




ORIGINAL ARTICLE

# *Extending the understanding of the impact of conscientiousness on individual soccer performance: examining the mediating role of mental toughness*

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## BACKGROUND

Drawing upon Motowidlo et al.'s theory of individual differences in individual performance, the current study aims to contribute to a better understanding of the relationship between conscientiousness and individual soccer performance, by examining whether mental toughness, posited as a characteristic adaptation, acts as a psychological mechanism underlying this link.

## PARTICIPANTS AND PROCEDURE

Relying upon a concurrent validity design, 130 soccer players completed a survey including the measures of conscientiousness and mental toughness. Participants were also instructed to provide a subjective assessment of their individual soccer performance, by self-rating their physical, technical and tactical performance levels. Their objective performance was also measured as the total amount of minutes each player participated in official games, during the first half-season.

## RESULTS

The findings showed that conscientiousness and mental toughness represent significant and meaningful predictors

of both individual soccer performance measures gathered, i.e. individual soccer subjective and objective performance. As expected, further mediation analyses showed that the influence of conscientiousness on subjective performance is totally indirect, via mental toughness. Still, for the objective performance criterion, only the direct effect of conscientiousness was supported.

## CONCLUSIONS

These findings support the merits of conscientiousness as a valid predictor of human performance across achievement contexts, namely in sports settings and specifically in the domain of soccer. They also suggest that while this personality factor exerts a direct impact on individual soccer objective performance, it seems to play a more distal influence on subjective performance, by enacting individual mental toughness resources. Major theoretical and applied research implications are discussed.

## KEY WORDS

Big Five; conscientiousness; mental toughness; soccer performance; mediation

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## BACKGROUND

Soccer is, undoubtedly, one of the most prominent and engaging sports worldwide. To succeed in a globalised and highly competitive sports environment, professional soccer clubs must effectively select and develop their players' talent to prompt the high and consistent performance levels required for achieving competitive goals (Gledhill et al., 2017; Musculus & Lobinger, 2018). Hence, as happens in other sports contexts, the identification of individual and team performance determinants lies at the cornerstone of soccer clubs' competitive edge and success.

Consistently, recent research in sport psychology has been placing a growing emphasis on the examination of psychological characteristics, particularly of personality individual differences, as potentially meaningful predictors of athletic performance and success across settings of sports achievement, bringing this relevant matter to the agenda, which has remained clearly overlooked in previous decades (Allen et al., 2013; Roberts & Woodman, 2017). Contrasting with pessimism in earlier literature regarding the usefulness of personality measures for predicting valuable sports criteria (Vealey, 2002), more recent findings, relying upon the big five taxonomy and samples from several sports settings, have been encouraging and have shown "that personality has much predictive utility in organised sport and can contribute to the development of applied interventions in various athletic contexts" (Allen et al., 2013, p. 185).

This emphasis on personality and its relevance in athletic success is also emerging in soccer-related research, where initial empirical attempts have been undertaken to uncover the impact of broad big five personality factors and related psychological constructs on players' performance, talent development and competitive success (e.g., Kalinowski et al., 2020; Lenz et al., 2020; Steca et al., 2018).

Despite the contributions of these preliminary efforts, the understanding of the role of personality in soccer performance remains underdeveloped, since extant sports and football literature has been primarily focused on the study of athletic and practice-related determinants, and has often left personality constructs aside (Gledhill et al., 2017; Roberts & Woodman, 2017). Accordingly, several authors, including Allen et al. (2013), have called for more primary research on the relationships between personality dimensions and athletic performance in most sports, such as soccer. As emphasised by these authors, this sort of research and its subsequent meta-analytic integration are essential to allow more accurate effect sizes regarding the validity of personality in predicting sports and exercise outcomes. Likewise, the further study of the psychological mechanisms through which personality impacts athletic performance behaviours and competitive outcomes across sports

settings, particularly in soccer literature, stands as another relevant but unexplored matter (Lenz et al., 2020, constitutes an exception).

The current study aims to address such questions by focusing on the relationship between the personality dimension of conscientiousness and individual soccer performance, further examining the mediating role of mental toughness in this link. To achieve this aim, it builds upon the metatheoretical tenets of the five-factor theory (McCrae & Costa, 1996, 2008; McCrae & Sutin, 2018), which focuses on a high-level causal explanation of how personality traits (i.e. basic tendencies), together with external influences and learning processes, generate characteristic adaptations (i.e., skills, habits, attitudes, social roles and other psychological resources) that, ultimately, affect individual overt behaviour and shape one's objective biography, i.e., cumulative life experience. Furthermore, it also follows Motowidlo et al.'s (1997) theory of individual differences in performance. We draw upon these two theories to build the conceptual framework of this paper, as Motowidlo et al.'s theory of individual differences in performance shares the core assumptions of the five-factor theory (McCrae & Costa, 1996; McCrae & Sutin, 2018) but, specifically, applies these principles to explain the causal mechanisms by which personality traits (i.e. basic tendencies) affect overt performance behaviours. By adopting this conceptual framework, conscientiousness is modelled as a basic tendency, i.e. a fundamental disposition that maps differences between individuals and is posited to indirectly affect performance behaviours, via characteristic adaptations.

This focus on conscientiousness derives from its pivotal status as the most successful big five predictor of human performance across achievement settings, including organisational and academic contexts, as supported by compelling empirical evidence from meta-analytic reviews of a substantial number of primary studies (see Potočnik et al., 2021; Richardson et al., 2012; Salgado, 2017, for reviews).

In line with such evidence and considering that conscientiousness assesses the extent to which individuals are goal-focused, dependable and persistent towards high-performance achievement, it seems plausible that its instrumental role in enacting strong individual performance levels across education and work domains may also occur in sports settings, including soccer. Related findings, albeit limited, point in this direction by showing the positive influence of conscientiousness on several athletic success indicators (Allen et al., 2013; Allen & Laborde, 2014; Roberts & Woodman, 2017, for reviews).

In addition to proposing this beneficial influence of conscientiousness on individual performance in relation to competitive soccer, this study suggests that mental toughness represents a key characteristic adaptation in such an achievement domain, therefore

acting as an intervening psychological mechanism in this relationship. Posited as a set of positive psychological resources instrumental for coping and striving to achieve top performance in challenging and adverse circumstances (e.g. self-confidence, competitiveness and emotional control), mental toughness has been highlighted in the sports literature, mostly over the last two decades, as a crucial determinant of athletic performance (Gucciardi, 2020; Papageorgiou et al., 2018). More recently, its merits for predicting individual performance have also been asserted in other domains of achievement, including academic and work contexts (Lin et al., 2017; McGeown et al., 2016). Interestingly, evidence from both qualitative and quantitative research, mostly from sports settings, has supported the relevant role of mental toughness for enacting and maintaining high performance levels, by reporting its positive impact on several athletes' competitive outcomes (e.g. Cowden, 2017, for a review).

Considering these research developments and following Gucciardi et al. (2015, p. 41) conceptualisation of mental toughness as a "characteristic adaptation, that is, a contextualised expression of dispositional traits that are activated or shaped by contextual or social factors (e.g. motives, values, coping styles, personal strivings, self-beliefs)", the present study proposes that mental toughness, like other characteristic adaptations (e.g., specific knowledge and skills), will contribute to establishing the connection between conscientiousness, as a basic tendency, and soccer athletes' individual performance (McCrae & Costa, 1996; McCrae & Sutin, 2018; Motowidlo et al., 1997). As such, the present study follows Roberts and Woodman's (2017) recommendations to expand the scope of sports performance prediction models through the inclusion of specific psychological constructs beyond the broad big five factors, especially those which have a strong performance-focused theoretical basis, such as mental toughness. To our knowledge, this is the first study to advance and empirically test such a mediation effect of mental toughness on the conscientiousness-performance link, by focusing upon the domain of soccer.

In the following sections, these aspects are further developed along with the review of relevant literature and formulation of hypotheses.

#### CONSCIENTIOUSNESS, MENTAL TOUGHNESS AND INDIVIDUAL SOCCER PERFORMANCE

As previously emphasised, conscientiousness represents a meaningful predictor of individual performance, with validity generalisation across jobs, organisations and academic contexts, as supported by several comprehensive meta-analyses (Potočnik et al., 2021; Richardson et al., 2012; Salgado, 2017). In competitive sports settings, extant empirical evidence

is incomparably less developed. However, prior empirical studies ascribe plausibility to the role of this disposition as a driver of athletic success, by showing that athletes reporting stronger conscientiousness scores tend to rely upon more effective preparation and coping strategies, accomplish stronger long-term performance and often operate at higher competitive levels (Allen et al., 2013; Allen & Laborde, 2014, for reviews). Of the remaining big five, extraversion and mostly emotional stability have also been found to exert a positive influence on some of these outcomes.

Similarly, findings pertaining to this study's specific scope, i.e. personality in competitive soccer, albeit limited, suggest that conscientiousness represents a valid predictor of individual soccer performance outcomes. Specifically, an early study conducted by Piedmont et al. (1999), with a sample of 79 female athletes aged between 18 and 21 years old, reported a positive and sizeable link between conscientiousness and coaches' ratings on different dimensions of soccer performance ( $r = .33, p < .01$ ), e.g. athletic ability, team plainness and work ethic, as well as between this disposition and a set of game performance objective indices ( $r = .30, p < .01$ ), e.g. scores, assists and games played. Meaningful links with both criteria composites were also reported for emotional stability. Notwithstanding, whereas both these personality factors accounted for 23% of the variance in coaches' ratings, only conscientiousness yielded a significant contribution of 8% for the prediction of objective performance. Another soccer-specific study carried out by Ruiz-Barquín and García-Naveira (2013) with a sample of 128 male soccer players aged between 14 and 24 years old from Spanish soccer competitions reported positive, but smaller correlates between some big five factors and game performance, assessed via coach ratings, specifically of  $r = .19 (p < .05)$  for emotional stability,  $r = .18 (p < .05)$  for openness, and  $r = .15 (p < .10)$  for conscientiousness.

More recently, Kalinowski et al. (2020), relying on a sample of 122 young male soccer players from Polish championships, reported a significant contribution of conscientiousness, neuroticism and extraversion to predicting the effectiveness of soccer game performance, measured through players' specific tactical and technical actions (e.g. shots at goal, passes on target). Lastly, a study developed by Steca et al. (2018), with Italian male non-athletes and athletes belonging to different competitive levels of individual and team sports, including soccer, found that levels of athletic involvement and competitive achievement can be effectively distinguished using the big five, since athletes from higher competitive levels also reported stronger scores of conscientiousness, emotional stability and agreeableness. Furthermore, the largest effect size in differentiating between athletes at a high and low competitive level was yielded by conscientiousness.

Overall, these preliminary findings provide support for the usefulness of the big five taxonomy for the prediction of sport and particularly soccer performance outcomes, further suggesting that conscientiousness may represent one of its most important dispositional predictors. This converges with results from other research pertaining to other achievement settings, such as academic and work contexts. As underlined by Allen et al. (2013), athletic success is partly determined by individual capacity, as happens in other human performance domains. But it is also influenced by the willingness to perform, through the display of behavioural patterns and habits of effort and perseverance, which are considered the expression of the core attributes of conscientiousness (Costa & McCrae, 1992). Thus, considering these conceptual and empirical aspects, we anticipate that this factor will emerge as a significant predictor of soccer performance and hypothesise that:

Hypothesis 1: Conscientiousness is positively related to individual soccer performance.

Mental toughness has emerged as one of the most prevalent concepts of positive psychology in the literature (Rusk & Waters, 2013). Under the assumption that it entails a set of positive psychological resources involved in top performance achievement, related research has recently broadened its focus to uncover mental toughness links with academic and work performance, providing encouraging preliminary findings that support its validity in predicting such outcomes (Gucciardi et al., 2015; McGeown et al., 2016). In sports and exercise contexts, mental toughness has received a consistently higher level of interest from both conceptual and empirically focused research (Gucciardi, 2020).

Despite the proliferation of research on mental toughness, particularly over the last two decades, its conceptualisation (trait vs. state-like), dimensionality (unidimensional vs. multidimensional), distinctiveness from related psychological constructs (e.g. hardiness, resilience), and measurement remain part of an ongoing debate (Gucciardi et al., 2015; Papageorgiou et al., 2018). Most previous research has drawn on multidimensional models, particularly the 4Cs model of Clough et al. (2002), which posits this construct as a personality trait akin to psychological hardiness and encompassing the subcomponents of control, commitment, challenge and confidence. However, more recent empirical efforts have challenged its multidimensionality and dispositional nature, pointing towards a unitary, state-like conceptualisation of mental toughness (e.g. Gucciardi et al., 2015).

As previously noted, this latter unidimensional conceptualisation is adopted in the current study, therefore positing this construct as a “state-like psychological resource that is purposeful, flexible and efficient in nature for the enactment and maintenance of goal-directed pursuits” (Gucciardi, 2017,

p. 18). Hence, mental toughness is conceived as a set of psychological resources, implied in successful coping and goal attainment when individuals are facing challenging or stressful circumstances, being: *purposeful*, i.e. characterised by giving direction and energy towards self-referenced goals; *efficient*, i.e. holding congruency between actions and objectives; and *flexible*, enabling adaptation of regulatory processes across stressors and situational demands (Gucciardi, 2017, 2020).

Despite the relevant ongoing debates about the concept, measurement and distinctiveness of this construct, previous qualitative studies, focused on its conceptual span and encompassing attributes, have consistently reported that mental toughness is perceived by elite athletes, coaches and sport psychologists as a key requirement for achieving and sustaining high levels of performance across sports (e.g. Anthony et al., 2016; Jones et al., 2002, 2007), including in soccer (Coulter et al., 2010; Thelwell et al., 2005). Moreover, most findings from prior quantitative research, although more limited and relying on distinct mental toughness conceptualisations, support the positive influence of this construct on sports performance, as it shows an association with greater athletic achievement ranks and several competitive sport performance indices (e.g. Cowden, 2017; Liew et al., 2019, for reviews).

With a particular interest for this study, evidence from soccer settings, albeit particularly scarce, also suggests that players from the highest competitive levels (e.g. elite leagues and national teams) tend to report significantly higher scores of mental toughness in comparison to those competing at a lower level. One of these empirical studies was conducted by Danielsen et al. (2017) with a sample of 298 female soccer players from three Norwegian leagues, showing that elite league players reported significantly higher mental toughness scores than players from the third league. Yet, no significant differences were obtained between the players of the elite and the second league, nor between the players of the second and the third league. Another soccer-specific study was carried out by Guillén and Santana (2018), with a sample of 242 male Spanish players, from an age range of 14-19 years. They reported significant differences in mental toughness depending on players’ age and team classification in the league, with the highest scores obtained for older players and for those playing for the top-ranking team in each performance category (i.e. under 16s and under 19s). The results also showed that players’ mental toughness scores were positively correlated with their perceptions regarding their ability to play in a superior category. Lastly, a study conducted by Kristjánsdóttir et al. (2019), with a sample of 142 Icelandic female soccer players, revealed that significantly higher scores of mental toughness were found between the

three competition levels under analysis (i.e. national team, first and second divisions).

In line with these empirical findings and acknowledging the instrumentality of mental toughness to cope with competition demands and pursue and excel in performance goals, regardless of contextual pressure and adversity (Gucciardi, 2020; Papageorgiou et al., 2018), including in soccer (Coulter et al., 2010; Thelwell et al., 2005), we expect that mental toughness will exert a positive influence upon individual soccer performance and thereby hypothesise that:

Hypothesis 2: Mental toughness is positively related to individual soccer performance.

#### MEDIATING ROLE OF MENTAL TOUGHNESS ON THE CONSCIENTIOUSNESS-SOCCER PERFORMANCE LINK

As reviewed above, both conscientiousness and mental toughness have been examined as antecedents of individual performance across several achievement settings, such as sports, educational and work contexts (Cowden, 2017; Lin et al., 2017; McGeown et al., 2016). While their predictive validity for individual performance has been supported by initial research, assessment of their joint effects on performance outcomes remains unexplored, preventing a more comprehensive understanding of how they may build up together and impact individual performance. Drawing upon the theory of individual differences in performance of Motowidlo et al. (1997) and following Gucciardi et al.'s (2015) conceptualisation of mental toughness as a characteristic adaptation, the current study proposes that mental toughness acts as an intervening mechanism on the link between conscientiousness and soccer performance.

As noted, according to Motowidlo et al.'s (1997) theoretical developments, individual differences in personality and mental abilities, combined with learning experiences, impact indirectly performance behaviours by affecting specific knowledge, skills and habits (i.e., characteristic adaptations). As posited by these authors, while abstract basic tendencies comprise enduring capacities and dispositions, including the big five, characteristic adaptations are the combined product of basic tendencies and learning processes, since they are built up through the interaction between individuals' basic tendencies and their environment. As discussed by Gucciardi et al. (2015), in view of their findings indicating that while 44% of total variance in mental toughness results from between-person differences, more than half of its variance (i.e., 56%) was due to within-person variance over time, mental toughness should be interpreted as a characteristic adaptation, i.e. a contextualised expression of dispositions activated and shaped by environmental factors.

Building upon these aspects, we propose that conscientiousness represents a particularly important dispositional root of mental toughness, since it encompasses enduring core individual tendencies to show intentional and diligent behavioural persistence toward goal attainment (Costa & McCrae, 1992). Therefore, it is clearly linked to mental toughness, when asserted as a characteristic adaptation subsuming psychological resources that are relevant for goal-directed pursuits (Gucciardi, 2017). Consistently, previous findings regarding the relationships between the big five and mental toughness, despite being limited, have identified conscientiousness among the strongest obtained correlates, along with neuroticism and extraversion (i.e. Delaney et al., 2015; Yankov et al., 2019).

Thus, the current study postulates that mental toughness, as an instrumental characteristic adaptation for fulfilling challenging goals, like those involved in competitive sports, will act as a route through which the distal influence of conscientiousness impacts on soccer performance, and it is hypothesised that:

Hypothesis 3: Mental toughness mediates the relationship between conscientiousness and individual soccer performance.

## PARTICIPANTS AND PROCEDURE

### PARTICIPANTS

This study sample was composed of 130 male soccer players aged between 17 and 37 years ( $M = 25.74$ ,  $SD = 4.70$ ) belonging to Portuguese teams, from amateur (56.9%) and professional official leagues (43.1%) of the Portuguese Football Federation (FPF). The majority of players were Portuguese (73.1%), with the remainder being of other nationalities, including Brazilian (13.1%), Cape Verdean (7.7%), Angolan (3.1%) and Spanish (3.1%).

Overall, 56.2% played in defensive positions, whereas 43.8% had attacking positions, with an average club tenure of 2.90 years ( $SD = 3.55$ ). In terms of players' education level, 13.9% were college graduates, 66.9% had completed high school, and 16.2% and 3% had completed the third and second cycles of basic education, respectively.

### PROCEDURE

A concurrent validation design was employed, using paper and pencil questionnaires for data collection. After granting permission from the board of the target club, questionnaires were administered by a research team member to all players who agreed to participate. The main research goals were briefly mentioned

in the first section of the questionnaire and participants' informed consent was requested, emphasising the anonymity of all answers and their exclusive use for research purposes. In the second section, players were instructed to provide relevant sociodemographic data and answer conscientiousness and mental toughness measures. The third section included the assessment of players' individual soccer performance, by instructing them to rate their respective physical, technical and tactical performance levels, as exhibited in the first half of the season (i.e. approximately over the last six months).

Players were also required to provide objective performance statistics, specifically the total amount of minutes they played in their team's official games. To maximise the accuracy of reported statistics, a spreadsheet containing all team player-related game statistics, from an official source, was made available to the research team for their consultation during the sessions of data collection.

## MEASURES

*Conscientiousness.* This factor was assessed through the respective four-item subscale from the Mini International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006), provided with a five-point Likert-type scale, ranging from 1 (*very inaccurate*) to 5 (*very accurate*). Sample items included "I get chores done right away" and "Like order". The aforementioned authors have provided evidence supporting the psychometric adequacy of this instrument and its usefulness as a brief measure of the big five. Cronbach's  $\alpha$  was .73 in the present sample.

*Mental toughness.* The eight-item Mental Toughness Index (MTI; Gucciardi et al., 2015) was employed to assess this construct. Players were instructed to rate the extent to which each item constitutes an indication of how they usually think, feel and behave as a performer in their setting, by using a 7-point Likert-type scale ranging from 1 (*false, 100% of the time*) to 7 (*true, 100% of the time*). Sample items include "I consistently overcome adversity" and "I am able to regulate my focus when performing tasks". Consistent with previous research (i.e. Gucciardi et al., 2015), principal component analysis uncovered a single-component solution in the current sample data, supporting the unidimensionality of mental toughness, as measured by MTI. This solution accounted for 51.32% of the total variance and yielded appropriate item loadings, ranging from .59 to .84. Cronbach's  $\alpha$  was .87.

*Individual soccer performance.* Both subjective ratings and objective soccer game statistics were used as measures of player performance, following the same procedure adopted in previous related research (e.g. Lenz et al., 2020; Piedmont et al., 1999).

*Subjective performance.* An individual subjective performance index was obtained via players' self-ratings regarding their physical, technical and tactical levels, exhibited throughout the first half-season, given the recognition of these dimensions as core factors of soccer performance and success (Elferink-Gemser et al., 2012; Gledhill et al., 2017; Kalinowski et al., 2020). Hence, players were instructed to rate their individual performance using a three-item scale provided by using a 7-point Likert-type scale, anchored from 1 (*very poor*) to 7 (*outstanding*), where each performance aspect (i.e. physical, technical and tactical) was assessed using a specific item, for example, "Overall, my tactical performance since the beginning of the season until the present was...". Results from a principal component analysis uncovered a single solution accounting for 64.22% of the total variance, with respective item loadings ranging from .78 to .81, supporting the aggregation of obtained players' ratings as a subjective index of global individual soccer performance. The corresponding Cronbach's  $\alpha$  was .71.

*Objective performance.* As for objective performance, it was operationalised using players' individual game official statistics, consistent with the approach adopted in prior soccer studies (e.g. Lenz et al., 2020; Piedmont et al., 1999). Adopting the operationalisation procedure of Lenz et al. (2020), objective performance was assessed using the proportion of minutes each player had participated in team official games during the first-half season, in relation to the total amount of minutes from all games played by the team throughout that competition period.

*Control variables.* Consistent with previous research, players' age, education, club tenure, soccer league type (i.e. professional vs. amateur) and field position (i.e. defending or attacking positions) were also measured to control for their possible effects on player performance (Elferink-Gemser et al., 2012; Han & Dongen, 2015).

## RESULTS

Before testing the hypotheses under study, the discriminant validity of all self-rated measures was assessed. Since the sample size was insufficient to carry out a confirmatory factor analysis with the items from all the respective scales, principal component analysis was used as a feasible alternative. As expected, this analysis uncovers a three-component solution corresponding to the constructs under study (i.e. conscientiousness, mental toughness and overall subjective performance), accounting for 57.40% of the items' total variance. After employing an oblimin rotation, given the observed moderate component interrelations, all items yielded appropriate loadings on the expected component, ranging from .82 to .64 for

mental toughness, from .84 to .50 for conscientiousness, and from .81 to .76 for subjective performance, suggesting that these items represent discrete scales.

Table 1 displays the means, standard deviations and correlations between the variables under examination. As postulated, both conscientiousness and mental toughness emerged positively and significantly linked with both subjective and objective measures of individual soccer performance, supporting hypotheses 1 and 2, respectively. Players' age was also positively correlated with these performance criteria, whereas field position was negatively associated with objective performance, indicating that players from defensive positions tend to accumulate a higher number of minutes in official team games, in comparison to players from attacking positions.

To empirically test H3, according to which mental toughness mediates the relationships between conscientiousness and individual soccer performance measures, i.e. subjective and objective performance, respective indirect effects were estimated using ordinary least square path analysis, through the Process macro (model 4) for SPSS, developed by Hayes (2013). Since preconditions for testing the hypothesised mediating effects were met, i.e. significant links were obtained between conscientiousness (i.e. the predictor) and mental toughness (i.e. the mediator), as well as between such a proposed mediator and both performance criteria, an independent mediation analysis was conducted for each performance criterion. As recommended by Hayes (2013), the statistical significance of respective indirect effects was assessed through the calculation of bias-corrected 95% bootstrap intervals, based on 5000 samples. Research on mediation methods has shown bootstrapping robustness in terms of control over Type I and II errors and mitigation of power problems resulting from possible

non-normal sampling distributions of the indirect effects (Hayes, 2013; Preacher & Hayes, 2008). Given that age was significantly correlated with subjective and objective performance criteria, while the player's field position was also significantly associated with objective performance, both these variables were entered as controls in correspondent mediation analyses. The main results are summarised in Table 2.

As depicted in model 1, while conscientiousness ( $B = 0.41$ , 95% CI [0.21, 0.61]) significantly accounts for mental toughness variance, its contribution to predicting subjective performance becomes non-significant when the effects of mental toughness and controls are also accounted for (model 2a). Still, as shown by bootstrap analyses, while the direct effect of conscientiousness on subjective performance did not reach statistical significance, with a point estimate of 0.21 ( $SE = 0.14$ , 95% CI [-0.06, 0.48]), its indirect effect, via mental toughness, was significant, with a point estimate of 0.15 ( $SE = 0.06$ , 95% CI [0.06, 0.30]). As such, mental toughness fully mediated the association between conscientiousness and subjective performance.

An inverse pattern of results was found for objective performance. While the direct effect of conscientiousness on this criterion was significant (model 2b), with a point significance of 0.11 ( $SE = 0.05$ , 95% CI [0.00, 0.21]), its indirect effect, through mental toughness, was non-significant, with a point estimate of 0.02 ( $SE = 0.02$ ) and a respective bootstrap interval including zero (95% CI [-0.01, 0.07]). Overall, these findings show that whereas the effects of conscientiousness on subjective performance were fully indirect, via mental toughness, the effect of this personality factor on objective performance was exclusively direct. Therefore, only partial empirical support for H3 was found.

**Table 1**

*Means, standard deviations and intercorrelations*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Age	25.74	4.70	1.00								
2. Education	2.97	0.60	-.04	1.00							
3. League type	0.43	0.49	.19*	-.11	1.00						
4. Club tenure	2.90	3.55	.23**	.02	-.12	1.00					
5. Player's position	0.44	0.50	-.07	-.06	.01	-.09	1.00				
6. Conscientiousness	3.99	0.58	.29**	.17	.03	-.03	-.12	1.00			
7. Mental toughness	5.73	0.68	.22*	.06	.08	-.16	.02	.38***	1.00		
8. Subjective performance	4.94	0.89	.24**	.01	.00	-.12	-.09	.28**	.37***	1.00	
9. Objective performance	0.47	0.33	.20*	.12	-.08	-.16	-.24*	.29*	.21*	.46***	1.00

*Note.*  $N = 130$ . All participants are male. League type was coded as 0 – amateur, 1 – professional. Player's position was coded as 0 – defensive position and 1 – attacking position. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 2**

*Results of mediation analyses examining the mediating role of mental toughness (MT) in the relationships between conscientiousness and performance criteria*

	Estimate	SE	<i>p</i>	BC bootstrap 95% CI <sup>a</sup>	
				Lower	Upper
Model 1. Mental toughness as outcome					
Constant	3.61	.44	< .001	2.73	4.49
Age	0.02	.01	.169	-.01	.04
Player's position	0.09	.11	.408	-.13	.31
Conscientiousness	0.41	.01	< .001	.21	.61
<i>R</i> <sup>2</sup> = .16***					
Model 2a. Subjective performance as outcome					
Constant	1.28	.71	.072	-.12	2.68
Age	0.03	.02	.118	-.01	.06
Conscientiousness	0.21	.14	.125	-.06	.48
Mental toughness	0.38	.12	.001	.15	.61
<i>R</i> <sup>2</sup> = .18***					
Model 2b. Objective performance as outcome					
Constant	-0.42	.27	.121	-.95	.11
Age	0.01	.01	.252	-.01	.02
Player's position	-0.14	.06	.013	-.25	-.03
Conscientiousness	0.11	.05	.041	.00	.21
Mental toughness	0.06	.04	.175	-.03	.15
<i>R</i> <sup>2</sup> = .15*					
Indirect effect of conscientiousness on subjective performance via MT	0.15	.06		.06	.30
Indirect effect of conscientiousness on objective performance via MT	0.02	.02		-.01	.07

*Note.* *N* = 130. <sup>a</sup>Bias-corrected bootstrap confidence intervals. All the coefficients reported are unstandardized. MT – mental toughness. \**p* < .05, \*\*\**p* < .001.

## DISCUSSION

### MAIN THEORETICAL AND APPLIED CONTRIBUTIONS

The current study was carried out following prior calls for more research examining whether the big five, especially conscientiousness, could hold equivalent virtues as meaningful predictors of performance in sports settings, such as soccer (Musculus & Lobinger, 2018), as they have proven to hold for predicting work and academic performance (e.g. Richardson et al., 2012; Salgado, 2017). By focusing on conscientiousness, our findings support such status of this personality disposition in relation to soccer,

by showing its positive and moderate links with both subjective and objective soccer performance criteria. Hence, these results are consistent with extant empirical findings supporting the merits of conscientiousness as one of the more relevant dispositional predictors of sports performance (Allen et al., 2013; Allen & Laborde, 2014), ascribing relevance to the almost intuitive propositions that its core traits of goal-focused effort, perseverance and discipline are drivers of individual performance across achievement contexts, such as competitive soccer (Kalinowski et al., 2020; Piedmont et al., 1999; Steca et al., 2018).

Another contribution from the current study stems from the examination of the predictive validity of mental toughness in the specific soccer domain,



given the acknowledged need for more empirical research which scrutinises whether this construct should be considered among the key psychological determinants of success in athletic performance and development (Coulter et al., 2010; Gucciardi, 2020; Roberts & Woodman, 2017). Positive links obtained with both objective performance and subjective soccer performance measures, mostly with the latter, ascribe plausibility to previous theoretical assumptions regarding the role of mental toughness in prompting and maintaining goal-focused endeavours toward the achievement of high levels of performance in challenging and stressful circumstances (Gucciardi et al., 2015; Jones et al., 2002; Papageorgiou et al., 2018). Thus, our findings support such a role in soccer and suggest that Gucciardi's (2017, 2020) unitary conceptualisation of this construct, as a state-like psychological resource implied in challenging goal attainment, holds pertinence for the prediction of sports outcomes, specifically in soccer settings.

Besides reporting the isolated links of conscientiousness and mental toughness with soccer performance, the current study ultimately aimed to contribute to a better understanding of how these two meaningful antecedents may jointly impact performance. As such, by drawing upon Motowidlo et al.'s (1997) theory and Gucciardi et al.'s (2015) conceptualisation of mental toughness as a characteristic adaptation, it has proposed and tested the intervening role of mental toughness on the influence of conscientiousness on individual soccer performance as a distal determinant. Indeed, enduring and state-like commonalities regarding persistence and effort toward performance goal accomplishment (Costa & McCrae, 1992; Gucciardi, 2017) that underpins conscientiousness and mental toughness constructs, respectively, add plausibility to this assertion that they may build up and sequentially impact performance. Hence, our findings are consistent with the proposed theoretical rationale, by supporting the statement that "basic tendencies directly affect characteristic adaptations, which in turn, directly impact upon individual objective biography" (Motowidlo et al., 1997, p. 78), the latter referring to soccer performance behaviours in the scope of this study. Specifically, the results revealed this mediating effect for subjective performance criteria, supporting the assertion that mental toughness may represent a contextualised expression of conscientiousness enacted and mutually influenced by environmental factors, in this case pertaining to soccer-related learning processes and competitive demands. Thereby, these findings suggest that mental toughness should be further examined in causal modelling of individual soccer performance, particularly in the scope of the characteristic adaptations (i.e. together with relevant sport's skills, habits and instrumental knowledge) through which conscientiousness indirectly enacts critical player's behaviours, such as

those encompassed by the tactical, physical and technical dimensions of soccer performance. In parallel, these findings also support Motowidlo et al.'s (1997) model, as a relevant framework for future research on the impact of individual difference constructs and other psychological variables on human performance beyond its original work context, such as sports.

Still, for objective performance, only the direct effect of conscientiousness has received empirical support, suggesting that this disposition's influence on the overall number of minutes officially played by sampled soccer athletes seems to occur via other mechanisms. Unlike subjective performance, which tends to focus exclusively upon factors under the players' discretion, i.e. their physical, tactical and technical actions and determination, objective performance indexes, such as the number of played minutes, tend to suffer contamination from factors beyond the players' control, including the coach's specific game strategy, fatigue management and related choices, which ultimately affect their game participation. Extant evidence shows that more conscientious athletes tend to take fewer reckless risks and develop more favourable relationships with coaches and teammates (see Allen & Laborde, 2014, for a review), along with their stronger adherence to rules and instructions. Thus the dispositional effects of conscientiousness in objective performance, when measured in played minutes, could be mainly prompted via these other possible mechanisms, instead of players' mental toughness. Future research accounting for such variables' effects is needed before more conclusive findings can be made.

Along with the discussed theoretical contributions, the current findings also provide some practical implications. Specifically, the obtained results support the inclusion of conscientiousness and mental toughness in the psychological assessment of soccer players for selection and talent development purposes, given its meaningful positive effects on individual soccer performance, as previous research started to show (e.g. Danielsen et al., 2017; Guillén & Santana, 2018; Piedmont et al., 1999). Furthermore, in light of research suggesting that players' mental toughness can be enhanced through focal intervention, such as the creation of an autonomy-supportive coaching environments (i.e., contexts conducive to mastery development, non-hostile interactions and positive social constellations) and the related nurturing of basic psychological needs (Gucciardi et al., 2009; Mahoney et al., 2014), coaches and technical staff should capitalise on these aspects to promote the benefits of mental toughness for performance. Specifically, they can foster such supportive environments and focus on developing players' mental toughness core psychological resources, such as self-efficacy and emotional regulation. For example, players' self-efficacy can be enhanced through frequent

exposure to challenging tasks and enactive mastery, by providing opportunities for repeated performance success in challenging but progressively attainable aspects of soccer training and learning. Moreover, coaches should use verbal persuasion to increase players' confidence in their competence to master soccer's training and competition goals (see Bandura, 1986, 1997 for further details). In terms of emotional regulation, coaches and support staff should promote positive feelings and emotions among players during these endeavours in order to broaden players' attentional focus and build psychological resources, rather than buffering individual and team stress and insecurity that undermine players' attention and impair their cognitive flexibility (Frederickson, 2005).

### CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

Notwithstanding these contributions, this study has some limitations. Despite its pertinent focus on conscientiousness, given this factor's prime role as a performance predictor within the big five model, our findings are uninformative regarding the potential impact of the other personality factors on soccer performance. Future empirical research should contribute to a more complete picture of related personality effects, by including the other big five, especially emotional stability and extraversion, for which previous studies have also reported meaningful links with competitive sports outcomes (Allen et al., 2013; Allen & Laborde, 2014). Moreover, further attention should be paid to assessing the potential, yet unexplored, beneficial effects of agreeableness, given the existing evidence from other achievement settings supporting its role in promoting an empathetic and trusting interpersonal approach, which ultimately facilitates team processes and cooperation at work (see Barrick et al., 2001; Potočnik et al., 2021; Salgado, 2017, for reviews). Consistently, teams composed of more conscientious and agreeable members (see Peeters et al., 2006) tend to exhibit higher levels of collective performance and benefit from a higher prevalence of citizenship behaviours (Gonzalez-Mulé et al., 2014).

The joint study of the big five and mental toughness is also relevant from the perspective of uncovering the dispositional roots of mental toughness and assessing its distinctiveness from personality and consequent incremental validity to predict performance. These aspects remain particularly unexplored in the extant literature. This sort of research including all the big five and mental toughness is also instrumental in identifying which other factors might impact on performance via mental toughness, with emotional stability being a promising candidate due to its conceptual similarities with some identified elements of mental toughness, such as self-confidence and emo-

tional control (Clough et al., 2002; Jones et al., 2007; Thelwell et al., 2005).

Another limitation stems from the relatively small size and the specificity of male soccer players in our sample, which precludes the generalisation of the findings for other sports and female soccer. Lastly, the use of players' self-ratings of soccer performance does not allow us to rule out the possibility of the obtained effects being inflated, to some degree, by common source bias. While the absence of ceiling effects in subjective performance ratings, along with their moderate association with objective performance, provides some confidence in our findings, suggesting that performance ratings were not affected by major player's self-distortion, future research should preferably rely upon independent subjective measures of soccer performance, such as coach or peer ratings (Musculus & Lobinger, 2018).

In conclusion, this study supports the relevance of conscientiousness and mental toughness for predicting individual soccer performance and has attempted to improve the understanding of the mechanisms by which personality influences individual performance. In particular, it has shown that while conscientiousness directly affects objective soccer performance, its effect on subjective performance is entirely indirect, via mental toughness.

### DATA AVAILABILITY STATEMENT

Data supporting this study's findings are available from the corresponding author, upon reasonable request.

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