

Article

Determining Factors of Psychological Performance and Differences among Age Categories in Youth Football Players

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Abstract: Within the determining factors of psychological performance, mental toughness is considered a multidimensional factor, comprising cognitive, affective, and behavioural components together with self-confidence, which is related to success in sports performance as well as psychological health and well-being. The aim of this study was to analyse the relationship between different factors composing mental toughness and age categories in young football players, in order to determine the presence of specific psychological skills in their formative progression. A total of 118 male players (16.91 ± 2.42 years old) completed the Spanish version by Cernuda (1988) of the original Psychological Performance Inventory (PPI) by Loher (1982, 1986). The results indicated significant differences in four variables (negative energy control, attention control, visual and image control, motivational level) on three different age categories, where the U19 category showed the best results for all the variables, decreasing afterwards in the semi-professional category. Significant correlations were established between mental toughness variables and age categories, where the age category variable was significantly correlated in a positive way with attention control, visual and image control, and motivational level. In the same line, the variable self-confidence correlated positively with negative energy control, attention control, motivational level, attention control, and positive energy. The assessment of psychological variables such as mental toughness, taking into account the formative stage, may be helpful for both coaches and players when selecting adequate mental skill training for improving competitive performance and sporting success, as well as for positive and healthy psychological development and well-being.

Keywords: young athletes; psychological performance; mental strength; attention control; self-confidence; motivation; well-being



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1. Introduction

Nowadays, the mental component is considered one of the fundamental aspects that influence sport success [1], together with other factors like physical, technical, tactical, and strategic skills [2–5]. In top-level sport, especially when the sporting performance is not as expected, there is an increasing interest concerning the putative causes behind those poor results, such as mental toughness, which is a specific mental capability related to sport but also to well-being [6–8]. Its application and development are also very important in the personal growth and well-being of young athletes, since mental toughness is a multidimensional capability commonly associated with a positive self-concept and self-belief, resilience, coping adequately with negative situations in training and competitions, improved concentration, as well as the ability to avoid feelings related to “giving up” [9,10]. Psychological well-being is directly related to mental toughness by considering the resources that an individual possesses to overcome adversity and strengthen his- or

herself, but it also implies proactivity towards the search for opportunities for growth and development of new skills [9,11]. In line with this, Jones, Hanton and Connaughton [12] stated that it is necessary to provide athletes with a wide variety of psychological skills that will enable them to develop the maximum level in other components during competition, as well as influence other vital parameters for their sporting growth, such as resting capacity, self-confidence, or the adherence to a healthy lifestyle [5,13].

From this perspective, it should also be noted that the development of young athletes must be approached holistically, accompanying their performance improvement with their psychological and physical maturation. Several studies have shown that the athletes' mental abilities are directly related to their success in all spheres of life, not only at a competitive level [9,11,14]. By enhancing elements such as mental toughness, goal-setting, or self-reflection, athletes can improve in their disciplines at the same time as they improve their academic results and achieve a substantial improvement in their well-being [11,15,16].

Among the many precedents in the scientific literature, there is a predominance of investigations studying the acquisition or not of mental abilities by athletes [8,17]; some comparing certain abilities with others [13,18,19], others analysing their incidence according to the athlete's level [20,21] or even relating the training quality of these mental skills to the sports performance [12,22,23].

Loehr [24,25] concluded that both coaches and athletes reported that at least 50% of success is influenced by psychological factors related to mental processes. Moreover, Gucciardi, Hanton and Fleming [26] showed that in terms of strength, skills, and willingness to win, 90% of the determining factor for success depends on the mental aspect. Likewise, Gould et al. [27] reported that 82% of coaches suggested that mental strength is a determining factor in achieving sporting success.

Furthermore, it has been demonstrated that high values of mental toughness and mental abilities have a negative correlation with elements such as depression or perceived stress, being determining factors of the players' competitive level, affecting their well-being, as well [16]. An improvement in mental strength has a direct relationship with the player's mental health [28], and therefore the development of these mental capacities by the technical staff is considered key in order to guarantee his or her psychological health, directly contributing to physical fitness and sports performance [9,29].

In this context, Loehr [24] proposed a psychological model that conceptually defines mental toughness as the athlete's ability to use energy positively in those situations where it is needed, determining seven psychological skills: self-confidence, negative energy, attention control, visual and image control, motivational level, positive energy, and attitude control. These seven psychological factors have been accepted by the scientific community and used as a reference in other applied scientific studies in the field [30–33].

If these aspects are important in the performance of individual sports, they seem to be even more vital in collective disciplines. A common factor in all team sports is that the team's mental disposition seems to be decisive in achieving collective successes [21,34]. In these disciplines, factors such as the result of the previous match, the significance of the match itself, or the match timing, among others, can influence the performance in competition [35]. In the specific case of football, Krueger [36] analysed how football players managed their mental skills differently, thus correlating different psychological variables with parameters such as gender and different age categories. Likewise, Meggs, Chen and Koehn [37] suggested that mental toughness can contribute in a positive way to the cognitive exertion and emotional control necessary to improve the performance and flow state.

In addition, Reverberi et al. [14] argued that such emotional improvement related to mental toughness has a direct dependence on the player's environment. This will determine their sport success, as long as this is supported by an adequate psychological state and proper mental well-being. The key to improving players' performance and well-being lies in their psychological improvement, together with interpersonal relationships. Actually, previous studies have established that the individual's mental toughness seems

to be determined by both natural aspects (heritage) and environmental influences together with experiences and learning processes [38–41].

Additionally, recent studies have summarised the observed importance of mental toughness in football, ensuring that it is a fundamental characteristic that allows the players to remain focused on goals, being flexible and efficient in their decisions, thus avoiding states of anxiety or burnout [28,42].

In summary, and taking into account all these antecedents, it is of interest to establish the relationship between several psychological elements that influence success in the football player's formative progression as well as the competitive performance and other factors, such as age categories. The novelty of our study lies in the possibility to assess mental toughness in all the main categories within the same football club, playing at the highest competition level in each stage. This perspective can help to achieve a better understanding of how psychological performance can fluctuate and change in different teams under the same methodology and working philosophy in a club. Therefore, the main purpose of this study was to analyse the relationship between age categories and the dimensions of mental toughness, specifically in youth football players from a Spanish professional football team. Additionally, we tried to give a categorisation of players' psychological abilities according to their age [43]. Taking into account previous studies where better cognitive and motor skills are related to increased levels of mental toughness [44,45], we hypothesised that: the psychological performance in youth categories, and the mental toughness in this case, would be greater in all dimensions as age and category increased, having its greatest expression in semi-professional football players.

2. Materials and Methods

2.1. Participants

A cross-sectional study was performed with a selected sample of 118 male football players (16.91 ± 2.42 years old and 8.56 ± 1.22 years of expertise in football) from the youth categories of Córdoba C.F., a professional team from the Spanish football league. The following categories were established according to the Royal Spanish Football Federation: U14 ($n = 29$), U16 ($n = 35$), U19 ($n = 38$) and Semi-professional (From 19 onwards, $n = 16$). The ratio for training sessions per week was 4 sessions for the U14 and U16 categories; and 5 sessions for U19 and semi-professional, plus the competition match in both cases.

2.2. Measures

To assess mental toughness through every one of the areas of mental abilities that define Loehr's model, the Spanish version [46] of the original Psychological Performance Inventory [24,25] was used. This inventory builds a profile of the athlete's weak and strong points. The questionnaire is composed of 42 items ranging from 1 to 5 on a Likert scale through seven dimensions: self-confidence, negative energy control, positive energy control (to evaluate the emotional control factor), attention control, and visual and image control (to evaluate the concentration factor), motivational level, and attitude control. These seven scales were used to obtain a psychological profile of high performance. The score range for each scale varied from 0 to 30 points, reported in three qualitative levels: low (up to 19 points), medium (20–25 points) and high (25–30 points), considering as satisfactory performance levels those scoring in the upper 20 points, and high performance those between 25 and 30.

This evaluation tool is included in the test battery of the Sports Talent Detection Programme developed by the Sports Council of Spain (Ministry of Education, Culture and Sports, Government of Spain, 2001) [47].

2.3. Procedures

Prior to the data collection process, the Educational Psychology Area of the Córdoba C.F., S.A.D. requested the consent and permission of parents, technicians, and managers to conduct the necessary questionnaires during the season. The coaches of the different

categories were previously invited to arrange a suitable date adapted to their training programme. The questionnaires were individually distributed by age categories at a specific time on an afternoon free of training. The players were accompanied by their coaches, who remained outside the room during the completion of the questionnaires. The tests were held in the club's sports facilities prepared for this purpose with individual tables that allowed privacy and concentration for the activity. Two researchers and four collaborators were present, providing the necessary guidelines, help, and support in the correct organisation. The researchers stressed the need to read the questions carefully and to answer honestly, making it clear that the questionnaires were anonymous. The questionnaire completion process took approximately 20–25 min.

2.4. Statistical Analyses

Cronbach's alpha value was calculated to establish the internal consistency of the applied questionnaire. The sample was checked for normality using the Kruskal–Wallis test. The descriptive data of the variables by age categories were calculated and expressed by the mean \pm standard deviation (SD). The differences between the questionnaire's dimensions according to the age categories were calculated using one-way ANOVA. The differences between the categories were established by post hoc analysis using the Tukey test. Likewise, the correlations between the different study parameters were determined by Pearson correlation test. The significance level was set at $p < 0.05$. The effect size for t-tests (d) was calculated through Cohen's d [48,49]. The interpretation of the d , regardless of the sign, followed the scale: Very small (0.01), Small (0.20), Medium (0.50), Large (0.80), Very large (1.20), Huge (2.0), as initially suggested by Cohen [48] and expanded by Sawilowsky [50]. Effect sizes for F-statistics were reported as partial eta squared (η^2), with < 0.019 = trivial effect size [T]; $0.020 < \eta^2 < 0.059$ = small effect size [S], $0.06 < \eta^2 < 0.139$ = medium effect size, [M], and $\eta^2 \geq 0.14$ = large effect size [L] [48,49,51]. Statistical analyses were performed using SPSS® 26.0 (IBM Corporation, Armonk NY, USA) for Windows.

3. Results

The variables considered for this study reported a Cronbach's alpha of 0.803. All the variables had a value greater than 0.7, representing a sufficient level to guarantee the scale reliability for this study.

Table 1 shows significant differences ($F_{\text{range}} = 2.731\text{--}5.765$; $p < 0.01$ or $p < 0.05$, depending on the factors) in four out of seven studied variables: negative energy (Range = 19.94–22.39), attention control (Range = 21.93–24.60), visual and image control (Range = 22.69–25.06), and motivational level (Range = 25.34–27.34).

Table 1. Descriptive data and significant differences obtained for the studied variables considering the category and age.

	U14 (N = 29)	U16 (N = 35)	U19 (N = 38)	Semi-Professional (N = 16)	F	p-Value	Partial Eta Squared
Self-confidence	24.24 \pm 2.67	24.51 \pm 2.41	25.84 \pm 2.89	24.56 \pm 3.44	2.293	ns	0.057 [S]
Negative Energy Control	19.94 \pm 3.07 ^{b,c}	22.07 \pm 3.12 ^a	22.39 \pm 2.95 ^a	21.37 \pm 3.40	2.731	<0.05	0.067 [M]
Attention Control	21.93 \pm 2.40 ^c	22.66 \pm 3.51 ^c	24.60 \pm 2.64 ^{a,b}	24.19 \pm 2.90	5.765	<0.01	0.132 [M]
Visual and Image Control	22.69 \pm 3.35 ^c	24.09 \pm 3.25	25.06 \pm 2.93 ^a	24.44 \pm 3.33	2.742	<0.05	0.067 [M]
Motivation Level	25.34 \pm 2.69 ^c	26.06 \pm 2.46	27.34 \pm 2.17 ^a	26.62 \pm 1.75	4.282	<0.01	0.101 [M]
Positive Energy	24.07 \pm 3.86	24.63 \pm 2.53	25.71 \pm 2.39	25.25 \pm 2.98	1.916	ns	0.048 [S]
Attitude Control	23.63 \pm 2.87	24.17 \pm 3.00	24.29 \pm 2.30	23.81 \pm 2.32	0.441	ns	0.011 [T]

Data presented as mean \pm SD. The ANOVA value is considered significant if $p < 0.05$. Post hoc analysis: ^a. significant with respect to U14; ^b. significant with respect to U16; ^c. significant with respect to U19;

Focusing on the differences obtained by the post hoc analysis by categories (Table 1), negative energy control showed that the lowest and highest values were for the U14 and U19 categories, respectively ($d = -0.69$; $p < 0.05$). Concerning attention control, the results showed clear and significant differences between U19 and U14 ($d = 1.06$; $p < 0.01$) and

U16 ($d = 0.62$; $p < 0.01$), observing the highest values as the age of the subjects increased, specifically in the U19. Moreover, the dimensions visual and image control ($d = 0.75$; $p < 0.05$) and motivational level ($d = 0.82$; $p < 0.01$), reported the highest values in U19, in contrast to the U14 category with the lowest scores.

In addition, the correlation study depicted in Table 2 revealed significant and positive correlations between most of the analysed variables ($p < 0.05$, $p < 0.01$ or $p < 0.001$). The age category variable was significantly correlated with attention control ($r = 0.272$; $p < 0.01$), visual and image control ($r = 0.193$; $p < 0.05$), and motivational level ($r = 0.206$; $p < 0.05$). Likewise, self-confidence correlated with attention control ($r = 0.440$; $p < 0.001$), visual control/capacity ($r = 0.268$; $p < 0.01$), and motivational level ($r = 0.417$; $p < 0.001$) among others such as positive energy ($r = 0.536$; $p < 0.001$) and attitude control ($r = 0.508$; $p < 0.001$).

Table 2. Bivariate correlations of the total sample for the different variables and age factor.

		Self-Confidence	Negative Energy Control	Attention Control	Visual Control	Motivation Level	Positive Energy	Attitude Control
Negative Energy Control	R	0.501 ***						
	p	0.000						
Attention Control	R	0.440 ***	0.506 ***					
	p	0.000	0.000					
Visual Control	R	0.268 **	−0.004	0.085				
	p	0.003	0.963	0.358				
Motivation Level	R	0.417 ***	0.373 ***	0.446 ***	0.160			
	p	0.000	0.000	0.000	0.083			
Positive Energy	R	0.536 ***	0.399 ***	0.537 ***	0.406 ***	0.443 ***		
	p	0.000	0.000	0.000	0.000	0.000		
Attitude Control	R	0.508 ***	0.431 ***	0.417 ***	0.224 *	0.418 ***	0.539 ***	
	p	0.000	0.000	0.000	0.015	0.000	0.000	
Age	R	0.079	−0.028	0.272 **	0.193 *	0.206 *	0.159	0.016
	p	0.397	0.766	0.003	0.036	0.026	0.086	0.866

R = Pearson's correlation; p = bilateral significance. * Correlation is significant at level 0.05. ** Significant at level 0.01. *** significant at level 0.001.

4. Discussion

Four different levels of the youth categories from a professional football team were analysed, considering the seven dimensions or variables proposed by Loehr's model [24] for the evaluation of mental toughness in sport.

The analysis of variance revealed significant differences in the variables depending on the different age categories. Thus, regarding the analysis of self-confidence, we found that it remained unchanged with no differences between any of the evaluated age categories.

These results contrasted with the conclusions reported by Garry and Jolly [33] in their attempt to establish personality traits and mental toughness as predictors of sporting success in different sports. Using the Loehr scale, the authors stated that medallists obtained higher scores in the self-confidence variable than non-medallists (generally in lower age categories), establishing considerable differences between different levels of sports practice. In the same line, Golby et al. [30,31] reported that elite athletes show greater scores of mental toughness compared to lower-level athletes. In spite of this, the players that were evaluated in our study could be considered as belonging to the highest competitive level within the age category, so the comparison between ages may not resemble a comparison between competitive levels, since all players compete at the highest level allowed. In this case, the players showed a high level of self-confidence, remaining similar in increasing age categories but without changing their associated competitive level. These results were in line with previous findings that related a stable high level of self-confidence to subjects with a higher competitive level [52,53].

It should be noted that self-confidence and self-acceptance have a very close relationship with the athletes' well-being, so that stable data in the player's self-confidence

imply a continuous self-perception of well-being within the sport, something fundamental for the development of their performance and their psychophysical maturation. Actually, as established by Reverberi et al. [14]: “mentally tough individuals are able to maintain greater levels of control and confidence under stressful situations, which might lead to better psychological well-being”.

On the other hand, concerning the negative energy control variable, appreciable differences were found between the lower category (U14) and the higher ones, where U19 showed the highest score. In addition, the emotional control results were favourable and stable as age increased. The results reported in our study fully coincide with previous results in other collective sporting disciplines [30,33,54]. Golby and Sheard [30] stated that those who play in higher competitive level leagues offer a higher level of negative energy control than players of lower levels when analysing rugby players in Great Britain. Likewise, Oliva [54] also suggested negative energy control as one of the most affected aspects in the psychological performance of footballers. Similarly, Garry and Jolly [33] claimed that better levels of negative energy control can be associated with a greater orientation towards the pursuit of the collective goals, a behaviour that is achieved through the maturity of the player.

Statistically significant differences were found in attention control, being gradually improved as the age increased. This is the most determining factor, with the highest margin of improvement of all the evaluated variables. De la Vega [32] concluded that the training of football players' concentration capacity must start from the base categories, and it must not be something unrelated to or isolated from the reality of the players' daily training. Moreover, Golby and Sheard [30] showed the progressive evolution of attention control at different sport practice stages, establishing this ability as a key differentiator of success factors between high performance sport athletes and regular ones. In the same line, previous studies have confirmed that it is essential to use mental attention strategies in the football training context in order to achieve high levels of competition success [36,41], as well as that attention control and mental toughness are key in sports injury prevention [55,56]. In addition, injuries should not only be considered as physical ailments that are influenced by mental strength, but good psychological health guarantees a decrease in the perceived pain, as psychological complaints may influence in the same way as a muscle strain. Therefore, the development of these mental capacities will have a direct influence on the player's overall health, both physically and psychologically [57].

Attending to the visual and image control variable, U19 seemed to reach higher levels of achievement in this parameter, maintaining a similar good level in the later stages. Along these lines, the importance of this skill in football has also been reflected in previous studies, where the improvement of the visual-spatial control capacity in a game can be a determining factor in the competitive outcome, especially in high performance sport [54,56]. The same interpretation can be made for the motivational level variable, since the best results were achieved by U19 with a positive progression from the lower age category up to this U19 category. Conversely, the trend in all the variables for the semi-professional category was towards decreasing values, compared to the positive progression in lower age categories. It should not be ignored that motivation is a factor closely related to attentional and concentration aspects, as well as emotional ones, being very important in sports performance.

The more time you invest in a goal, the more consistent and psychologically strong you become towards it. If there is a good motivational capacity and the fear of failure is removed, implying mental toughness, success chances are increased [11]. All of this, together with the player's satisfaction perception closely related to own well-being, results in the union of concentration abilities and persistence, satisfaction, and psychological health [16]. Therefore, a linear increase in players' motivational level as they progress through the categories seems evident, as the time spent on their professional goal increases, improving their concentration and evolving in parallel to a constant feeling of well-being.

Furthermore, focusing on the positive energy and attitude control variables, and as shown by Eric [17], no statistically significant differences were observed between any of the categories analysed.

Additionally, as a summary of the inter-group analysis, there was no evolution over time in the variables of self-confidence, positive energy, and attitude control. A very significant improvement in attention control was observed with the footballer maturation, an aspect that must be taken into account in the training planning processes. In U19, the results achieved in visual and image control and motivational level were much higher than in previous age categories. No significant changes, but a negative trend was observed in the psychological variables analysed when a footballer finished the under-19 stage to start the semi-professional stage. In line with our findings, Chen and Chessman [58] found that youth (amateurs) practitioners reported a higher mental toughness level than semi-professionals on a questionnaire similar to the one used in the present study.

However, these results were not in agreement with those reported by Singh [20], who clearly expressed his conviction that the mental toughness level depends linearly and positively on the stage and the athlete's level of practice. In this context, the question arises as to whether a footballer in the semi-professional stage can be considered complete from a solely formative point of view. Additionally, the studies referred to above associated the age level directly with the competitive level (the higher the age, the higher the competitive/performance level) and from our perspective, those are two elements that do not have to be inseparable at all. In the present study, each team belonging to a specific age group was competing at the highest possible division and achieving a good performance. The decreasing levels shown by the highest age category (semi-professional) in all variables, especially the motivation level, could be related to other internal or external factors, such as locus of control, perceived success, economic benefits, adequacy of workloads during training, and relationship with the technical staff. In fact, Enríquez-Caro [59] reported that even though the coach's perception was just the opposite, 50% of the professional players perceived that the coach barely made them work hard, possibly affecting the motivational level while training in a negative way. The distortion between the self-perceived effort and the intensity of the work done could directly affect the level and source of motivation in the players, as well as related variables. The training and coaching environment is fundamental to ensure a good strategy to improve players' mental toughness and psychological health, as an inappropriate methodology can lead athletes to frustration and failure [11,16].

In addition, as reported by Nicholls, Perry, Jones, Sanctuary, Carson and Clough [60], the presence of variables such as motivation and self-efficacy, among others, could enable mentally tough athletes to succeed under stressful situations instead of just coping. For this reason, remaining highly motivated could be a key factor to take into account from the coach's perspective.

The correlation analysis showed positive significant correlations between multiple variables, similar to previous studies by Nicholls et al. [19]. The positive energy and attitude control showed very strong positive correlations with the rest of the variables. Specifically, very significant correlations were established with self-confidence, negative energy control, visual and attention control, and motivational level. Likewise, the present study evidences the importance of self-confidence and motivation, where the higher the levels of self-confidence, the greater the attention control, visual capacity and emotional balance, as well as more motivation and attitude control. Nevertheless, authors such as Bull and Shambrook [22], Fourie and Potieter [23], Jones et al. [12], or Levy, Perry, Nicholls, Larkin, and Davies [61] stated that regardless of the correlation found between the different variables, it seems that the training quality of these mental skills is the determining factor when using them in order to achieve optimum sports performance in competition.

Finally, following the postulates of previous research [43], the present study highlights the importance for technicians and coaches to have an exhaustive knowledge of the psychological differentiating factors influencing in the progression of the footballer's formative stages. This is based on the conviction that only if we are thoroughly aware of

the essential needs of each athlete, will we be able to proceed in a satisfactory manner to the desirable improvement at each stage. From this perspective, it is not only important that the athlete has the mental strength to achieve the goals, but also to maintain the effort and a stable psychological health over time. This will ensure that the effort does not translate into obsession or anxiety, but rather into focused and motivated behaviour [11].

5. Conclusions

The U19 category showed the best results for all the variables, especially for negative energy control, attention control, visual and image control, and motivational level. The different mental toughness dimensions had a positive and progressive trend when age increased until the U19 category but slightly decreased in the semi-professionals. These results partially corroborate our study hypothesis, where the mental toughness would be greater in all dimensions as age and category increased. However, this hypothesis is not fully corroborated, as the U19 category, and not the semi-professionals, seems to be the one with the best values. Nevertheless, the semi-professional level is close behind and is the second category with the highest values in the dimensions that compose mental toughness.

Furthermore, the evaluation of mental or psychological variables in athletes, in this case, mental toughness, may be helpful for the coaches and athletes as well, with the selection of mental skills training for improving the competitive performance. Actually, mental toughness can have a higher predictive power of the performance and the outcome in competition than other physical tests, like medicine ball throw or jumps [62]. Therefore, this kind of psychological analysis, specifically the analysis of mental toughness and the differentiation between its most important dimensions according to maturational status, should be taken into account when improving the training quality, and the sport performances are the main purposes. These tools contribute to giving those leadership figures such as coaches the knowledge about the players' weaknesses and strengths. Then, coaches could programme and adapt the skills training to the individual player's needs and psychological abilities, in order to increase the performance and achieve sporting success, as well as guarantee a positive and healthy psychological development and well-being [16].

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