Fryer, & Huguet, 2006; Lemyre, Roberts, & Stray-Gundersen, 2007; Smith, Balaguer, Duda, 2006).

Although task and ego orientations are orthogonal in nature (i.e., an athlete can be high or low in either or both orientations at the same time), athletes that are high ego-oriented manage worse frustration in competitive situations, perceptions of low competence, defeats and setbacks in competition (Duda, 2001, 2007). Moreover, while task orientation was negatively associated with thoughts of escape a positive association was found between ego orientation and athletes' thoughts about escaping from the competitive situation when their perceived competence was low (Hatzigeorgiadis & Biddle, 1999). Because of this, many times athletes high in an ego orientation prefer to compete against lesser competition to guarantee chances of success (Duda, 2001, 2007). In sum, high task-oriented athletes manage setbacks better and could display greater MT.

The social context plays a key role in the motivation process (Ames, 1992; Nicholls, 1989). To be ego or task-oriented is the result of socialization through task or ego-involving achievement contexts. Athletes perceive the degree to which task and ego criteria are salient within the sport context, and his or her interpretation of their experiences influence the degree to which a task-involving or ego-involving climate is perceived as relevant. An ego climate is created when the athlete perceives that the criteria of success is other-referenced and ego-involving, and the demonstration of normative ability is valued, whereas a task climate is created when is valued the demonstration of mastery and learning and the criteria of success are self-referenced and

task-involving (Ames, 1992).

Some researchers have integrated SDT and AGT theories (e.g., Duda, Appleton, Stebbings, & Balaguer, 2017), showing that environments that support athlete's autonomy are related to mastery or task goals, whereas a controlling interpersonal style is associated with performance goals or social comparisons (ego goals) as a motivational strategy. Social contexts which reinforce mastery approaches, self-reference, intrinsic motivation, and effort as a way to success in sport, with providing autonomy supportive environments, produces more adaptive athletes (such as higher levels of vitality, enjoyment, persistence and future intention of practice) (Duda et al., 2017). Contrarily, contexts that reinforce results, normative reference, extrinsic motivation, with controlling interpersonal styles of significant others, encourages 'maladaptive' participants (such as higher levels of boredom, heightened anxiety and dropout) (Duda, 2013).

Evidence from research on MT appears to align with SDT and AGT theories. Specifically, Mahoney and colleagues (Mahoney, Ntoumanis et al., 2014; Mahoney, Gucciardi et al., 2014) have illustrated how autonomy-supportive environments contribute to the development of MT through the satisfaction of psychological needs, and contrarily, controlling environments inhibit MT development by thwarting psychological needs. Gucciardi and colleagues (Gucciardi, Gordon, Dimmock, & Mallett, 2009) proposed that coaches that promote mastery were more likely to facilitate MT, whereas coaches that emphasize ego involvement were more likely to thwart MT development. On the other hand, Gucciardi (2010) carried out research exploring relationships between MT, achievement goals and sport motivation in youth Australian footballers by a cluster analysis distinguishing between moderate MT and high MT. He concluded that the high MT group showed higher levels of both approach goals (mastery and performance) compared to moderate MT group.

Another important variable that appears to be linked with the development of MT is self-beliefs (e.g., Gucciardi & Gordon, 2008; Hays, 2012). Several researches support the use of strategies such as modelling/watching others, the use of video clips and self-performance analysis to facilitate this development and/or enhance mental toughness. For example, Connaughton et al (2008) suggested that watching elite athletes and seeing how they trained and completed skills provided athletes with the belief that they could achieve this level of performance. Gucciardi and Gordon (2008) asked Australian football coaches to identify key characteristics related to MT in descending order. Coaches positioned self-beliefs as the most important construct to build MT. So probably, the belief of positive performances can help athletes maintain confidence to perform well during competition and in turn to enhance mental toughness.

After a literature review, research studies linking SDT perceived motivational climates, AGT goal orientations, MT and intention to continue participation do not appears to be a void in the literature. Thus, the aims of the current study were to explore how motivational variables detailed in athlete's perception of coaches' autonomy support vs controlling interpersonal style and athletes' task and ego goal orientations relate to athletes MT, and how MT is influenced by sport performance. We also explored athletes' future intention of continuing playing sport as a potential outcome of MT (see Figure 1). In particular, we propose that athletes' perception of autonomy supportive interpersonal style created by the coach will facilitate MT through task orientation that, in turn, results in adaptive athlete outcome (i.e., intention to continue playing sport). Whereas athletes' perception of controlling style, may lead to the forestallment of MT through ego orientation. Further, athletes who perceived higher levels of subjective sport performance would report higher levels of MT. Based on the MT literature, we predicted that elite athletes would be associated with higher levels of MT, and that males would report higher MT scores than females.

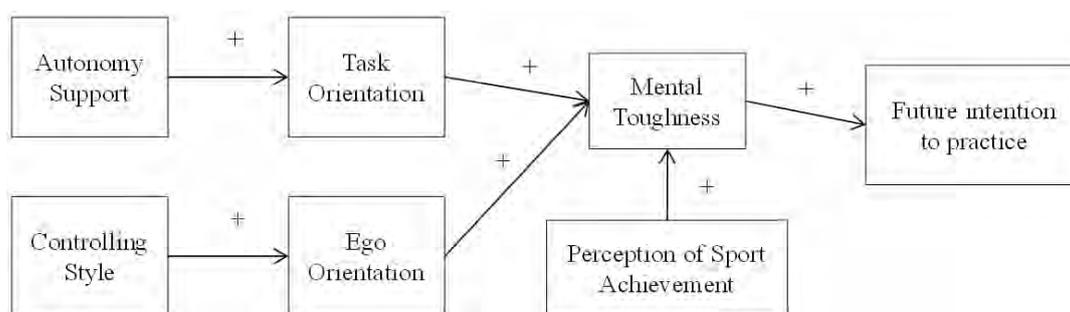


Figure 1. Hypothesized path model of motivational antecedents and outcome of mental toughness.

Method

Participants

Participants were 155 athletes, including 82 male (14 elite & 68 non-elite) and 73 female (48 elite & 25 non-elite) ranging from 18 to 36 years of age ($M_{age} = 22.64$, $SD = 3.91$), recruited from 13 teams registered in the Valencian Community Federation, from different sports such as handball, volleyball, soccer indoor, basketball, rugby and soccer. On average, athletes had a mean of 10.88 years of experience ($SD = 5.63$), and had worked with their current coach and average of 2.22 years ($SD = 1.66$). The participants competed at international ($n = 33$), national ($n = 49$), state ($n = 40$), and local club ($n = 33$) tournament levels. To be considered an elite athlete, participants had to be a medal winner in a national competition or had to compete at an international level (Falco et al., 2009). Participants completed an informed consent form prior to study participation.

Instruments

The Sport Climate Questionnaire (SCQ; <http://www.psych.rochester.edu/SDT/>) in its Spanish short version (Balaguer, Castillo, Duda, & Tomás, 2009) was used to assess players' perceptions of autonomy support provided by their coaches. The scale is composed of six items, each one starting with the phrase: "On my sport team..." and the responses are rated on a 7-point Likert scale ranging from 1 (not at all true) to 7 (very true). An example item is "my coach answers my questions fully and carefully".

The Spanish version (Castillo et al., 2014) of the Controlling Coach Behaviors Scale (CCBS; Bartholomew et al., 2010) was used to assess players' perceptions of the coach controlling style. The scale has 15 items divided into four sub-dimensions (controlling use of rewards, conditional regard, intimidation, and excessive personal control). Each item starts with the phrase: "On my sport team..." and the responses are rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is "my coach tries to motivate me by promising to reward me if I do well". For the present study a composite scale score of the coach controlling interpersonal style was created.

The Spanish version (Balaguer, Castillo, & Tomás, 1996) of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989) was used to assess athlete's degree of task and ego orientation. The scale has 13 items divided into two scales assessing a task (7 items) and ego (6 items) orientation. When completing the instrument, the athletes were requested to think of when they felt most successful in their sport and then indicate their agreement with items reflecting task-oriented (e.g., "I feel successful in sport when I work really hard") or ego-oriented (e.g., "I feel successful in sport when the others can't do as well as me"). Responses

are indicated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

The Mental Toughness Index (MTI; Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015) was translated into Spanish to measure athletes' mental toughness. This index is an eight-item scale representing eight facets of mental toughness. Athletes respond to each item on a 7-point scale (1 = false, 100% of the time and 7 = true, 100% of the time). An example item is "I am able to regulate my focus when performing tasks". The English version of the MTI was translated to Spanish following the back-translation procedure (e.g., Hambleton & Kanjee, 1995).

Intention of being physically active in the future was assessed using the Spanish version (Balaguer, Castillo, Duda, Queded, & Morales, 2011) of the future intention of practice scale (Chatzisarantis, Biddle, & Meek, 1997). Players were asked to respond to three items designed to tap the degree to which they intended to continue playing sport in the future (e.g., "I plan to play sport next season"). Responses are indicated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree).

The subjective perception of sport performance was measured with the single item 'In general, you think your performance in sport is... 1) excellent; 2) very good; 3) good; 4) fair; 5) poor. It has been shown that single-item measures have comparable or equal predictive validity compared to multiple-item measures for constructs in psychological research (Gardner, Cum-mings, Dunham, & Pierce, 1998).

Procedure

After obtaining approval for the human subjects protocol from the university institutional review board, permission from the different clubs and coaches selected by convenience was obtained prior to the administration of the questionnaires. The purpose of the study was explained to the coach and all players at to the practice session agreed to participate. Data collection occurred at coaches' convenience during a 15-minute interval at the beginning or the end of a practice session. Confidentiality was assured and athletes were reminded that there were no right or wrong answers, to take their time responding to questions, and to ask the research assistants any questions regarding the study and the questionnaires.

Data analysis

All data were examined for missing values and univariate outliers in order to meet the assumptions of normality, homoscedasticity and linearity. Descriptive statistics and inter-correlations were computed for all measures assessed. Internal consistency of the instruments was examined using Cronbach's alpha coefficients. MANOVA were conducted to

examine the effect of gender and level of competition on the study variables. A comparison between the elite and non elite correlations was examined by computing Fisher's r to z transformation for comparison across variables. This is recommended when the correlations are conducted on the same variables by two different groups, and if both correlations are found to be statistically significant (Steiger, 1980).

On account of the number of parameters in the proposed model (Figure 1), mean scores were used as indicators of the targeted variables and a path model was tested. To determine the fit of the model, we considered different indices of fit that included chi-square, the non-normative fit index (NNFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Values of CFI and NNFI higher than 0.90 indicate an acceptable fit (23). For RMSEA and SRMR, values between 0.05 and 0.10 are considered acceptable, equal to or lower than 0.08 is optimal. Seven observable variables were included in the model: (a) perceived coach autonomy supportive style, (b) perceived coach controlling style, (c) task orientation, (d) ego orientation, (e) MT, (f) future intention, and (g) sport

performance. Data analysis used SPSS version 20 and LISREL 8.80.

Results

Means, standard deviations and Cronbach's alpha for entire sample are presented in Table 1. Athletes' responses showed that values for perceptions of the coach's autonomy support, task orientation, MT, future intention to play sport and sport performance were above the mean value of the questionnaire, while perceptions of the coach's controlling style and ego orientation were under the mean value. The Cronbach internal reliability coefficients for all the study variables were satisfactory (alpha range = 0.83-0.91).

Theoretically consistent relations were present between social environments and psychological variables. In particular, positive correlations were observed between perceptions of coach-autonomy support, task orientation and MT, as well as between coach-controlling style and ego orientation. Further, task orientation and future intention to play sport were positively associated, as well as MT and future intention to continue playing sport (see Table 1).

Table 1. Descriptive statistics, reliabilities and correlations between study variables.

Variables	Mean	SD	Alpha	1	2	3	4	5	6
1. Autonomy support	5.10	1.16	.91	1					
2. Controlling style	2.46	1.02	.89	-.28**	1				
3. Task orientation	5.84	0.87	.83	.45**	-.24**	1			
4. Ego orientation	3.33	1.38	.83	-.14	.27**	.02	1		
5. Mental toughness	5.48	0.86	.86	.30**	.01	.43**	.06	1	
6. Future intention	5.99	1.38	.89	.12	-.08	.30**	-.01	.20*	1
7. Sport performance	3.71	0.68	(*)	.13	.05	.03	.01	.42**	-.01

Note. Range = 1-7, except for Sport performance = 1-5. (*) = A single item variable. ** $p < .01$, * $p < .05$.

The MANOVA analysis resulted in a non-significant multivariate gender x level of competition interaction effect (Pillai's Trace = .04, $F_{7,142} = .85$, $p = .550$, $\eta^2 = .04$) and non-level differences among the participants (Pillai's Trace = .09, $F_{7,142} = 1.99$, $p = .06$, $\eta^2 = .09$). Results showed significant gender differences (Pillai's Trace = .16, $F_{7,142} = 3.97$, $p = .001$, $\eta^2 = .16$). Univariate t -test indicated that men scored higher in perceptions of controlling style created by the coach ($M_{men} = 2.70$ vs $M_{women} = 2.21$, $p < .01$) than women. Whereas, women scored higher in perceptions of autonomy support style ($M_{men} = 4.97$ vs $M_{women} = 5.21$, $p < .05$) and task orientation ($M_{men} = 5.56$ vs $M_{women} = 6.14$, $p < .01$)

than men. Men and women were not found to report significant differences in MT ($p > .05$).

In order to examine whether variables inter-correlations were a function of level of competition, we tested the significance of the correlations between categories using Fisher's z transformation (see Table 2). Results showed that the correlation between ego orientation and MT was significantly different between levels of competition ($z = 2.01$, $p < .05$). Nevertheless, the correlation coefficient values (non elite = .19; elite = -.14) were no significant. Therefore, the total sample was used in subsequent analyses.

Table 2. Statistical significance test on correlation coefficients between categories (Fisher's z).

Variables Correlations	Non Elite (n = 93)	Elite (n = 62)	z
	Correlation	Correlation	
Autonomy Support – Task Orientation	.45**	.48**	-.23
Controlling Style – Ego Orientation	.35**	.12	1.46
Task Orientation – Mental Toughness	.45**	.39**	.43
Ego Orientation – Mental Toughness	.19	-.14	2.01*
Mental Toughness – Future Intention	.16	.24*	-.50
Sport Performance – Mental Toughness	.36**	.50**	-1.03

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

The fit statistics for the hypothesized model indicated an acceptable fit to the data, $\chi^2(12) = 20.49$, $p < .001$, CFI = .943, NNFI = .90, SRMR = .045, RMSEA = .07, 90% CI [.00, .09]. Direct path coefficients from autonomy support to task orientation, from task orientation to MT, and from controlling style to ego orientation were significant. Perception of sport performance was directly related to MT and MT to future intention to practice (see Figure 2). The total indirect effect from autonomy support to MT via task orientation was significant (standardized indirect effect estimate = .18, $p < .01$).

The total indirect effect from autonomy support to future intention via task orientation and MT was also significant (standardized indirect effect estimate = .04, $p < .05$). The specific indirect effects of perception of sport performance to future intention to practice via MT was significant (standardized indirect effect estimate = .09, $p < .05$), thereby supporting our expectation that sport performance would exert some of its influence on future intention to practice through MT.

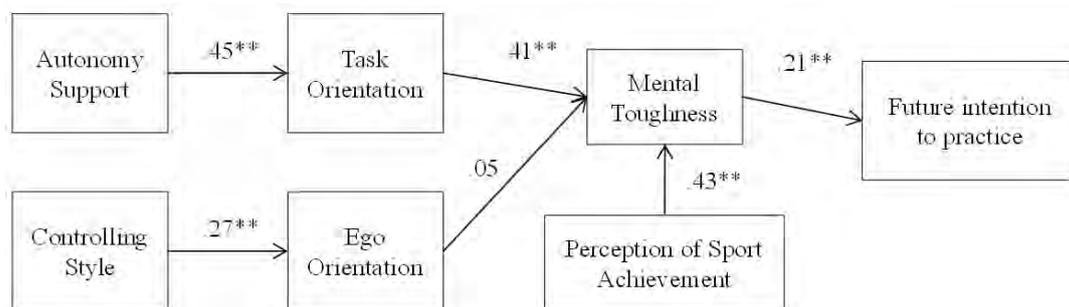


Figure 2. Standardized solution for the path model of motivational antecedents and outcome of mental toughness. ** $p < .01$.

Discussion

Extending the literature and based on SDT and AGT theoretical frameworks, the aim of the current study was to explore relationships between athlete's perception of coaches' autonomy support vs controlling interpersonal style and athletes' task and ego goal orientations related to athletes' MT, and the influence of sport performance on MT. Finally this study explored MT as a predictor of athletes' intention to continue the sport in the future.

Mahoney, Ntoumanis et al. (2014) proposed that autonomy-supportive environments might contribute to the development of MT and that controlling environments could undermine MT development. Indeed, they suggested that this might occur through the satisfaction or thwarting of psychological needs (i.e., competence, autonomy and relatedness). The present study indicated that this can also occur

through athletes' self-perceptions of competence and personal definitions of success. Results indicated that those athletes who perceived that their coaches interacted with them using autonomy supportive behaviors tended to be task-oriented and in turn displayed high levels of mental toughness. Whereas, those athletes who perceived that their coaches behaves in a controlling manner, tended to be ego-oriented and this was not related to MT. These results are in line with the theorizing of Deci and Ryan (2000) who suggested that the social context (e.g., coaches' interpersonal style) has important implications for athletes' functioning. Through the creation of a more autonomy supporting strategies and the avoidance of controlling behaviors, coaches can potentially have a wider impact on the development of MT.

With respect to the correlation between goal orientations and MT, the correlation was positive between task orientation and MT and was non-significant between ego orientation and MT.

tation and MT. This result reinforces the importance of motivational orientation to get higher levels of MT. Task-oriented athletes are more likely to persist in the face of difficulty, to select challenging tasks and be more motivated in the process of development. These factors allow athletes to become more confident and stable (Roberts, 2012).

The results of the present study did not support the assertion that athletes of higher competitive levels are more mentally tough (e.g., Crust, 2007; Gucciardi & Hanton, 2016) as elite and non-elite athletes did not differ in their reported levels of MT. Our results are incompatible with this assumption and indicated that MT was positively correlated with perception of sport achievement but not contributes to discriminate between competitive levels, that is, the higher perception of sport achievement, the higher MT will be. Our findings, along with previous results (Golby & Sheard, 2004; Nicholls et al., 2009), suggest that other factors like technical skill, psycho-social attributes, predict competitive level more accurately and that MT is not an exclusive characteristics of elite athletes. With respect to gender, our results showed non-significant differences between males and females in MT. This result support previous studies in which no differences occurred between male and female athletes (Crust, 2009), supporting the assumption that being mentally tough is considered a positive attribute both for male and female

In summary, our findings confirm that autonomy-supportive and controlling coaching interpersonal styles are predictors of athletes' goal orientations, and that athletes that are task oriented score higher in MT and report stronger intentions to continue being physically active in the future. The data support, and confirm previous research, indicating that coaches play an important role in shaping the cognitions and experiences of athletes. So it is important that coaching education programs work to help coaches increase the use of autonomy-supportive behaviors and decrease the use of controlling behaviors if we want to promote positive athlete outcomes. An example of theoretically grounded coach education training program is Empowering Coaching™, which was designed to create a sporting environment which was more positive and adaptive for young children (for more detail, see Duda et al., 2013). This program pulls from both the AGT and SDT theories and related research suggesting that if we want to sustain and optimize engagement in sports we have to take into account the key dimensions of the social psychological environments created by significant other such as coaches (see Duda, 2013).

A limitation of the present study is that the information is obtained through self-reported measures, so future studies could try to include the use of objective measures like observational measures of the coach interpersonal styles. Furthermore, due to the cross-sectional nature of the study design, we cannot make causal inferences so that caution must be used in the interpretation of the observed associations.

Conclusion

The present study provides support for a model of the environmental social effects on goal orientations, MT and behavioral intentions of elite and non-elite athletes. These motivational variables (interpersonal styles and goals orientations) explain MT and behavioral intentions, and contribute to the understanding of the processes of considering MT expressing motivated actions. These results suggest that an important and crucial factor in facilitating athletes' goal orientation, MT and intention to continue sport activities is the coaches' interpersonal style. Coaches therefore can adopt an appropriate interpersonal style by providing appropriate behaviors and feedbacks to enhance goal orientation, to promote MT and in turn enhance the intentions to continue playing sports in future.

Although many factors (personal, social, ambient) may impact athletes' MT (for a review see Weinberg, Freysinger, Melliano, & Breokhouse, 2016), the coach-athlete relationship could be one of the most important influences on athletes' motivation, MT and subsequent behavioral intentions. Several authors such as Jowett and Poczwadowski (2007) have stressed the importance of building an effective coach-athlete relationship due to the effect that the quality of this relationship has on the athletes' experience that in turn may enhance their intention to continue being physically active.

Practical applications

Our research provides several practical implications. First, coaches have to exhibit behaviors of autonomy support. That is, provide athletes with opportunities to choice in their sport practices, recognizing athletes' needs and feelings. For example, in the design of a workout session, the coach would offer two equivalent alternatives to develop some of the drills, given athletes the opportunity to choose the way they develop this exercise. Another good coach practice consists in have chats periodically with athletes talking about athlete's point of view about his/her performance, inviting him/her to suggest alternative solutions to improve their performance. Second, coach's feedback has to be focused on process and effort and not in sport results or any normative reference. In this sense, coaches will help athletes to focus in mastery instead of results, which will be better for their MT. Third, when coaches provide positive feedback that enhances athletes' perception of sport achievement, that behavior will improve the athletes' MT. Many times, coaches are focus in instructions to modify some technical or tactical performance; if coaches are not aware to give positive feedback after good performances, it is possible to lose the opportunity to enhance the athlete perception of sport achievement. Therefore, we encourage coaches to balance both types of feedback. We are aware that those recommendations suppose more work in

and out of the court but our research shows some evidence that the results of these coach behaviors will produce more

mental tough athletes with a greater intention to practice their sports.

References

- Alvarez, M. S., Balaguer, I., Castillo, I., Duda, J. L. (2012). The coach-created motivational climate, young athletes' well-being, and intentions to continue participation. *Journal of Clinical Sport Psychology, 6*(2), 166-179. <https://doi.org/10.1123/jcsp.6.2.166>
- Ames, C. (1992). Achievement goals and adaptive motivational patterns: The role of the environment. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.
- Amorose, A. J. & Anderson-Butcher, D. (2015). Exploring the independent and interactive effects of autonomy-supportive and controlling coaching behaviors on adolescent athletes' motivation for sport. *Sport, Exercise, and Performance Psychology, 4*, 206-218. <http://dx.doi.org/10.1037/spy0000038>
- Anthony, R. D., Gucciardi, D. F. & Gordon, S. (2016). A meta-study of qualitative research on mental toughness development. *International Review of Sport and Exercise Psychology*. <http://dx.doi.org/10.1080/1750984X.2016.1146787>
- Balaguer, I., Castillo, I., & Tomás, I. (1996). Análisis de las propiedades psicométricas del Cuestionario de Orientación al Ego y a la Tarea en el Deporte (TEOSQ) en su traducción al castellano. *Psicológica, 17*, 71-81.
- Balaguer, I., Castillo, I., Duda, J. L., & Tomás, I. (2009). Análisis de las propiedades psicométricas de la versión española del Cuestionario de Clima en el Deporte. *Revista de Psicología del Deporte, 18*, 73-83.
- Balaguer, I., Castillo, I., Duda, J. L., Quedsted, E., & Morales, V. (2011). Predictores socio-contextuales y motivacionales de la intención de continuar participando: Un análisis desde la SDT en danza. *Revista Internacional de Ciencias del Deporte, 25*(7), 305-319.
- Balaguer, I., González, L., Fabra, P., Castillo, I., Mercé, J., & Duda, J. L. (2012). Coaches' interpersonal style, basic psychological needs, and the well- and ill-being of young soccer players: A longitudinal analysis. *Journal of Sports Sciences, 30*(15), 1619-1629. <https://doi.org/10.1080/02640414.2012.731517>
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport & Exercise Psychology, 32*(2), 193-216. <https://doi.org/10.1123/jsep.32.2.193>
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin, 37*, 1459-1473. <http://dx.doi.org/10.1177/0146167211413125>
- Castillo, I., Tomás, I., Ntoumanis, N., Bartholomew, K., Duda, J. L., & Balaguer, I. (2014). Psychometric properties of the Spanish version of the Controlling Coach Behaviors Scale in the sport context. *Psicothema, 26*, 409-414. <http://dx.doi.org/10.7334/psicothema2014.76>
- Chatzisarantis, N., Biddle, S., & Meek, G. (1997). A self-determination theory approach to the study of intentions and the intention-behaviour relationship in children's physical activity. *British Journal of Health Psychology, 2*, 343-360. <http://dx.doi.org/10.1111/j.2044-8287.1997.tb00548.x>
- Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: perceptions of elite performers. *Journal of Sport Sciences, 26*, 83-95. <http://dx.doi.org/10.1080/02640410701310958>
- Crust, L. (2007). Mental toughness in sport: A review. *International Journal of Sport and Exercise Psychology, 5*, 270-290. <https://doi.org/10.1080/1612197X.2007.9671836>
- Crust, L. (2009). The relationship between mental toughness and affect intensity. *Personality and Individual Differences, 47*, 959-963. <https://doi.org/10.1016/j.paid.2009.07.023>
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268. http://dx.doi.org/10.1207/S15327965PLI1104_01
- Deci, E. L., & Ryan, R. M. (Eds.) (2002). *Handbook of self-determination research*. Rochester, NY: University Rochester Press.
- Duda, J. L. (1989). Relationship between task and ego orientation and the perceived purpose of sport among high school athletes. *Journal of Sport and Exercise Psychology, 11*(3), 318-335. <https://doi.org/10.1123/jsep.11.3.318>
- Duda, J. L. (2001). Achievement goal research in sport: Pushing the boundaries and clarifying some misunderstandings. In G. C. Roberts (Ed.), *Advances in motivation in sport and exercise*. (pp. 129-182). Champaign, IL: Human Kinetics.
- Duda, J. L. (2007). Motivation in sport settings: A goal perspective approach. In D. Smith & M. Bar-Eli (Eds.), *Essential readings in sport and exercise psychology* (pp. 78-93). Champaign, IL: Human Kinetics.
- Duda, J. L. (2013). The conceptual and empirical foundations of Empowering Coaching™: Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology, 11*, 311-318. <http://dx.doi.org/10.1080/1612197X.2013.839414>
- Duda, J. L., Appleton, P. R., Stebbings, J., & Balaguer, I. (2017). Towards more empowering and less disempowering environments in youth sport: theory to evidence-based practice. In C. J. Knight, C. G. Harwood, & D. Gould (Eds.) *Sport psychology for young athletes* (pp. 81-93). New York, NY: Routledge.
- Duda, J. L., Quedsted, E., Haug, E., Samdal, O., Wold, B., Balaguer, I., Castillo, I., Sarrazin, P., Papaioannou, A., Ronglan, L. T., Hall, H., & Cruz, J. (2013). Promoting Adolescent health through an intervention aimed at improving the quality of their participation in Physical Activity (PAPA): Background to the project and main trial protocol. *International Journal of Sport and Exercise Psychology, 11*(4), 319-327. <http://dx.doi.org/10.1080/1612197X.2013.839413>
- Elliot, A. J., Cury, F., Fryer, J. W., & Huguet, P. (2006). Achievement goals, self-handicapping, and performance attainment: A mediational analysis. *Journal of Sport and Exercise Psychology, 28*(3), 344-361. <https://doi.org/10.1123/jsep.28.3.344>
- Falcó, C., Álvarez, O., Castillo, I., Estevan, I., Martos, J., Mugarra, F., & Iradi, A. (2009). Influence of the distance in a roundhouse kick's execution time and impact force in Taekwondo. *Journal of Biomechanics, 42*, 242-248. <https://doi.org/10.1016/j.jbiomech.2008.10.041>
- Gardner, D. G., Cummings, L. L., Dunham, R. B., & Pierce, J. L. (1998). Single-item versus multiple-item measurement scales: An empirical comparison. *Educational and Psychological Measurement, 58*, 898-915.
- Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Puhse, U., Elliot, C., Holsboer-Trachsler, E., & Brand, S. (2012). Adolescents' exercise and physical activity are associated with mental toughness. *Mental Health and Physical Activity, 5*, 35-42. <https://doi.org/10.1016/j.mhpa.2012.02.004>
- Golby, J., & Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences, 37*, 933-942. <https://doi.org/10.1016/j.paid.2003.10.015>
- Gould D., Dieffenbach K., & Moffett A. (2002) Psychologi-

- cal characteristics and their development in Olympic champion. *Journal of Applied Sport Psychology* 14, 172-204. <https://doi.org/10.1080/10413200290103482>
30. Gucciardi, D. F. (2010). Mental toughness profiles and their relations with achievement goals and sport motivation in adolescent Australian footballers. *Journal of Sports Sciences*, 28(6), 615-625. <http://dx.doi.org/10.1080/02640410903582792>
 31. Gucciardi, D.F., & Gordon, S. (2008). Personal construct psychology and the research interview: the example of mental toughness in sport. *Personal Construct Theory & Practice*, 5, 119-130.
 32. Gucciardi, D.F., Gordon, S., Dimmock, J., & Mallett, C.J. (2009). Understanding the coach's role in the development of mental toughness: Perspectives of elite Australian football coaches. *Journal of Sports Sciences*, 27, 1483-1496. <http://dx.doi.org/10.1080/02640410903150475>
 33. Gucciardi, D.F., Hanton, S., Gordon, S., Mallett, C.J., & Temby, P. (2015). The concept and measurement of mental toughness: Test of dimensionality, nomological network and traitness. *Journal of Personality*, 83, 26-44. <http://dx.doi.org/10.1111/jopy.12079>
 34. Gucciardi, D. F. & Hanton, S. (2016). Mental toughness: Critical reflections and future considerations. In R. Schinke, K. McGannon, & B. Smith (Eds.), *The Routledge International Handbook of Sport Psychology* (pp. 439-448). New York, NY: Routledge.
 35. Gucciardi, D. F., Jackson, B., Hanton, S., & Reid, M. (2015). Motivational correlates of mentally tough behaviours in tennis. *Journal of Science and Medicine in Sport*, 18(1), 67-71. <http://dx.doi.org/10.1016/j.jsams.2013.11.009>
 36. Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. *Sport, Exercise, and Performance Psychology*, 4, 100-112. <http://dx.doi.org/10.1037/spy0000024>
 37. Hambleton, R. K., & Kanjee, A. (1995). Increasing the validity of cross-cultural assessments: Use of improved methods for test adaptations. *European Journal of Psychological Assessment*, 11(3), 147-157. <http://dx.doi.org/10.1027/1015-5759.11.3.147>
 38. Hatzigeorgiadis, A., & Biddle, S. (1999). The effects of goal orientation and perceived competence on cognitive interference during tennis and snooker performance. *Journal of Sport Behavior*, 22(4), 479-501.
 39. Hays, K. F. (2012). The psychology of performance in sport and other domains. In S. Murphy (Ed.), *The Oxford Handbook of Sport and Performance Psychology* (pp. 24-45). New York, NY: Oxford University Press.
 40. Jowett, S., & Poczwadowski, A. (2007). Understanding the coach-athlete relationship. In S. Jowett & D. Lavallee (Eds.), *Social Psychology in Sport* (pp. 3-14). Champaign, IL: Human Kinetics.
 41. Lemyre, P. N., Roberts, G. C., & Stray-Gundersen, J. (2007). Motivation, overtraining, and burnout: can self-determined motivation predict overtraining and burnout in elite athletes? *European Journal of Sport Science*, 7, 115-126. <https://doi.org/10.1080/17461390701302607>
 42. Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904. <http://dx.doi.org/10.1080/0264041031000140374>
 43. Mahoney, J., Ntoumanis, N., Mallett, C., & Gucciardi, D. (2014). The motivational antecedents of the development of mental toughness: a self-determination theory perspective. *International Review of Sport and Exercise Psychology*, 7 (1), 184-197. <http://dx.doi.org/10.1080/1750984X.2014.925951>
 44. Mahoney, J. W., Gucciardi, D. F., Ntoumanis, N., & Mallett, C. J. (2014). Mental toughness in sport: Motivational antecedents and associations with performance and psychological health. *Journal of Sport & Exercise Psychology*, 36, 281-292. <https://doi.org/10.1123/jsep.2013-0260>
 45. Mahoney, J. W., Ntoumanis, N., Gucciardi, D. F., Mallett, C. J., & Stebbings, J. (2016). Implementing an autonomy-supportive intervention to develop mental toughness in adolescent rowers. *Journal of Applied Sport Psychology*, 28 (2), 199-215. <http://dx.doi.org/10.1080/10413200.2015.1101030>
 46. Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
 47. Nicholls, A. R., Polman, R. C. J., Levy, A., & Backhouse, S. H. (2009). Mental toughness in sport: Achievement level, gender, age, experience, and sport type differences. *Personality and Individual Differences*, 47, 73-75. <https://doi.org/10.1016/j.paid.2009.02.006>
 48. Roberts, G. C. (2012). Motivation in sport and exercise from an achievement goal theory perspective: After 30 years, where are we?. In G. C. Roberts & D. C. Treasure (Eds.), *Advances in motivation in sport and exercise* (pp. 5-58). Champaign, IL: Human Kinetics.
 49. Smith, A. L., Balaguer, I., & Duda, J. L. (2006). Goal orientation profile differences on perceived motivational climate, perceived peer relationships, and motivation-related responses of youth athletes. *Journal of Sports Sciences*, 24(12), 1315-1327. <https://doi.org/10.1080/02640410500520427>
 50. Smith, A. L., Ntoumanis, N., & Duda, J. L. (2010). An investigation of coaching behavior, goal motives, and implementation intentions as predictors of well-being in sport. *Journal of Applied Sport Psychology*, 22, 17-33. <http://dx.doi.org/10.1080/10413200903403190>
 51. Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87, 245-251.
 52. Weinberg, R., Freysinger, V., Melliano, K., & Breokhouse, E. (2016). Building mental toughness: Perceptions of sport psychologists. *The Sport Psychologist*, 30, 231-241. <http://dx.doi.org/10.1123/tsp.2015-0090>

