

Original Research

Attentional focus in team sports: Effects of an intervention program on football players

Juan Martín Tassi^{1,2}, Miguel A. López-Gajardo², Jesús Díaz-García², Tomás García-Calvo² and Inmaculada González-Ponce^{3*}

¹ Argentine Football Association

² Faculty of Sport Sciences. University of Extremadura.

³ Faculty of Education and Psychology. University of Extremadura.

* Correspondence: ingopo@unex.es  0000-0002-7816-7789

Received: 15/02/2023; Accepted: 06/06/2023; Published: 31/06/2023

Abstract: The cognitive processes that influence athletic performance have been increasingly studied in recent years. Therefore, the aim of the present study was to evaluate the effects of an intervention programme aimed at improving the attentional focus of football players, using game situations similar to competitive ones. The participants were 46 male football players belonging to the youth academy of a first division Argentine football club, who were divided into an experimental group and a control group. The methodological design was quasi-experimental, with pre-intervention, post-intervention, and follow-up measures. The measures used were the Psychological Inventory of Sport Performance was used. The results showed significant differences in the variable attentional control in favour of the experimental group compared with the control group after the intervention period and during the follow-up period. On the other hand, the other of the variables analysed (negative coping control, visual image control, positive coping control, and attitudinal control) did not show significant differences between the two groups, but there was a positive trend in the experimental group after the intervention. In conclusion, the use of strategies related to attentional focus in habitual tactical and specific football training tasks seems to have a positive effect on attentional control.

Keywords: Principles of game; specific tasks; constraints; quasi-experimental.

1. Introduction

Until relatively recently, great athletes were usually described by their physical or technical-tactical abilities (Starkes et al., 2001). In this context, research has not paid much attention to the cognitive factors involved in sport performance (Thompson et al., 2020). In particular, the basic process of attention plays a relevant role within the

existing psychological skills in sport, especially to achieve an improvement in performance (Memmert, 2009).

Specifically, in team sports, attention is considered a good sport skill due to the presence of numerous interactions and distractions in the game (Howard et al., 2018). Indeed, in football, knowing what, where and when to look is essential to achieve optimal competitive outcomes



(Mann et al., 2007). In this sense, it would be interesting to develop training tasks that simultaneously promote physical, technical-tactical, and cognitive development, i.e., actions that are similar to what happens in competition. Therefore, the aim of this study is to develop an intervention programme to improve the attentional focus of football players using game situations similar to the competition.

The concept of attention refers to the ability to maintain attentional focus on relevant signals present in the environment (Weinberg & Gould, 2010). Considering the structure of this variable, attention is composed of a set of specific processes and characteristics, where attentional foci can be distinguished in an external order (i.e., attentional focus focused on stimuli external to the athlete) or an internal order (i.e., attentional focus focused on the athlete him/herself). Drawing attention to previous research, Schwab et al. (2019) showed that the use of external attentional focus significantly improved the optimization of technical-tactical actions in football. In addition, Barbosa et al. (2017), mentioned that the athletes with higher performance were those who had a higher level of attention to the game and more developed motor skills. Similarly, Scharfen and Memmert (2019) also highlighted a positive correlation between a high cognitive level and a high motor level.

Therefore, the ability to select relevant stimuli is very present in team sports throughout the competition cycle and should therefore be included in the team's work planning in order to achieve a continuous improvement in attentional cognitive processes (Lohse, 2012; Wulf, 2013; Wulf et al., 2007). However, despite the interest and importance of this variable in sport (Memmert, 2009; Moeinirad et al., 2022), there are few studies in football that have investigated the mechanisms that enable the

development of attentional focus in real game situations that are related to performance (Wulf, 2013; Wulf et al., 2007).

Previous research on attentional enhancement in sport has been conducted in laboratory with improvements in attentional capacity and performance (Lohse, 2012; Memmert, 2009; Moeinirad et al., 2022). However, professional football training requires simultaneous a high perceptual-cognitive and physical workloads, including tracking the location and speed of the ball and other players, a task that is likely to require a lot of visual attention as well as coordination with the motor system (Howard et al., 2018). In this regard, the attentional processes present in a football match have been analysed with respect to the actual demands of competition (Hüttermann et al., 2019).

However, to the best of our knowledge, scientific works analyzing the cognitive process of attention within team sports and from an ecological perspective is very limited (Memmert, 2009).

For this reason, the intervention programme presented in this research works on attentional focus on relevant stimuli through the establishment of exercises with parameters close to competitive reality. In this way, the external attentional focus will be one that aims to develop and work from the assessment of the specific behaviour of the player during training and competition (Schwab et al., 2019). As a main hypothesis, the present intervention programme, aimed at working on the attentional focus in a specific and integrated way through the constraints will improve the attentional control in the experimental group as a consequence of the training of behaviours and technical-tactical behaviours similar to the real game situations.

2. Materials and Methods

Participants — The study sample consisted of 46 male football players. These players were part of two teams belonging to the youth academy of a club in the first division of Argentine football. Participants were divided into a control group, consisting of 25 players ($M = 19.20$; $SD = 1.49$), and an experimental group consisting of 21 players ($M = 18.40$; $SD = 0.80$). Participants were selected using purposive selection sampling, establishing as a requirement that they were two teams with players of a similar age and competitive level.

Measure— The Psychological Inventory of Sport Performance (IPED; Hernández-Mendo, 2006) was used. Five subscales of the questionnaire were employed in this research: negative coping control (e.g., "Mistakes during the competition make me feel and think negatively"), attentional control (e.g., "I become distracted and lose my concentration during the competition"), visual image control (e.g., "Before the competition, I imagine myself executing my actions and performing perfectly"), and visuo-imaginative control (e.g., "Before the competition, I imagine myself executing my actions and performing perfectly"), Positive coping control (e.g., "I can maintain positive emotions during the competition") and Attitudinal control (e.g., "By controlling my thinking I am able to transform negative moods into positive ones"). Each of the factors consisted of six items. The items were answered on a Likert scale ranging from 1 (almost never) to 5 (almost always).

Procedure— The development of the research went through a several of stages, at all times following the ethical guidelines of the American Psychological Association (2010) and respecting the 1964 Declaration of Helsinki. Initially, the research was approved by the university's bioethics committee (239/2019). The researchers then contacted club officials and coaches to inform them of

the purpose of the study and to request their cooperation. All subjects were informed that their participation was voluntary and that the documents and files would be treated confidentially and used only exclusively for research purposes.

The present study was conducted under a quasi-experimental methodology, with two independent groups, the control group and the experimental group. It was also conducted using a pre-intervention - post-intervention - follow-up repeated measures design. The pre-intervention questionnaire was administered to each group to provide an initial and individual assessment of each subject. Subsequently, the constraints related to the principles of game (technical-tactical behaviours) and external focus of attention (Table 1) were implemented in the experimental group, and once this phase was completed, the inventories were completed again in both groups (post-intervention). The intervention programme lasted one month. Finally, a follow-up measure was carried out. This measure was carried out one month after the end of the intervention.

Data analysis— SPSS 25.0 software was used for data analysis. Initially, means and standard deviations were calculated for all study variables (negative coping control, attentional control, visual imaginative control, positive coping control, and attitudinal control). An analysis of variance was conducted to test for between-group differences in pre-intervention measures. When there were significant differences in the pre-intervention measures between the control and experimental groups, the pre-intervention measures were included as covariates. A two-way factorial analysis of variance (ANOVA) was then performed to show the effect of the intervention: time factor (3- pre-intervention, post-intervention and follow-up) \times group factor (2- experimental or control). If the combined

Table 1. Principles of game (tactical component), external focus of attention, behaviours, and constraints

Objetive of the tasks	Constraints experimental group	Control group
<p>1.- Playing simply, attracting to progress. Behaviour and conduct related to the external focus of attention in relation to the ball, team-mates, opponents and playing spaces (Hüttermann et al., 2019).</p>	<p>A.- Attract and pass the ball before the opponent touches the player in possession. B.- Make 3 to 5 passes per sector to attract the defense and then pass the ball to a team-mate in another sector of the field.</p>	Constraints not used
<p>2.- Defenders must mark when the team is attacking. The external focus of attention is related to the opponent (designated opposition or opposition to be marked on the field of play) and the ball (game element to recover or prevent its arrival in one's own goal). These two external approaches are associated with a higher level of effectiveness in terms of motor performance and learning (Wulf, 2007).</p>	<p>A.- Propose duels with equal numbers and distribution of marks. B.- Remove the defender who allows the striker to receive the ball in front of his goal. C.- Remove the defenders who allow the attackers to receive the ball on their own. D.- Count the number of balls received by players in attack or possession (midfielders or strikers) as a goal. To provoke frustration in defenders.</p>	Constraints not used
<p>3.- 1st option of forward passing. External focus of attention linked to the playing space (zone next to or in front of the ball possession zone), the team-mate (visual search for possible receivers), opponent (possible opposition to the player receiving the ball or opposition pressing ball receiver).</p>	<p>A.- The passer gives the order to turn to validate the completion or goal. B.- Points are scored for every pass to the next area that is received by a team-mate. C.- Forward oriented control without pressing opposition; support to the nearest team-mate in case of pressure on the back. D.- Do not allow in the tasks, to return to the areas through which the ball has already passed.</p>	Constraints not used
<p>4.- Pressing immediately after losing of the ball. External focus of attention linked to the playing space (pressure zone close to the ball and distant zone for advancing or retreating), the team-mate (visual search for possible receivers after recovering the ball), opponent (opponent recovering or having the ball, opponent who is a possible receiver in any sector of the field) and ball (recovering or avoiding its progress in one's own field) and ball (recovery or avoid its progression in their own field). Importance of the role and feedback on external focus given by the coach (Porter, 2010).</p>	<p>A.- Avoid the exit of the ball from the sector where the loss occurs. B.- Score the situations of recovery after a turnover and pass to a team-mate or completion. C.- Recover the ball after a turnover before a certain time (6/8").</p>	Constraints not used

effect was significant, the main effect of time was analysed in each of the groups. Statistical significance was set at $p < .05$.

3. Results

No significant differences were found between the pre-intervention measures of the control and experimental groups for the variables negative coping control ($F = 3.45, p = .070$), visual image control ($F = .00, p = .95$), positive coping control ($F = .018, p = .89$), and attitudinal control ($F = 1.40, p = .24$). On the contrary, significant differences were found in the variable attentional control between the pre-intervention measures of the control and experimental groups ($F = 7.69, p = .00$), so that the pre-intervention measure was included as a covariate in the analyses of this variable.

Table 2 shows the evolution over time and in both groups of the values of the variables negative coping control, attentional control, visual image control, positive coping control, and attitudinal control.

Regarding the negative coping control variable, the repeated-measures ANOVA procedure showed no significant group \times time interaction ($F = 2.12, p = .12$). The analysis of the main effect of time for this variable confirmed a significant effect of time for the control group ($F = 4.57, p = .01$), with a significant decrease in this variable between the pre-intervention and follow-up measures. In the experimental group, no significant effect of time was observed ($F = 2.75, p = .08$) but, on the contrary, there was an increase in scores between the pre- and post-intervention and between the mean post-intervention and follow-up.

Concerning the attentional control variable, a repeated-measures ANOVA analysis with the pre-measure as a covariate showed a significant combined group \times time effect ($F = 8.06, p = .00$). Analysis of the main effect of time showed a significant effect of

time in the control group ($F = 4.24, p = .02$), with a significant decrease in this variable between the pre-intervention and follow-up. This significant effect was also observed in the experimental group ($F = 5.00, p = .01$), although, on the contrary, a significant increase in this variable was observed between the pre-intervention and follow-up measures.

On the other hand, the repeated-measures ANOVA procedure showed no combined group \times time effect for the visual image control variable ($F = 1.29, p = .28$). Analysis of the main effect of time showed no significant effect of time in the control group ($F = .27, p = .77$) and a significant effect in the experimental group ($F = 6.36, p = .00$), with an increase in this variable between the pre- and post-intervention and the post-intervention and follow-up measures.

Considering the positive coping control variable, the repeated-measures ANOVA procedure showed no combined group \times time effect ($F = .13, p = .85$). The analysis of the main effect of time for this variable showed a lack of significant effect of time in both the control group ($F = 2.22, p = .12$) and the experimental group ($F = 1.16, p = .32$).

Finally, the attitudinal control variable showed no combined effect of group \times time ($F = .56, p = .57$) in the repeated-measures ANOVA analysis. The main effect analysis of time for this variable shows a lack of significant effect of time in both the control group ($F = .23, p = .80$) and the experimental group ($F = .93, p = .40$).

4. Discussion

The aim of the study was to test the effects of an intervention programme on attentional focus, the results obtained show significant changes between the control and experimental groups during the research process. Specifically, it can be observed that the intervention carried out with the

Table 2. Results of Mixed Repeated-Measures ANOVA

	Control group			F	p	Experimental group			F	p	Time x condition	
	Pre	Post	Foll.			Pre	Post	Foll.			F	p
Negative coping control	20.40±2.19	20.32±2.83	18.60±2.92	4.57	.01	18,85±3,39	20,38±2,90	18,95±3,21	2,75	.08	2.12	.12
					b							
Attentional control	23.00±3.34	21.04±3.02	20,44±3,27	4.24	.02	20,00±4,00	20,71±2,88	22,33±1,90	5.00	.01	8.06	.00
					b					b		
Visual image control	21,40±4,25	22,24±4,25	21,80±3,29	.27	.77	21,47±3,69	22,47±4,51	23,90±3,44	6.36	.00	1.29	.28
										b, c		
Positive coping control	21,92±3,21	22,12±2,47	23,44±2,06	2.22	.12	22,04±3,16	22,00±2,52	23±2,73	1,16	.32	.13	.85
Attitudinal control	22,68±2,70	22,12±2,94	22,28±2,54	.23	.80	21,66±3,10	21,71±2,75	22,42±2,78	.93	.40	.56	.57

Note. Means, standard deviations, differences between means for each period. Pre: represents the pre-intervention period; Post: represents the post-intervention period; Follow-up (Foll.): represents the follow-up period. The difference between periods within each group (control and experimental) is represented by the letters "a", "b" and "c". In this case, "a" represents the difference between the pre-intervention and post-intervention periods; "b" represents the difference between the pre-intervention and follow-up periods; "c" represents the difference between the post intervention and follow-up periods.

experimental group through constraints related to with the principles of the game (tactical component) using external focuses in football training tasks, would favour the improvement of this capacity. In this sense, and with regard to the main hypothesis put forward, the experimental group has positively modified its scores on attentional control after the intervention sessions carried out.

Firstly, negative coping control showed a slight decrease in the post-intervention period and a significantly high decrease during the follow-up period compared to the pre-intervention mean in the control group. On the other hand, the experimental group showed an increase in the post-intervention period and a slight increase during the follow-up period compared to the pre-intervention period. Therefore, the intervention programme favoured coping with adverse sporting situations, since although there was no significant combined group x time effect, the positive trend of the experimental group after the intervention programme and the negative trend of the control group could be observed. Previously, the direct positive relationship between negative coping control and attention has been demonstrated (Ríos et al., 2021). Thus, if your attention level increases, you have a greater ability to maintain attentional focus and therefore to control adverse negative emotions during the game (Ríos et al., 2021).

Specifically, attentional control showed significant differences between groups. On the one hand, the control group showed a significant decrease in this variable between the baseline measurement and follow-up measurement. On the other hand, the experimental group showed a slight increase in this variable during the intervention programme and a significant increase at follow-up compared to the initial measurement. Therefore, it can be affirmed

that after the intervention programme, the attentional control variable improved the state of alertness in specific game situations. This may reinforce the idea that the tasks directed by coaches and physical trainers should generate contexts and strategies that allow the control of mental and psychological variables during training, in working conditions and in the specific evaluation of skills and not exclusively through studies carried out in laboratories (Baláková et al., 2015; Vestberg et al., 2017). On the relevant external focus attention in training tasks and competitions where component and psychological abilities can be systematically and specifically planned under a broad spectrum of attention, associated with motor development (Scharfen & Memmert, 2019) and tactical behaviour. At the same time, it promotes the recognition of psychological and mental variables and aspects, providing methodological mechanisms to implement them in their daily practice. In the same way, it reinforces the importance of the contribution that psychologists can make to interdisciplinary work, while developing strategies that allow them to get closer to the field of specific and global training practice. In this way, it would be possible to encompass the complexity required by the game (Vestberg et al., 2017) and even to include other characteristics related to the study, detection, and assessment of the talent in football players at an early and training age (Baláková et al., 2015).

Regarding the visual image control variable, the control group showed an improvement after the intervention and the retention measure but not significantly. Similarly, the experimental group showed a significant trend but, in this case, significantly after the intervention programme and during the retention measure. In this sense, it was corroborated that the intervention helped the athletes to

master the sensory and perceptual experiences that are carried out through a controlled process. Therefore, the direct positive relationship between visual image control and attention was proven (Ríos et al., 2021). If your attentional focus is focused on the constraints imposed during training and the different alternatives that can arise during the game, you will be able to visual image control in similar situations that will arise in the game.

Specifically, the Positive coping control variable showed a positive trend in both the control and experimental groups after the intervention and during the follow-up period, but there were no significant differences. One of the possible explanations for this could be that as the season progresses, many situations are experienced during training and competition that help, at both a cognitive and behavioural level to maintain the appropriate attentional conditions in favourable situations. In this regard, a direct positive relationship has been found between positive coping control and attention (Ríos et al., 2021). Finally, attitudinal control showed a negative trend in the control group after the intervention programme and the follow-up stage. In contrast, the experimental group showed a positive trend after the intervention programme and the follow-up stage. Thus, after the intervention programme, the experimental group increased their mastery of task and environmental distortions. Therefore, the direct positive relationship between attitudinal control and attention was previously proven (Ríos et al., 2021). Focusing on specific strategies could lead to a higher level of attitudinal control by focusing on the goals to be achieved during the different tasks within the different constraints posed.

5. Practical Applications, Limitations, and future directions.

These results represent a step forward in the study of ability to focus in football players, using game situations similar to the competition. Thanks to this research, coaches and sport psychologists should propose global tasks in which all the physical and cognitive aspects are worked on simultaneously, since how they will be presented in the competition. It is also essential to maintain these variables throughout the season as they may be related to sporting performance. However, this scientific contribution presents a series of limitations that must be known and considered when trying to extrapolate these results to any other competitive context or in the different real situations of the game. Firstly, a limitation of this work relates to the sample included in the intervention programme. In this case, although it is very difficult to carry out this type of ecological study with a sample of elite youth players, the athletes included only compete in football and correspond in a small number. For this reason, it would be interesting in future research to include a sample that includes other team sports and a greater number of female athletes, in order to verify the differences between the sexes and to be able to work in a more specific way depending on the context in which the sporting activity is developed. Secondly, the inclusion of only one variable was analysed through subjective perceptions. In this sense, future studies could use behavioural (e.g. reaction time) or physiological (e.g. heart rate variability) indicators to increase scientific knowledge of the cognitive processes that influence sports performance.

In addition, it would be appropriate for the tests developed to be administered during training or competition itself, in order

to specifically observe which constraints favour the improvement of attentional focus.

6. Conclusions

Our results advance the literature by proving that an ecologically designed intervention programme using constraints in the training tasks significantly improved attentional control even after the retention measure. Similarly, the variables: negative coping control, visual image control, positive coping control, and attitudinal control showed a positive trend during follow-up and a negative trend in the control group.

Funding:

Financial support provided by the European Regional Development Fund (ERDF) and Government of Extremadura (Ministry of Economy, Science and Digital Agenda).

Conflicts of Interest:

The authors declare no conflict of interest

References

- Baláková, V., Boschek, P., & Skalíková, L. (2015). Selected cognitive abilities in elite youth soccer players. *Journal of Human Kinetics*, 49(1), 267–276. <https://doi.org/10.1515/hukin-2015-0129>
- Barbosa, C., Montiel, J. M., Machado, A. A., & Bartholomeu, D. (2017). Comparação da atenção em jogadores de futebol e em não atletas. *Psychologica*, 60(2), 141–160. https://doi.org/10.14195/1647-8606_60-2_8
- Howard, C. J., Uttley, J., & Andrews, S. (2018). Team ball sport participation is associated with performance in two sustained visual attention tasks: Position monitoring and target identification in rapid serial visual presentation streams. In S. Marcora & M. Sarkar (Eds.), *Sport and the brain: The science of preparing, enduring and winning, part 100* (Vol. 240, pp. 53–69). Elsevier B.V. <https://doi.org/10.1016/BS.PBR.2018.09.001>
- Hüttermann, S., Memmert, D., & Nerb, J. (2019). Individual differences in attentional capability are linked to creative decision making. *Journal of Applied Social Psychology*, 49(3), 159–167. <https://doi.org/10.1111/jasp.12572>
- Lohse, K. R. (2012). The influence of attention on learning and performance: Pre-movement time and accuracy in an isometric force production task. *Human Movement Science*, 31(1), 12–25. <https://doi.org/10.1016/j.humov.2011.06.001>
- Mann, D. Y., Williams, A. M., Ward, P., & Janelle, C. M. (2007). Perceptual-cognitive expertise in sport: A meta-analysis. *Journal of Sport and Exercise Psychology*, 29(4), 457–478. <https://doi.org/10.1123/jsep.29.4.457>
- Mendo, A. H. (2006). Un cuestionario para la evaluación psicológica de la ejecución deportiva: estudio complementario entre TCT y TRI. *Revista de psicología del deporte*, 15(1), 71–93
- Memmert, D. (2009). Pay attention! A review of visual attentional expertise in sport. *International Review of Sport and Exercise Psychology*, 2(2), 119–138. <https://doi.org/10.1080/17509840802641372>
- Moëinirad, S., Abdoli, B., Farsi, A., & Ahmadi, N. (2022). Training visual attention improves basketball three-point shot performance under pressure. *Sport Sciences for Health*, 18, 853–861. <https://doi.org/10.1007/s11332-021-00866-0>
- Porter, J., Wu, W., & Partridge, J. (2010). Focus of attention and verbal instructions: Strategies of elite track and field coaches and athletes. *Sport Science Review*, 19(3–4), 77.
- Ríos, J., Pérez, Y., Fuentes, E., Soris, Y., & Borges, R. (2021). Anxiety and psychological variables of sports performance related to injuries in high-performance sportsmen. *Apunts Sports Medicine*, 56, 100358. <https://doi.org/10.1016/j.apunsm.2021.100358>
- Scharfen, H. E., & Memmert, D. (2019). The relationship between cognitive functions and sport-specific motor skills in elite youth soccer players. *Frontiers in Psychology*, 10, 1–10. <https://doi.org/10.3389/fpsyg.2019.00817>
- Schwab, S., Rein, R., & Memmert, D. (2019). “Kick it like Ronaldo”: a cross-sectional study of focus of attention effects during learning of a soccer knuckle ball free kick technique. *German Journal of Exercise and Sport Research*, 49(1), 91–96. <https://doi.org/10.1007/s12662-018-0558-4>

- Starkes, J. L., Helsen, W. F., & Jack, R. (2001). Expert performance in sport and dance. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of research in sport psychology* (pp. 174–201). Wiley.
- Thompson, C. J., Noon, M., Towson, C., Perry, J., Coutts, A. J., Harper, L. D., Skorski, S., Smith, M. R., Barrett, S., Meyer, T., & Thompson, C. (2020). Understanding the presence of mental fatigue in English academy soccer players. *Journal of Sports Sciences, 38*(13), 1524–1530.
<https://www.tandfonline.com/doi/abs/10.1080/02640414.2020.1746597>
- Vestberg, T., Reinebo, G., Maurex, L., Ingvar, M., & Petrovic, P. (2017). Core executive functions are associated with success in young elite soccer players. *PLoS ONE, 12*(2), 1–13.
<https://doi.org/10.1371/journal.pone.0170845>
- Weinberg, D. S., & Gould, D. (2010). *Fundamentos de Psicología del Deporte y el Ejercicio Físico*. Ariel.
- Wulf, G. (2013). Attentional focus and motor learning: A review of 15 years. *International Review of Sport and Exercise Psychology, 6*(1), 77–104.
<https://doi.org/10.1080/1750984X.2012.723728>
- Wulf, G., Töllner, T., & Shea, C. H. (2007). Attentional focus effects as a function of task difficulty. *Research Quarterly for Exercise and Sport, 78*(3), 257–264.
<https://doi.org/10.1080/02701367.2007.1059942>