

# apunts

EDUCACIÓN FÍSICA Y DEPORTES

148

2.º trimestre (abril-junio) 2022  
ISSN: 2014-0983

inefc



Generalitat  
de Catalunya



# Experiences of Olympic Hopefuls of the Disruption of the Olympic Cycle at Tokyo 2020

Rocío Zamora-Solé<sup>1,3</sup> , Saül Alcaraz<sup>2,3</sup> , Susana Regüela<sup>4</sup> and Miquel Torregrossa<sup>2,3</sup>

<sup>1</sup>Department of Psychobiology and Methodology of Health Sciences, Autonomous University of Barcelona, Barcelona (Spain).

<sup>2</sup>Department of Basic, Developmental Psychology and Education, Autonomous University of Barcelona, Barcelona (Spain).

<sup>3</sup>Institute for Sports Research (IRE), Autonomous University of Barcelona, Barcelona (Spain).

<sup>4</sup>High Performance Sports Centre, Sant Cugat del Vallès (Spain).

## Cite this article:

Zamora-Solé, R., Alcaraz, S., Regüela, S., & Torregrossa, M. (2022). Experiences of Olympic Hopefuls of the Disruption of the Olympic Cycle at Tokyo 2020. *Apunts Educación Física y Deportes*, 148, 1-9. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.01](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.01)

## Abstract

Lockdown due to COVID-19 and the postponement of the Tokyo 2020 Olympic Games meant Olympic hopefuls experienced an uncertain and changing Olympic cycle. This paper describes the experiences of high-level and high-performance athletes amidst the disruption of the Olympic cycle caused by the concurrent non-normative transitions of coronavirus lockdown and the postponement of the Olympic Games. Twenty-five athletes (14 females and 11 males; age  $M = 26.2$ ,  $SD = 6.99$ ) were interviewed via videoconference during the eighth week of confinement. An inductive reflexive thematic analysis was carried out to organise the results into four thematic axes: (a) pre-confinement, (b) confinement, (c) post-confinement and (d) Tokyo 2020 + 1. The announcement of the postponement of the Olympic Games was recognised as a milestone that changed the lockdown experience, transforming the perception of lockdown as a threat into an opportunity. While the transitions were experienced in a variety of ways, the presence of sport identity psychological resources (i.e., frustration tolerance and resilience), the development of extra-sport identities (i.e., dual careers) and sport lifestyle (e.g., experiences at meets) are highlighted as facilitating factors in coping with and managing these concurrent transitions. The results obtained can help sports psychology professionals and others in the field to aid athletes in coping with the disruption of the Olympic cycle, as well as in coping with other unexpected situations.

**Keywords:** athlete, coronavirus, lockdown, non-normative transition, olympic games, qualitative methodology.

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Corresponding author:

Rocío Zamora  
[rocio.zamora@uab.cat](mailto:rocio.zamora@uab.cat)

## Section:

Human and Social Sciences

## Original language:

Spanish

## Received:

May 3, 2021

## Accepted:

October 26, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Introduction

The 32nd Olympic Games were scheduled to be held in July 2020 in Tokyo. To this end, athletes from all over the world were preparing to face the final phase on the road to Olympic qualification. Towards the end of 2019, the first cases of infection from a new coronavirus strain causing COVID-19, were announced and, due to the evolution of the situation, a global pandemic was declared by the World Health Organisation (WHO) on 11 March 2020. COVID-19 disrupted the daily lives of a large part of the world's population and in doing so, also caused major disruption to the Olympic cycle. Like the rest of the population, athletes faced lockdown enforced by the authorities of their countries and, in their specific case, they also had to deal with the postponement of the Olympic Games, a sporting goal for which they had been preparing for at least four years. In this paper the experiences of high performance athletes (DAR) and high level athletes (DAN) will be explored, as they underwent these two transitions concurrently (i.e., lockdown and postponement of the Olympic Games).

To this end, the paper will adopt the position of the International Society of Sport Psychology (ISSP) on the career development and transitions of athletes (Stambulova et al., 2020a). In it, transitions are defined as phases of change and are highlighted as one of the main conceptualisations in the discourse on sport careers. Career transitions have been classified into three categories, according to their predictability: (a) normative, those that are relatively predictable and derived from the logic of athlete development; (b) non-normative, those that are difficult to predict; and (c) quasi-normative, those that are predictable for a particular group of athletes. The former includes the transition from junior to senior (Torregrossa et al., 2016) and retirement from elite sport (Torregrossa et al., 2015; Jordana et al., 2017), the latter include aspects such as sport injuries (Palmi & Solé-Cases, 2014), in addition to sport migration (Prato et al., 2020). Lockdown due to COVID-19 and the postponement of the Olympic Games can be conceptualised as non-normative transitions; the former is an event while the latter is not (see Schlossberg, 1981). Stambulova (2003) points out that non-normative transitions are more likely to turn into crises (see also Stambulova et al., 2020a), due to the inherent difficulty of anticipating them.

Focusing on the experience of lockdown due to COVID-19, Odriozola-González et al. (2020) conducted a quantitative study to analyse the short-term psychological effects of the COVID-19 crisis and lockdown on the Spanish population. Specifically, the study sought to assess symptoms of anxiety, depression and stress, which

were measured through a questionnaire. The results showed that, out of a total of 3550 participants, 32.4% showed symptoms of anxiety, 44.1% of depression and 37.0% of stress. Pons et al. (2020) sought to describe and characterise the overall impact that lockdown had on young athletes. The results of this quantitative study showed that the assessment of lockdown was negative in terms of impact on both mental health and different spheres of life (e.g. dual career). Clemente-Suárez et al. (2020) conducted a study of 175 Olympians and Paralympians with the understanding that this population faced an additional barrier: the postponement of the Tokyo 2020 Olympic Games. The study aimed to analyse the effect of psychological profile, academic level and gender on the perception of personal and professional threat in the run-up to the Tokyo 2020 Olympic Games. It demonstrated that both Olympians and Paralympians had a negative perception of lockdown in relation to their training routines, but not in their performance in the run-up to the Games. At the same time, quarantine did not have a significant impact on athletes' anxiety responses, which they attributed to the experience and coping strategies that athletes develop.

The Olympic Games constitute the pinnacle event for many sports and it is common for athletes and sports organisations alike to plan their activities around the Olympic cycle (Wylleman et al., 2012; Solanellas and Camps, 2017; Henriksen et al., 2020a). The disruption of the Olympic cycle resulted in the postponement of the Olympic Games for a year and complete suspension was threatened up until a few days before it was due to take place. This alteration occurred in the last phase of preparation for Olympic qualification, causing career disruption potentially resulting in a loss of motivation, identity and meaning (Henriksen et al., 2020b). Oblinger-Peters & Krenn (2020) conducted a qualitative study with the aim of exploring subjective perceptions of Austrian athletes and coaches surrounding the postponement of the Tokyo 2020 Olympic Games. It was discovered that postponement was experienced in various ways and that the immediate emotional responses ranged from confusion, disappointment and relief. The main consequences associated with postponement included: prolonged physical and psychological strain, concern about performance impact, loss of motivation, as well as opportunity for recovery and improvement.

In analysing the impact of the concurrent non-normative transitions of lockdown due to COVID-19 and the postponement of the Olympic Games, Stambulova et al., (2020b) differentiate between three possible scenarios depending on the stage of the athlete's sporting career. The

first scenario is rejection of the situation and it is considered typical of athletes who are towards the end of their careers and who have already participated in an Olympic Games and even won medals. They therefore do not want to face the uncertainty that comes with the disruption of the Olympic cycle and decide that it is an opportune time to retire. The second scenario is acceptance of the situation, representing early/mid-career athletes who are less affected by the disruption of the Olympic cycle, whether the intermediate postponement or even the complete suspension, because they still have the possibility of preparing for later cycles (e.g. the 2024 Olympic Games). This group of athletes would prefer to take a break and prepare strategically for the next Olympic Games as they do not consider that they have the resources to cope with the demands imposed by COVID-19 and the postponement of the Games. The final scenario constitutes one of struggle and represents athletes who are in the middle or towards the end of their careers, who have accumulated numerous resources and experiences, and decide to face COVID-19 with an active struggle to adapt and become stronger in this transition.

Taku & Arai (2020) point out that COVID-19 sets a precedent with regard to the certainty of holding sporting events, such as the Olympic Games. Investigating into the history of the Olympic Games, Constandt & Willem (2021) recall that in 1920 the Olympic Games took place in Antwerp. These Games took place in the aftermath of the First World War and the Spanish flu pandemic. Little is known about the experiences of the athletes, but like the current pandemic, the Games took place during a public health crisis. Symbolically, these Games represented the rebirth of the Olympic movement.

As has been observed, the studies that have been carried out to date have focused mainly on exploring COVID-19 lockdown and the postponement of the Tokyo 2020 Olympic Games in a quantitative manner. In contrast, few studies have used qualitative methodology to explore experiences related to the disruption of the Olympic cycle, resulting from lockdown and postponement. In order to provide insight into the experiences of aspiring male and female Olympians who underwent these concurrent non-normative transitions, this study presents an account through a retrospective exploration (of lockdown) and a prospective one (in relation to the eventual hosting of the Tokyo 2020 Olympic Games in 2021).

## Methodology

In this paper, qualitative research from a constructivist philosophical position was conducted. In other words, the research sought to understand the meanings that people attribute to lived experiences. To this end, two assumptions

were made: (a) there is no external reality independent of people, but reality is shaped in relation to experiences and (b) knowledge is jointly constructed through interactions between participant and researcher (see Poucher et al., 2020).

## Participants

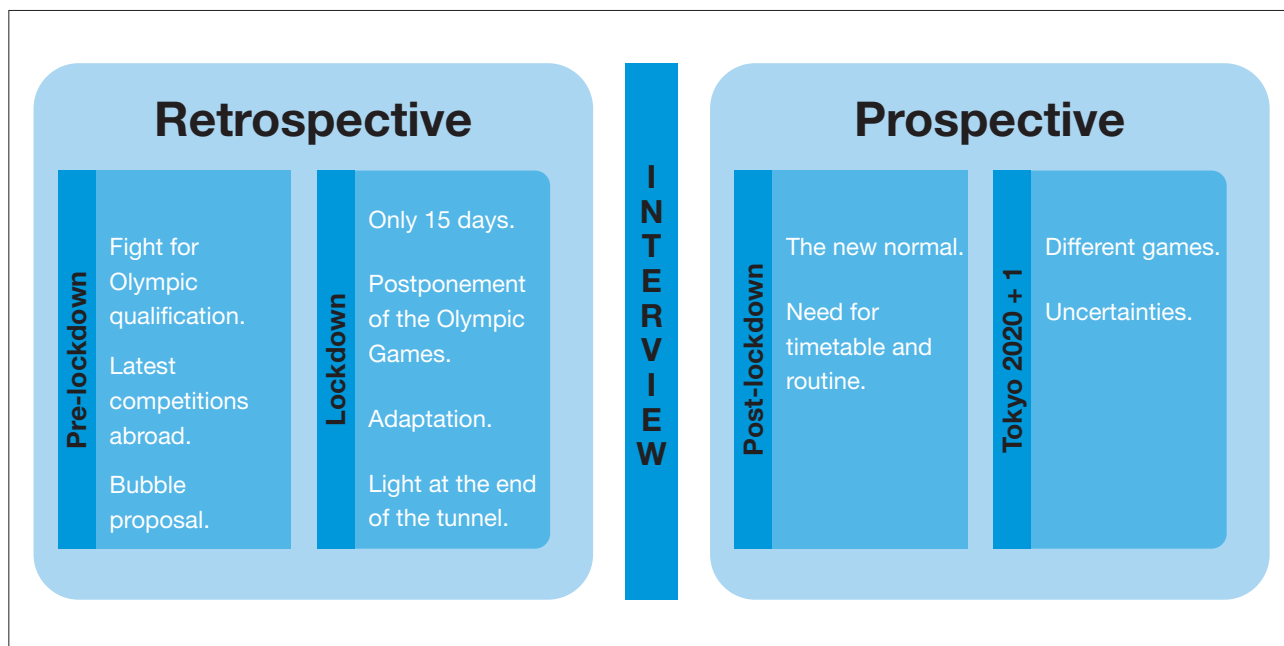
A convenience sampling was carried out and 25 DAN and DAR athletes linked to a High Performance Sports Centre participated on a voluntary basis: 14 women and 11 men ( $M = 26.2$   $SD = 6.9$ ). 88% participated in individual sports and 12% in team sports. 84% were pursuing a dual career, i.e. combining sport and studies or work (Stambulova & Wylleman, 2015). The selection criteria was to either have qualified or be in the process of qualifying for the Tokyo 2020 Olympic Games (qualifiers: 4 and in the process of qualifying: 21).

## Instrument

Semi-structured interviews were conducted in order to enable a detailed account of the participants' experiences. The interviews were conducted by the authors RZS and SR and the authors MT and SA. An interview script (see supplementary material) was prepared for the exploration of the following thematic axes: (a) sporting career, (b) importance of the Olympic Games, (c) lockdown experience, (d) vision of the post-lockdown world and (e) deferred pathway to Tokyo 2020. During the interview, participants were invited to share their stories about lockdown and the postponement of the Olympic Games.

## Procedure

After obtaining approval from the University Ethics Committee (CEEAH 5180), participants were selected and convened. Once participation was agreed, the project information sheet and the informed consent form were sent out. All participants signed the informed consent form before participating in the study. Each participant took part in a semi-structured synchronous interview conducted via videoconference, lasting between 30 and 90 minutes. Interviews were conducted in May 2020, following eight weeks of lockdown, as permission for outdoor physical activity began to be authorised. The time slots allocated for sporting activities were longer for DAN athletes and they also had the right to travel outside the municipality. All interviews were audio and video recorded and then transcribed following Jefferson's methodology (Bassi-Follari, 2015). Due to the possibility of identifying the participants, pseudonyms were used to preserve confidentiality.



**Figure 1**  
Result of the reflective thematic analysis: themes and sub-themes.

## Data analysis

Based on reflexive thematic analysis (Braun & Clarke, 2019), an inductive analysis was carried out adhering to the following phases: (a) data familiarisation, (b) code generation, (c) initial theme creation, (d) theme and code revision, (e) final definition of themes and (f) report writing. To ensure scientific rigour, critical peer reviews were conducted in order to raise observations on the process of topic generation and representation (Smith & McGannon, 2018).

## Results and Discussion

Considering that the description and interpretation of meanings are closely related, the Results and Discussion sections are combined in an attempt to interweave the experiences of the athletes with the scientific literature. Figure 1 summarises the themes and sub-themes resulting from the inductive reflective thematic analysis. These are structured along a timeline, with the first two themes reflecting the retrospective view at the time of the interview (regarding lockdown) and the last two reflecting the prospective view (of postponement).

### Retrospective analysis

The following is a retrospective account of athletes' experiences of pre-lockdown and lockdown phases.

### Pre-lockdown

#### Competing for Olympic qualification

The first four months of 2020 saw major competitions for most athletes who were still competing to qualify for the Olympics. Depending on the sporting discipline, qualification depended on the result of participation in a pre-Olympic competitions (e.g. water sports) or on the sum of points obtained in multiple competitions and overall *ranking* (e.g. athletics). In both cases, and as noted by Henriksen et al. (2020a), the pre-lockdown stage was a phase of intense training in order to achieve peak fitness. Clara explains: "[...] I remember the last days of training, we did so much, so much, so much, that we would get there and we couldn't even study."

#### Final competitions abroad

Days before the establishment of the state of alarm in Spain, some athletes sought to compete in their final competitions abroad. The global situation regarding COVID-19 was becoming more complicated day by day, and travelling abroad implied a fear of not being able to return home and of being stigmatised on the basis of being a Spanish athlete (due to the fact that Spain was gradually becoming one of the countries most affected by the number of contagions). Brooks et al. (2020) highlighted stigmatisation as one of the main post-lockdown stressors; i.e. rejection, fear, and cessation of invitations to social events for fear of contagion.

The results of the present study showed that stigmatisation was a stressor present, even prior to lockdown.

"[...] Before lockdown started, we were travelling to (a country) that had a European Cup which was a qualifier, it was one of the most important competitions of the season. And when we arrived, we had to go home the next day without competing because [country] had declared that Spaniards were not allowed in [country]. To be honest, that was a bit of a difficult time, realising: 'Damn! Competitions are being postponed and I'm not sure when I will compete, where I will compete or how I will qualify'. It was quite a difficult few days."

### **Bubble proposal**

In the days leading up to the imposition of lockdown, there was a sense of tension in the high performance centre. Faced with the exponential growth of cases in Spain, management opted to anticipate the circumstances and offer an alternative plan so that athletes with the possibility of Olympic participation could continue training in a safe space. They gathered all the athletes and coaches together and offered them the possibility of lockdown in the centre in order to continue training. This lockdown meant that for the duration of the state of alarm (initially only 15 days) they could not leave the centre and, in turn, no one could enter. In response to this communication, two positions emerged: those who decided to lockdown in the centre and those who preferred to do so at home with their loved ones. Following the communication, those who had decided to lockdown in the centre returned home to pack their bags, and it was then that the situation changed. With the confirmation of a positive test result at the centre, the possibility of lockdown there became impossible, and the institution had to be closed. Laia comments: "If I had been staying there and had my room and my space, I don't know (.) I might have reacted differently. But I just said 'no'. And I felt really guilty, because in the end I was deciding not to train."

### **Lockdown**

Most athletes identified four phases within lockdown. Within them it can be observed how the two transitions have been interconnected. The first phase, coded as "Only 15 days", captures the initial belief regarding the duration of lockdown. Putting aside the bewilderment and uncertainty of a new and unforeseen situation, given that the Olympic objective was still viable, training sessions were made just as demanding as before this new reality. Motivation remained high. Jordi commented: "Well, this is only going

to last a week, two at the most, and then things will go back to normal. I even trained harder than (...) I train normally, I did some pretty *heavy* sessions on the treadmill."

The second phase coded as "Postponement of The Olympic Games" followed the announcement of the postponement of the Olympic Games. In the days leading up to the Olympics, the sporting calendar was plagued by cancellations and postponements, but the Olympic goal was still alive and well. This situation caused concern as athletes from other countries continued their training without restrictions while athletes from Spain feared that their performance would suffer due to the unequal conditions. Faced with the postponement, on the one hand, they were relieved that conditions would be equal again, and on the other hand, they were sad to see another objective discarded from the competitive calendar. The emotional responses are similar to those found by Oblinger-Peters & Krenn (2020): confusion, disappointment and relief. Joaquín, an athlete who had overcome an injury, commented:

"When they decided that they were not going to be held, my mentality changed. It took me two or three days to get to grips with the fact that it wasn't going to happen and I'd put in all that effort, especially to recover from an injury, eh, it's not in vain, right?"

In this phase the motivation to train decreases due to the lack of goals. Alina explains:

"After they decided they were cancelling them and moving them to the following year, that second week was a bit of a downer because in the end it was a bit like: 'Ugh, what am I training for now if we don't know when there are going to be competitions?'"

The third phase was coded as "Acceptance and Opportunity" and shows the process of adapting to concurrent transitions. In this phase most athletes, with the support of their coaches, managed to set short-term goals and changed their assessment of lockdown and postponement from one of threat into one of opportunity. They prioritised other aspects of their lives (e.g. studies, career development, family) and took advantage of training at home to partake in training activities that habitually, due to lack of time, they are not able to do. Ignasi commented:

"We saw it like this: you can gain strength, you can gain flexibility if you stretch every day, you have a lot of time to work on flexibility, which sometimes we don't have time for on a daily basis."

The present results show that the psychological resources of sport identity (i.e., frustration tolerance, adaptability), resources related to the environment (i.e., coaches, family and centre agents) and the development of extra-sport identities (i.e., studies, professional development) have operated as facilitating factors in coping with and managing these concurrent transitions. In turn, the results add the perception of lifestyle as a resource for adapting to the demands of lockdown. Ignasi commented:

"I think that in situations like this, which are a bit exceptional, sportsmen and women are able to cope well. Even better than other people because we are actually more exposed to situations that are extraordinary. In competitions anything can happen and you have to know how to deal with it. I think, and I'm speaking generally, that we athletes are people who [laughs] often face restrictions, basically."

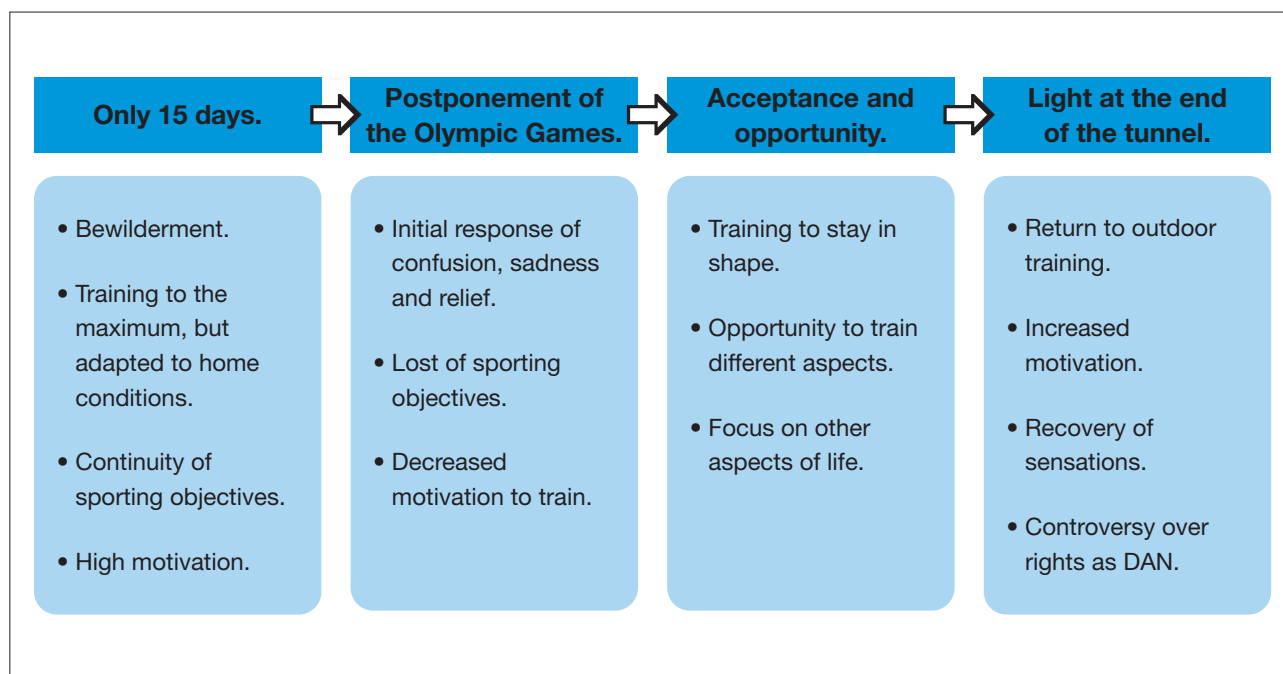
It is also at this stage that some athletes reported to have reflected on the role of sport, not only in their lives, but also in society. They also reflected on their identity. In this respect, the present results mirror those of Schinke et al. (2020) who argue that any unforeseen transition conceals the possibility of personal enrichment. Taking distance from the exacting demands of the sporting world

allowed for the development of personal identity and the exploration of interests outside sport. Joaquín shared:

"I mean, I can describe myself without saying I've been an Olympian, I've been to a World Cup, I've been [a sporting discipline]. You know? It has made me reflect on that. You are not just that! You are more than that!"

The last sub-theme was coded as "Light at the end of the tunnel" and coincides with the relaxation of lockdown, and the possibility of leaving home for outdoor training. The government decreed that DAN athletes were permitted longer training slots than the rest of the population. The possibility of training outdoors increased their motivation and enabled them to regain experiences that could not be replicated through training at home. Those who participated in water sports were particularly interested in regaining these experiences, as they had never before been away from their environment – the water – for such a long time. After returning to the sea Aina commented: "It's incredible, I mean, I don't know, I really wanted to go back and in fact, well, I trained and then it's true that I floated around for a while." Figure 2 summarises the phases described above with their sub-themes and codes.

Ruffault et al. (2020) found that athletes who continued training at home and maintained the dynamics of interaction with the technical team generated the ideal conditions for



**Figure 2**  
Lockdown phases: sub-themes and codes.

return to sport, reducing anxiety levels and remaining intrinsically motivated. The present results coincide, but the differences between sports need to be considered (i.e., aquatic and non-aquatic), on the basis that those who depend on aquatic environments for their sporting activities have never had to spend so many days away from the water. As a result, they highlighted the uncertainty of how long it would take for them to recover their fitness as a concern.

### **Prospective analysis**

Below are the codes, sub-themes and topics defined on the basis of expectations for the Post-Lockdown phase and concerns regarding the Olympic Games, scheduled to take place in 2021.

#### **Post-lockdown:**

In asking athletes to tell us what they envisaged the post-lockdown phase to be like, most participants highlighted: (a) concern about the global impact of COVID-19 (e.g. deaths, economic crisis, unemployment), (b) uncertainty about the sporting calendar, Joan commented:

"[...] we don't have the assurances we had last year (2019). Last year, well, you could plan from September until the Spanish Championships, for example. Because you knew that everything was going to be able to go ahead. But this year (.) we don't know."

(c) Concern about the duration of COVID-19 and (d) the expectation to return to training at the centre and adapt to the new health and safety regulations and protocols. In relation to the latter, Isona commented:

"It's going to be weird at first, isn't it? A lot of care, a lot of control, but I think the ability to adapt, especially for athletes, is very high. Once we've done it a few times we'll get used to the fact that this is what we have to do and that these are the measures we have to take and we'll do it."

#### **Tokyo 2020 + 1**

Most athletes agreed that the Tokyo 2020 + 1 Olympic Games will have an added value, given that in addition to the usual barriers they have to overcome within the Olympic cycle, this time they have also overcome the COVID-19 barrier. Projecting what the road to Tokyo 2020 + 1 might look like, Berta shared:

"The road there will be a bit of a *déjà vu* because, of course, I've already completed the season. You know? Now repeating it is like a second chance, because this time things are clearer to me."

As in the results of Clemente-Suárez et al. (2020), no negative perception of the impact of lockdown on

performance in the run-up to Tokyo 2020 was found in the present study.

Considering the three scenarios proposed by Stambulova et al. (2020b), the present results show that uncertainty and concern about the evolution of COVID-19 and the potential cancellation of the Olympic Games, were even stronger in those who see Tokyo 2020 as the final stages of their sporting careers, and even their last or only chance of Olympic participation. Robert said:

"If the Olympic Games had taken place in 2020, depending on how things turned out there, I would have considered certain areas of my future and my sporting career, but imagine if they were cancelled! I certainly don't know where I could find the energy... Yikes! The way I see it is that I've given it my all, I've come close once and all of a sudden that dream is gone."

The results of the present study are in line with Hakansson et al. (2021) who warn of the need to consider not only the acute impact of concurrent transitions, but also the cumulative and prolonged impact of the pandemic and the postponement of the Olympic Games on the psychological well-being of athletes.

### **Conclusions**

The results of this qualitative study offer further evidence for understanding the experiences of Olympic hopefuls in relation to the disruption of the Olympic cycle (i.e., lockdown and postponement of the Tokyo 2020 Olympic Games). The retrospective exploration of lockdown and prospective exploration of postponement have allowed an overview of the different events that make up these transitions. The announcement of the postponement of the Olympic Games was acknowledged as a milestone that changed the experience of lockdown, transforming the perception of lockdown from a threat into an opportunity. A number of resources that facilitated coping and adaptation to these transitions were also identified. These include psychological resources specific to sport identity (e.g. frustration tolerance, adaptability), environmental resources (e.g. coaches and other centre staff, rights as top athletes), lifestyle resources (e.g. habituation to training camps) and the development of extra-sporting identities (e.g. studies, professional development).

Exploring the prospective vision allowed possible focuses of intervention by sport psychology professionals to be detected, contemplating the impact of the prolongation of the pandemic. At the same time, it is understood that the disruption of the Olympic cycle can be seen as another opportunity to train athletes to deal with unexpected situations. By considering the stage of their sporting careers, athletes can be helped to make decisions about

fighting, fleeing or coping with the demands of these transitions.

This study makes the relevant contributions described above and is not without its limitations. Primarily, considering the pragmatic nature of the project and the interpretative nature of this particular study, the commitment to the confidentiality of the participating athletes necessarily resulted in the omission of some information that could be interesting for the people who read the article, this limits the transferability of this information to other similar sporting contexts, as well as the applied use that can be made by sport science professionals.

Finally, future research could focus on: (a) longitudinally exploring the disruption of the Olympic cycle, (b) exploring the experience of the surrounding actors (i.e. coaches, families) and (c) exploring the post-Olympic transition in this particular cycle.

## Acknowledgements

This work has been carried out thanks to the contribution of two research projects. Firstly, the project "Healthy Dual Careers" (HeDuCa) which has been supported by the Ministry of Science, Innovation and Universities (reference RTI2018-095468-B-I00), Spain. Additionally, thanks to the project: "Athletes' and sport entourage's longitudinal experiences on the disruption of the Olympic cycle of Tokyo 2020" supported by the Olympic Studies Centre of the International Olympic Committee (IOC).

Special thanks to all the participants in this study for allowing the researchers to investigate their experiences, enabling mental health professionals to understand how to help them cope with unexpected situations. We would also like to thank Marina García, Dorottya Molnár, José Mejías, Anna Jordana and Marta Borrueco for their collaboration in transcribing the interviews.

## References

- Bassi Follari, J. (2015). Gail Jefferson's transcription code: adaptation for its use in social sciences research. *Quaderns de Psicologia*, 17, 39. <https://doi.org/10.5565/rev/qpsicologia.1252>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589-597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Brooks, S., Webster, R., Smith, L., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 395(10227), 912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Clemente-Suárez, V., Fuentes-García, J., de la Vega Marcos, R., & Martínez Patiño, M. (2020). Modulators of the Personal and Professional Threat Perception of Olympic Athletes in the Actual COVID-19 Crisis. *Frontiers in Psychology*, 11, 1985. <https://doi.org/10.3389/fpsyg.2020.01985>
- Constandt, B., & Willem, A. (2021). Hosting the Olympics in Times of a Pandemic: Historical Insights from Antwerp 1920. *Leisure Sciences*, 43 (1-2), 50-55. <https://doi.org/10.1080/01490400.2020.1773982>
- Håkansson, A., Moesch, K., Jönsson, C., & Kenttä, G. (2021). Potentially Prolonged Psychological Distress from Postponed Olympic and Paralympic Games during COVID-19—Career Uncertainty in Elite Athletes. *International Journal of Environmental Research and Public Health*, 18 (1), 2. <https://doi.org/10.3390/ijerph18010002>
- Henriksen, K., Schinke, R., McCann, S., Durand-Bush, N., Moesch, K., Parham, W. D., Larsen, H. L., Cogan, K., Donaldson, A., Poczwadowski, A., Hunziker, J., & Noce, F. (2020a). Athlete mental health in the Olympic/Paralympic quadrennium: a multi-societal consensus statement. *International Journal of Sport and Exercise Psychology*, 18(3), 391-408. <https://doi.org/10.1080/1612197X.2020.1746379>
- Henriksen, K., Schinke, R., Noce, F., Poczwadowski, A., & Si, G. (2020b). Working with athletes during a pandemic and social distancing. *The International Society of Sport Psychology (ISSP)*. [https://www.issponline.org/images/isspdata/latest\\_news/ISSP\\_Corona\\_Challenges\\_and\\_Recommendations.pdf](https://www.issponline.org/images/isspdata/latest_news/ISSP_Corona_Challenges_and_Recommendations.pdf)
- Jordana, A., Torregrossa, M., Ramis Laloux, Y., & Latinjak, A. T. (2017). Retirada del deporte de élite: Una revisión sistemática de estudios cualitativos. *Revista de Psicología del Deporte*, 26(4), 68-74.
- Oblinger-Peters, V., & Krenn, B. (2020). "Time for Recovery" or "Utter Uncertainty"? The Postponement of the Tokyo 2020 Olympic Games Through the Eyes of Olympic Athletes and Coaches. A Qualitative Study. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.610856>
- Odriozola-González, P., Planchuelo-Gómez, Á., Irujo-Muñoz, M., & de Luis-García, R. (2020). Psychological symptoms of the outbreak of the COVID-19 confinement in Spain. *Journal of Health Psychology*, 1-11. <https://doi.org/10.1177/1359105320967086>
- Palma Guerrero, J., & Solé Cases, S. (2014). Psychology and Sports Injury: Current State of the Art. *Apunts Educación Física y Deportes*, 118, 23-29. [https://doi.org/10.5672/apunts.2014-0983.es.\(2014/4\).118.02](https://doi.org/10.5672/apunts.2014-0983.es.(2014/4).118.02)
- Pons J., Ramis Y., Alcaraz S., Jordana A., Borrueco M., & Torregrossa M. (2020) Where Did All the Sport Go? Negative Impact of COVID-19 Lockdown on Life-Spheres and Mental Health of Spanish Young Athletes. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.611872>
- Poucher, Z., Tamminen, K., Caron, J., & Sweet, S. (2020). Thinking through and designing qualitative research studies: A focused mapping review of 30 years of qualitative research in sport psychology. *International Review of Sport and Exercise Psychology*, 13(1), 163-186. <https://doi.org/10.1080/1750984X.2019.1656276>
- Prato, L., Alcaraz, S., Ramis, Y., & Torregrossa, M. (2020). Experiencias del entorno deportivo de origen al asesorar a esgrimistas migrantes. *Pensamiento Psicológico*, 18(2), 1-31. <https://www.redalyc.org/journal/801/80164789004/html/>
- Ruffault, A., Bernier, M., Fournier, J., & Hauw, N. (2020). Anxiety and Motivation to Return to Sport During the French COVID-19 Lockdown. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.610882>
- Schinke, R., Papaioannou, A., Maher, C., Parham, W., Larsen, C., Gordin, R., & Cotterill, S. (2020) Sport psychology services to professional athletes: working through COVID-19. *International Journal of Sport and Exercise Psychology*, 18 (4), 409-413. <https://doi.org/10.1080/1612197X.2020.1766182>
- Schlossberg, N. K. (1981). A Model for Analyzing Human Adaptation to Transition. *The Counseling Psychologist*, 9(2), 2-18.
- Smith, B., & McGannon, K. (2018). Developing rigor in qualitative research: problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology*, 11(1), 101-121. <https://doi.org/10.1080/1750984X.2017.1317357>

- Solanelas, F., & Camps, A. (2017). The Barcelona Olympic Games: Looking Back 25 Years On (1). *Apunts Educación Física y Deportes*, 127, 7-26.
- Stambulova, N. (2003). Symptoms of a crisis-transition: A grounded theory study. En N. Hassmen (Ed.), *SIPF Yearbook* (97- 109). Örebro, Sweden: Örebro University Press.
- Stambulova, N., Ryba, T., & Henriksen, K. (2020a). Career development and transitions of athletes: the International Society of Sport Psychology Position Stand Revisited. *International Journal of Sport and Exercise Psychology*, 1-27. <https://doi.org/10.1080/1612197X.2020.1737836>
- Stambulova, N., Schinke, R., Lavalley, D., & Wylleman, P. (2020b). The COVID-19 pandemic and Olympic/Paralympic athletes' developmental challenges and possibilities in times of a global crisis-transition. *International Journal of Sport and Exercise Psychology*, 1-10. <https://doi.org/10.1080/1612197X.2020.1810865>
- Stambulova, N. B., & Wylleman, P. (2015). Dual career development and transitions. *Psychology of Sport and Exercise*, 21, 1-3. <http://doi.org/10.1016/j.psychsport.2015.05.003>
- Taku, K., & Arai, H. (2020). Impact of COVID-19 on Athletes and Coaches, and Their Values in Japan: Repercussions of Postponing the Tokyo 2020 Olympic and Paralympic Games. *Journal of Loss and Trauma*, 25 (8), 623-630. <https://doi.org/10.1080/15325024.2020.1777762>
- Torregrossa, M., Chamorro, J. L., & Ramis, Y. (2016). Transition from junior to senior and promoting dual careers in sport: an interpretative review. *Revista de Psicología Aplicada al Deporte y el Ejercicio Físico*, 1, 1-11. <https://doi.org/10.5093/rpadef2016a6>
- Torregrossa, M., Ramis, Y., Pallarés, S., Azócar, F., & Selva, C. (2015). Olympic athletes back to retirement: A qualitative longitudinal study. *Psychology of Sport and Exercise*, 21, 50-56. <https://doi.org/10.1016/j.psychsport.2015.03.003>
- Wylleman, P., Reints, A., & Van Aken, S. (2012). Athletes' perceptions of multilevel changes related to competing at the 2008 Beijing Olympic Games. *Psychology of Sport and Exercise*, 13(5), 687-692. <https://doi.org/10.1016/j.psychsport.2012.04.005>

**Conflict of Interests:** No conflict of interest was reported by the authors.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Discussion of Obesity and Physical Education: Risks, Implications and Alternatives

Gustavo González-Calvo<sup>1\*</sup> , Fernando Otero-Saborido<sup>2</sup> and David Hortigüela-Alcalá<sup>3\*</sup>

<sup>1</sup>Department of Didactics of Musical, Plastic and Corporal Expression. Faculty of Educación of Palencia. University of Valladolid, Valladolid (Spain).

<sup>2</sup>Department of Sports and Computer Science. Faculty of Sports Sciences. Pablo de Olavide University, Seville (Spain).

<sup>3</sup>Departamento de Specific Didactics Faculty of Education. University of Burgos, Burgos (Spain).

## Cite this article:

González-Calvo, G., Otero-Saborido, F., & Hortigüela-Alcalá, D. (2022). Discussion of Obesity and Physical Education: Risks, Implications and Alternatives. *Apunts Educación Física y Deportes*, 148, 10-16. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.02](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.02)

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Dr. Gustavo González-Calvo  
[gustavo.gonzalez@uva.es](mailto:gustavo.gonzalez@uva.es)

## Section:

Physical Education

## Original language:

Spanish

## Received:

May 17, 2021

## Accepted:

October 26, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Abstract

In this article, we explore the current situation of school Physical Education in Spain, characterised by a biomedical debate, by a concern for the increase in teaching hours of the subject in order to fight against childhood and youth obesity and by a certain neoliberal channelling. To satisfy this predominant debate, Physical Education curricula are prioritising aspects related to health among their various elements (aims, contents and evaluative references), while other educational aspects assume a residual role. Therefore, we defend a model of Physical Education with an educational approach that uses movement as a comprehensive means of training and of transformation of society from a critical position. The article intends to contribute to the current debate on the relevance (or not) of increasing the hours of the subject, while trying to contribute to a paradigm shift in the subject that would allow the redefining and reconstituting of its pedagogical, critical and fundamentally educational essence.

**Keywords:** attitudinal style, critical pedagogy, Critical Physical Education, health, medicine.

## Introduction

From an epistemological point of view, two postulates stand as the seeds of the social discourse that feeds the school Physical Education (PE) model. On the one hand, technical rationalism, which assumes a pedagogy by objectives, behavioural and quantifiable. On the other hand, practical rationalism, which assumes a curriculum as a project and process. For technical rationalism, the epistemological position is specified in curricula that understand PE mainly as a "vaccine" against obesity, using methods and assessments based on physical and sports performance. From the other point of view, practical rationality in PE is based on a curriculum which is not monopolised by the obesity discourse but on learning and assessment methods based on student participation (López-Pastor, 1999). Likewise, and as an evolution of the second model, a third critical model tries to make the participation of teachers and students in their learning transform their social environment. This last epistemological approach is the one that this work assumes with PE being critical, with personal and social transformation tools such as formative and shared assessment, attitudinal style, service learning or the critical PE itself, which will be the detailed subjects of this work.

PE, focused from a critical and pedagogical perspective, has moved into the background and is almost non-existent (Kirk, 2020). The debate has centred around the so-called "obesity debate" (Tinning et al., 2016), which has led, in recent years, to the subject focussing on fighting the "growing epidemic of couch kids" (British Heart Foundation, 2000). A salutogenic perspective has inspired studies on health promotion initiatives in schools and youth participation in community sport (McCuaig & Quennerstedt, 2018). Therefore, academics have resorted to this health approach to underpin new research agendas and justifications for the school curriculum that go beyond the perspective of the youth physical activity deficit, something that directly affects school PE and its teachers (Kirk, 2020).

The medical discourse, probably the one with the greatest weight and prestige of all of them, has been joined by the political discourse. In Spain, this means that most of the political programs of the various ideologies use PE as a tool with which to negotiate and seek votes. "We will increase the subject hours in those places where we manage to govern" is usually one of their slogans, always backed by physiological ideas.

But, despite the obvious efforts that are being made in most Western countries to avoid what is already considered the biggest health problem of the 21st century (Smith, 2016), the truth is that obesity is still increasing in developed societies. As Popkin and Hawkes (2016) point out, the causes go beyond individual behaviour (economic

interests, trade agreements, subsidies for production, urban designs, etc.) and, to tackle it, PE has only a very limited role, although for advertising it is "gimmicky".

Likewise, as Wright (2009) explains, one should ask whether the obesity crisis is a real or fabricated issue, and whether the considerable resources, intellectual and economic, that have been allocated to fight it are justified, when, on the other hand, the aspects that could jeopardise the economic factors of the phenomenon are not addressed.

Under the guise of truth, most of the behaviours of society are driven by very defined socioeconomic parameters and imbued with consumerism, nihilism and hyperactivity (Han, 2018). In the field of physical exercise, this trend is reflected in the emergence of thousands of gyms and sports clubs, the rise of dietary and food products, the new patterns of physical activity and the medical guidelines that regulate how PE should be taught in schools (Varea et al., 2019).

Therefore, it is necessary to think along two lines. On the one hand, the necessary holistic approach to health, from an integrated psychological, motor and social point of view, and on the other, and more dangerous, hand, that which focuses solely on physical performance in PE. Thus, we try to encourage critical thinking on these issues and to disrupt entrenched debates on health, to *make the familiar strange* (Pringle, 2009).

### **Is a more critical and meaningful PE necessary?**

The traditional orientation given to PE has focused on achieving goals exclusively in the motor field and, in recent years, its approach has been predominantly biomedical (Kirk, 2020), focusing on the prevention or treatment of obesity among the youngest. However, in Spain some professionals in the sector have, for many years, used a Pedagogical Treatment of the Body (e.g. Bores Calle, 2005). This pedagogical approach opens the possibility of seeking learning that is not only significant, but also critical in the students. In other words, PE teaching can improve the acquisition of motor patterns in students, while trying to apply what they have learned to their daily lives to the conditioning factors that revolve around motor skills (sports elitism, sexism, bodily discrimination, etc.). The curriculum, thus understood, will be an intersection of practices that constitutes "a framework of interaction of the various processes, agents and contexts that, within a complex social process, give it a practical and real meaning" (Devís-Devís & Molina-Alventosa, 2001, p. 248). According to these authors, this way of understanding the curriculum is typical of those teachers who follow a critical theory of society and pedagogy, concerned about the connection between the theory and practice of teaching and the connection between schools and society.

On the other hand, meaningful learning, understood as that which connects new learning to existing learning, implies developing knowledge about cognition, that is, about the way in which we perceive, understand, learn, remember and think (Walseth et al., 2018). Meaningful learning is verified by the subject's active and personal involvement: participating by organising, making decisions, evaluating, searching for information, analysing it, comparing it. From this perspective, helping students to learn means providing them with tools that allow them to develop their own learning potential.

It seems clear that professionals who work in the world of education have to (re)consider the meaning of our job. Therefore, the role of the teacher cannot be reduced to the simple explanation of theoretical contents and the assessment of the degree to which these contents have been absorbed by the students. Nor can it be assumed that our task is reduced to the simple concept of preventing obesity in the school environment.

Therefore, our concept of PE aims to put into practice a curriculum formed from, and based on, an emancipatory interest that follows three essential principles (Grundy, 1998): (a) that students actively participate in the teaching-learning process; (b) the learning experience is meaningful to the students; and (c) that the learning is oriented to the development of the critical sense.

Linked to the theoretical position of a critical PE that is made in the present work, Kirk (1986) wrote that the initial training of PE teachers has failed to provide teachers with the critical skills necessary to protect schools against political inferences and their use as an agency of control, instead of as spaces for emancipation. This leads us to ask why, despite decades of efforts by various researchers and critical teachers, schools are predominantly dominated by a neoliberal agenda.

In this sense, the neoliberal system could lead to an immutable globalisation and homogenisation of ideas, services and products, not to mention feelings and actions. This situation gives rise to a sociocultural knowledge known as "the overabundance of the identical" (Han, 2018) which, paradoxically, under the precept of providing more freedom, ends up limiting it. Health, education and physical activity are areas in which large companies (banks, pharmaceutical companies, clothing companies, advertising companies, insurance agencies, sports franchises, etc.) have a lot to gain or lose (Varea et al., 2019). Thus, the obesity discourse "collapses" PE teaching, since it generates body prototypes through stereotypes, supported by political debates and marketing strategies (Evans, 2013).

### ***The risks of allowing PE to be governed exclusively by biomedical criteria***

PE as a subject has made a leap in recent years from achieving objectives in the motor field as its main reason for being, to focusing almost exclusively on a predominantly medical approach, focused on the prevention or treatment of obesity (Tinning et al. al., 2016).

The priority is no longer acquiring and improving students' motor patterns and applying what they learn to their daily lives, nor is it reflection on the conditioning factors that revolve around physical exercise and sport (aspects related to sports elitism, sexism and bodily discrimination, among others). If PE is oriented exclusively by a biomedical perspective, then providing students with tools that allow them to develop their own learning potential would cease to be important, so that physical educators are asked to (re)think the meaning of our work, work that has to go beyond the simple idea of avoiding excess weight among students. Thus, letting ourselves be carried away by a curriculum dictated by biomedical discourse implies giving in to passivity and the comfort of absorbing what medical science considers to be good and appropriate, without even thinking about it.

Although the interests that exist around health and PE have good intentions and meaning, the truth is that they are not as benign as, ironically, they think they are, since they send certain messages and behaviours to be imposed on the purpose of the subject. It is possible that this approach to health/obesity and PE is detrimental to the health and well-being of children and young people (Evans et al., 2008). The health debate is centred on the idea that the body can, effectively, be converted into a source of health through education in schools, based on the idea that society is at risk of succumbing to *obesity disease*. Following Evans (2003), the terms "weight", "overweight" and "obesity", as opposed to the physical/visceral condition of fat, are based on social arbitrariness and constructs measured and devised by someone (doctors, insurance companies, etc.) based on generic data that do not have to respond to personal realities. The term "ideal weight", for example, is highly questionable (Couch et al., 2016). It is a concept associated with optimal health and longevity, but the commonly used measure, BMI, has little validity (Evans, 2003; Smith, 2016). In any case, and despite the problems of measuring obesity and the lack of reliability in the relationship between obesity and disease spread in various media, the truth is that the increase in the prevalence of obesity in children/adolescents is considered an alarming fact in Western societies (Tinning et al., 2016). Thus, there is an emphasis on the prevention of obesity being the highest of our public health priorities.

Constructing a PE that is governed by biomedical criteria makes it obvious that the most obese and least healthy people are those who belong to the most disadvantaged economic backgrounds (Smith, 2016). As there is no simple remedy to prevent and combat this increase in obesity rates, prevention involves intervening in schools, trying to persuade students through PE to lead a more physically active life and to have a lower-fat diet. Thus, obesity ends up being reduced to a matter of "weight", the product of an inactive lifestyle and an unhealthy diet. Thus, the data is rationalised to generate policy recommendations that try to influence the practices of health experts, as is the case for physical educators (McCuaig & Quennerstedt, 2018; Varea et al., 2019). Herein lies the language of individual, national and global "threat", "risk", and "uncertainty". Our economic health and well-being are threatened by the increase in obesity, which leads to stigmatising those who are obese or overweight, without considering the social, cultural and economic reasons that underlie the problem (Lusk & Ellison, 2013).

This situation is worsening because there are more and more food companies and trading houses that flood the advertising market with misleading messages that influence the knowledge, attitudes and behaviours of this part of the population in relation to obesity and sugary products and drinks (Boles et al., 2014). Food advertising promotes unhealthy food products, although tasty and attractive to children and young people, and which contribute significantly to the current obesity epidemic (Folkvord et al., 2016). In some cases, the trading houses are linked to multinationals in children's television entertainment, closing the circle of abundant economic gains but little ethics, by making the most vulnerable public the direct recipient of the message. With all this, we end up creating a moral panic (Fletcher, 2013) that can only be tackled by monitoring and treating body shape, size and fat, through medical/educational interventions. And, although there are already many voices that, within Spain, are asking the Government for changes in the legislation to prevent the promotion of unhealthy foods with claims directed at children, that allow a greater reconciliation of family and work life, and that increase healthy leisure activities in rural areas and in disadvantaged socioeconomic contexts, much remains to be done.

### ***Some alternatives to the PE monopoly understood as a "remedy against obesity"***

Although this work considers the dominance of the medical-physiological paradigm in the understanding of PE, it seems necessary to suggest alternatives to this model. In its beginnings, critical pedagogy proposed very reasonable ethical and pedagogical amendments, but these were rarely

put into practice. For PE and for any discipline in the curriculum, this is resolved with specific methodological approaches that expand the reduced horizon of PE as it is understood within the obesity discourse. Some of them innovate the different elements of the curriculum, contribute to the personal development of the student and, in the medium term, promote change in the educational environment. This is the case for approaches such as the Educational Treatment of the Body (Bores-Calle, 2005), the Formative and Shared Assessment (López-Pastor & Pérez-Pueyo, 2017), the Attitudinal Style (Pérez-Pueyo, 2010) or the Learning-Service (Batle, 2013), among others.

Other approaches address the inclusion of ethnic and cultural minorities through PE and radically target social transformation. These models contribute to the education of a critical citizen, beyond the mere measurement of behaviours that can contribute to the achievement of objectives or standards, without educating the students. For example, Kirk (2020) understands PE as a tool for emancipation and which, therefore, cannot be constrained under assessment standards that are so limited and restricted by the students' physical condition. If PE is intended to be an ideal tool for generating motor awareness in students, health must be approached from a purely holistic, reflective and critical approach, without the medical criterion of obesity collapsing the entire pedagogical approach to the subject. If this were to happen, the subject curriculum would be reduced to the mere treatment of the body from an anatomical and physiological point of view. Likewise, assessment in PE curricula cannot be understood as the measurement of biomedical behaviours through curricular standards, but rather should encourage student development and participation (Otero-Saborido et al., 2020). Thus, it is essential to provide curricular alternatives clearly connected with the initial and ongoing training of teachers, resisting merely physiological approaches with action alternatives that allow progress.

Good examples from the PE area are the approaches of Azzarito (2010) and Oliver and Kirk (2016) that open the curriculum to social issues such as gender equality, racism or activism within PE. Action-research from a critical model (not technical or merely interpretive), service-learning or formative and shared assessment itself are methodological perspectives that broaden the horizon of a "medicalised" curriculum. We must be alert to the fact that the sciences, including Medicine, do not offer absolute certainties, so we must be on guard against those who, for whatever reason, claim to have found them. Students must leave school with not only a deep critical understanding of their individual health needs, but also how those needs have been constructed, manipulated and, perhaps, obfuscated by the interests of the health industry. But PE, reduced to the

"obesity debate", does not lead the subject to be interested in knowledge, understanding and competence, but rather, to concerning itself only with body shape, height and weight.

Several countries are experiencing the forces of change from both within the education profession and outside it. Consequently, the discursive practices of PE are based on a range of changing ideologies that extend from sports education to health education, but often with no consensus, consistency, regulation or clear and achievable goals (Wrench & Garrett, 2015).

As Biesta (2014) indicates, critical approaches allow us to resist the inertia that has caused the school to forget the educational paradigm to settle exclusively on the learning paradigm. Corporeality is an area with infinite possibilities for learning and socialisation, and, for this reason, it is necessary that the approaches applied to the subject are connected to the reality of everyday life, giving students transferability of learning to a range of contexts. If it is intended that, through PE, the emancipation of students is promoted through the use of the body, curricular and pedagogical paths must be established that build reflexive and critical students about their body, as well as with the possibility of carrying out physical activity and sport in their environment. This social relationship bond that must prevail in PE must be structured under the assumption of individual and group responsibility as key elements of a more equitable, proportionate and fair society. For this, it is necessary to generate autonomy in schoolchildren, applying self-regulation processes that allow them to decide how, when and where to carry out a physical activity suited to their needs and characteristics. No alternative approach to obesity-centred PE would make sense if positive motor experiences are not generated, making them explore, investigate and, above all, increase their perceived competence in performing tasks. This will make them incorporate a truly healthy lifestyle into their daily reality and will give them the ability to abstract themselves from media approaches, which are often politicised and lacking in rigour. For this, the pedagogical and evaluative models used in the subject are key.

## Conclusions

In accordance with what we state in our article, it is important that those of us who work in the field of PE be alert to scientific approaches focused on a single discipline, discourses that, moreover, try to monopolise the role that PE has to play within the school, thus reducing its diverse and comprehensive character. Rather, the subject should ensure that students leave school with not only a deep critical understanding of their individual health needs, but also

how those needs have been constructed, manipulated and, perhaps, obfuscated by the interests of the health industry. But PE, reduced to the "obesity debate", does not lead the subject to be interested in knowledge, understanding and competence but, rather, to concern itself only with body shape, height and weight, conditioned by consumerist and neoliberal criteria (Varea et al., 2019).

As educators in general, and physical educators in particular, we need to be able to seek something more than "weight loss" in the students. We have to be moved by the desire to build in the student a sense of control and self-esteem and to at least entertain the idea that you can be healthy at any size. Therefore, the discursive practices of PE are based on a range of changing ideologies that extend from sports education to health education, but often with no consensus, consistency, regulation or clear and achievable goals (Wrench & Garrett, 2015). As PE is a readily available resource to promote physical activity among children and adolescents, its curriculum has been increased and targeted, notably, towards the public health domain.

PE has had a long association with health that is based on a debate concerned with monitoring and regulating students' bodies, a monitoring which began with the regulation of postural habits in school, then turned its attention to *fitness* related health and, in recent years, it has focused on body size and shape (Kirk, 2020). The emphasis placed on physical activity and its relationship with health can be considered as a manifestation of the new public health agenda (Evans & Rich, 2011), summed up by each person being called on to do their part, implying that health is an individual responsibility. In addition, health is used as a means to give prestige to PE, a subject that has always been somewhat undervalued (González-Calvo, 2013) and that, therefore, is given relevance and legitimacy.

Not surprisingly, the professional culture of PE is quite close to the idea of a utilitarian and activist education, but these demands put its professionals in a dilemma. If the subject is dominated by "anti-obesity" physical activity classes (a challenge that, in itself, we understand to be impossible), we wonder if it would not be better to hire physical exercise professionals (sports instructors, gym instructors), who in addition to offering a better service, would offer it at a lower cost than that required for the teaching staff in charge of the subject. On the other hand, if PE refuses to put itself at the service of medical opinions, it will be socially criticised and could be excluded from the official curriculum. It is not a simple matter to resolve, and perhaps even less so in our country, where the subject has been unable to generate a debate and practices that legitimise it and separate it from sports and biomedical debates.

On the other hand, the idea that exercising is good for the health of young people is becoming popular. However, children and young people do not see the point of doing physical exercise for their health, since they are at an age where their health is fine. Physical activity must be approached from a fully playful perspective and not associated under any circumstances with an imposed external systematisation. Thus, understanding PE as a means of promoting and improving health can lead to considering the subject as irrelevant, lacking spontaneity, fun and autonomy, when PE is aimed at being something uniform, disciplined and regulated. It is ironic that physical exercise, often considered one of the most pleasurable human activities, is at the centre of an ideology that is too close to the idea of correctness and not close enough to the idea of improving and enhancing one's life (Evans & Davies, 2004). Scientific knowledge has been mediated and given meaning through PE, allowing teachers to promote a programme whose objective is to encourage students to make healthy choices in what they eat, the exercise they do and what their body image should be (González-Calvo et al., 2020).

We are opposed to the utilitarian approach of "increasing weekly PE time" based on medical and physiological criteria, since we understand that the current challenges of the subject should include: providing resources and rewarding and inclusive experiences that allow individual and collective activities to be carried out and organised in different contexts throughout life; developing a good self-image that allows one to accept one's own body reality, and that of other people; and providing a general vision of society, adopting a critical perspective to consumption, food and the media. For this, it is necessary to make a firm commitment to an emancipatory PE that abandons "medicalised" and physiological discourses that focus only on obesity, understanding health as a comprehensive and transversal concept adapted to the global needs of each student.

## References

- Azzarito, L., & Katzew, A. (2010). Performing identities in physical education: (En)gendering fluid selves. *Research Quarterly for Exercise & Sport*, 81(1), 25-37.
- Battle, R. (2013). El aprendizaje-servicio en España: el contagio de una revolución pedagógica necesaria. Madrid: PPC.
- Biesta, G. (2014). ¿Medir lo que valoramos o valorar lo que medimos? Globalización, responsabilidad y la noción de propósito de la educación. *Pensamiento Educativo: Revista de Investigación Educativa Latinoamericana*, 51(1), 46-57. <http://ojs.uc.cl/index.php/pel/article/view/25605>
- Boles, M., Adams, A., Gredler, A., & Manhas, S. (2014). Ability of a mass media campaign to influence knowledge, attitudes, and behaviors about sugary drinks and obesity. *Prev Med*, 67 Suppl 1, S40-45. <https://doi.org/10.1016/j.ypmed.2014.07.023>
- Bores-Calle, N. (2005). La lección de Educación Física en la etapa de Secundaria. In N. Bores Calle (Ed.), *La lección de Educación Física en el Tratamiento Pedagógico de lo Corporal* (pp. 67-90). Barcelona: Inde.
- Couch, D., Thomas, S. L., Lewis, S., Blood, R. W., Holland, K., & Komisaroff, P. (2016). Obese people's perceptions of the thin ideal. *Soc Sci Med*, 148, 60-70. <https://doi.org/10.1016/j.socscimed.2015.11.034>
- Devis-Devis, J., & Molina-Alventosa, J. P. (2001). Los estudios del currículum y la Educación Física. In Vázquez-Gómez, B. (Ed.), *Bases educativas de la actividad física y el deporte* (pp. 243-276). Madrid: Síntesis.
- Evans, J. (2003). Physical Education and Health: a Polemic or Let Them Eat Cake! *European Physical Education Review*, 9(1), 87-101. <https://doi.org/10.1177/1356336x03009001182>
- Evans, J. (2013). Physical Education as porn! *Physical Education and Sport Pedagogy*, 18(1), 75-89. <http://dx.doi.org/10.1080/17408989.2011.631002>
- Evans, J., & Davies, B. (2004). Pedagogy, symbolic control, identity and health. In Evans, J., Davies, B., & Wright, J. (Eds.), *Body knowledge and control. Studies in the sociology of physical education and health* (pp. 3-18). New York: Routledge.
- Evans, J., & Rich, E. (2011). Body policies and body pedagogies: Every child matters in totally pedagogised schools? *Journal of Education Policy*, 26(3), 361-379.
- Evans, J., Rich, E., Davies, B., & Allwood, R. (2008). *Education, disordered eating and obesity discourse: Fat fabrications*. London: Routledge.
- Fletcher, S. (2013). Touching practice and physical education: deconstruction of a contemporary moral panic. *Sport, Education and Society*, 18(5), 694-709. <https://doi.org/10.1080/13573322.2013.774272>
- Folkvord, F., Anschutz, D. J., Boyland, E., Kelly, B., & Buijzen, M. (2016). Food advertising and eating behavior in children. *Current Opinion in Behavioral Sciences*, 9, 26-31. <https://doi.org/10.1016/j.cobeha.2015.11.016>
- Foundation, B. H. (2000). Couch Kids: The Growing Epidemic : Looking at Physical Activity in Children in the UK. London: British Heart Foundation.
- González-Calvo, G., Hortigüela-Alcalá, D., & Fernández-Balboa, J. M. (2020). Foci and factors that contribute to physical educators' construction of their professional body subjectivities: a qualitative study. *Sport, Education and Society*, 25(3), 292-304. <https://doi.org/10.1080/13573322.2019.1578206>
- González-Calvo, G. (2013). La lucha de un docente novel de Educación Física por el reconocimiento de su profesión narrada desde una perspectiva autobiográfica. *Ágora para la Educación Física y el Deporte*, 15(2), 80-102.
- Grundy, S. (1998). *Producto o praxis del currículum*. Madrid: Morata.
- Han, B. C. (2018). *The expulsion of the Other: Society, Perception and Communication Today*. Cambridge, UK: Polity Press.
- Kirk, D. (1986). Beyond the limits of theoretical discourse in teacher education: Towards a critical pedagogy. *Teaching and Teacher Education*, 2(2), 155-167.
- Kirk, D. (2020). *Precairity, Critical Pedagogy and Physical Education*. New York: Routledge.
- López Pastor, V. (1999). Prácticas de evaluación En Educación Física: estudio de casos En Primaria, Secundaria y Formación de Profesorado. Valladolid: Servicio de Publicaciones de la Universidad de Valladolid.
- López-Pastor, V., & Pérez-Pueyo, A. (2017). Evaluación formativa y compartida en educación: experiencias de éxito en todas las etapas educativas. *León: Universidad de León*.
- Lusk, J. L., & Ellison, B. (2013). Who is to blame for the rise in obesity? *Appetite*, 68, 14-20. <https://doi.org/10.1016/j.appet.2013.04.001>
- McCuaig, L., & Quennerstedt, M. (2018). Health by stealth — exploring the sociocultural dimensions of salutogenesis for sport, health and physical education research. *Sport, Education and Society*, 23(2), 111-122. <https://doi.org/10.1080/13573322.2016.1151779>
- Oliver, K. L., & Kirk, D. (2016). Towards an Activist Approach to Research and Advocacy for Girls and Physical Education. *Physical Education and Sport Pedagogy*, 21(3), 313-327. <https://doi.org/10.1080/17408989.2014.895803>
- Otero-Saborido, F., Vázquez-Ramos, F., Cenizo-Benjumea, J., & González-Jurado, J. (2020). Analysis of the assessment in Physical Education curricula in Primary Education. *Sport, Education and Society*, 0(0), 1-14. <https://doi.org/10.1080/13573322.2020.1804349>

- Pérez-Pueyo, A. (2010). El estilo actitudinal: propuesta metodológica para desarrollar unidades didácticas en Educación Física. *Madrid: CEP*.
- Popkin, B., & Hawkes, C. (2016). Sweetening of the global diet, particularly beverages: patterns, trends, and policy responses. *Lancet Diabetes Endocrinol*, 4, 174-186.
- Pringle, R. (2009). Defamiliarizing Heavy-Contact Sports: A Critical Examination of Rugby, Discipline, and Pleasure, *Human Kinetics Journal*, 26(2), 211. <https://doi.org/10.1123/ssj.26.2.211>
- Smith, G. D. (2016). A fatter, healthier but more unequal world. *Lancet*, 387(10026), 1349-1350. [https://doi.org/10.1016/s0140-6736\(16\)00588-2](https://doi.org/10.1016/s0140-6736(16)00588-2)
- Tinning, R., Philpot, R. A., & Cameron, E. (2016). Critical Pedagogy, Physical Education, and Obesity Discourse. More advocacy than Pedagogy. In Robinson, D. B., & Randall, L. (Eds.), *Social justice in Physical Education: Critical reflections and pedagogies for change* (pp. 297-321). Toronto, Ontario: Canadian Scholars' Press.
- Varea, V., González-Calvo, G., & Hortigüela-Alcalá, D. (2019). The influence of consumerism on Spanish physical education teachers. *European Physical Education Review*, 25(4), 949-963. <https://doi.org/10.1177/1356336x18789196>
- Walseth, K., Engebretsen, B., & Elvebakk, L. (2018). Meaningful experiences in PE for all students: an activist research approach. *Physical Education and Sport Pedagogy*, 23(3), 235-249. <https://doi.org/10.1080/17408989.2018.1429590>
- Wrench, A., & Garrett, R. (2015). PE: it's just me: physically active and healthy teacher bodies. *International Journal of Qualitative Studies in Education*, 28(1), 72-91.
- Wright, J. (2009). Biopower, Biopedagogies and the Obesity Epidemic. In Wright, J., & Harwood, V. (Eds.), *Biopolitics and the 'Obesity Epidemic'. Governing Bodies* (pp. 1-14). New York: Routledge.

**Conflict of interests:** the authors have not declared any conflict of interest.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Implementation of a Pedagogical Vocabulary of Signs in Physical Education. A Pilot Study

Jorge Camilo Rhenals-Ramos<sup>1\*</sup> and Carlos Mario Arango-Paternina<sup>2\*</sup>

<sup>1</sup> University of Cordoba, Cordoba (Colombia).

<sup>2</sup> University Institute of Physical Education and Sports, University of Antioquia, Antioquia (Colombia).

## Cite this article:

Rhenals-Ramos, J. C. & Arango-Paternina, C. M. (2022). Implementation of a Pedagogical Vocabulary of Signs in Physical Education. A Pilot Study. *Apunts Educación Física y Deportes*, 148, 17-25. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.03](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.03)

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Jorge Camilo Rhenals-Ramos  
[Jorgecamilorhenals@gmail.com](mailto:Jorgecamilorhenals@gmail.com)

## Section:

Physical Education

## Original language:

Spanish

## Received:

July 2, 2021

## Accepted:

November 25, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Abstract

School, as the core of growth, should adapt its practices in relation to the various additional needs of hearing-impaired learners, providing solutions that allow for the advancement and development of teaching strategies. The aim of this study was to analyse, in terms of practicality, the procedures used for the planning and implementation of the use of sign language in Physical Education, and to explore its possible effects on academic performance. A pilot study was conducted on 48 hearing-impaired students (male  $n = 23$ ) aged 13-19 years. The use of sign language was introduced in one group, there was no control group and changes in academic performance were analysed before and after the intervention. The chosen repertoire of vocabulary yielded a set of 27 signs for pedagogical use in Physical Education. Preliminary findings of the study found that the educational intervention in Physical Education produced a significant effect ( $d = 2.05$ ) and significant differences in the academic performance of hearing-impaired students ( $p < .05$ ). The results of the study indicate that the use of the external validity tool, known as RE-AIM, provided valuable elements in its design and implementation. However, no significant differences were found in academic performance regarding the sex of the participant ( $p > .05$ ). The implementation of the educational intervention in Physical Education produced positive results in terms of improving the hearing-impaired students' academic performance. It is considered paramount to establish future lines of work associated with the study of these initiatives.

**Keywords:** academic performance, Physical Education, hearing-impaired students, pedagogical sign vocabulary.

## Introduction

Inclusive education comprises a set of strategies used to improve learning based on students' various educational needs. These strategies constitute an important alternative to educational advancement for hearing-impaired students, guaranteeing equal opportunities and rights, and adapting methodologies to improve their teaching and learning conditions (Taylor et al., 2017).

In recent years, studies have recognised that positive education for people who are hard of hearing is based on the understanding that hearing-impaired people are a cohort with different social characteristics and linguistic needs (Beckner & Helme, 2018). People who are hard of hearing use hand movements and their own gestures to communicate through specific linguistic codes of sign language (SL). For these people, this is their main form of communication as it is the one that they first acquire and develop (Quiroz-Pelayo et al., 2018), understanding that this type of non-verbal communication favours social development, the transmission of beliefs, emotions and thoughts (Asún-Dieste et al., 2020). Collectively, this supports the need for its use in the development of teaching processes. However, as Tovar (2003) states, its value in the development of teaching strategies was not recognised until a few years ago. The consolidation of this type of language in educational processes is a necessary aspect for educating hearing-impaired students and the development of inclusive education, since it is part of their communicative needs.

Teaching hearing-impaired students poses challenges that a school, as the core of growth, must take on. To cope with these responsibilities, it is essential that teaching strategies are devised with inclusive education in mind. In this regard, scholars such as Morilla-Portela (2016) posit that this type of education offers benefits in terms of the improvement of the quality of life and the psychological, social and intellectual well-being of students with special educational needs. This occurs due to the social interaction strategies and the benefits they provide. From this perspective, inclusive strategies generate social obligations and responsibilities associated with the right to education as a fundamental aspect of human development.

SL is recognised as the language of the hearing-impaired community in Colombia (Rozo-Melo, 2015) and for educational purposes the repertoire of signed vocabulary published by the National Federation of the Deaf of Colombia (FENASCOL) is employed.

Despite the efforts to make the use of SL at an educational level accessible to everyone, several difficulties still persist (Tovar, 2003). In particular, these difficulties are manifested in the pedagogical and interpretation strategies that take place in physical education (PE) classes, because

there is no lexicon of signs that indicates this specific terminology in SL. This situation limits the development of formative processes, due to difficulties in communication associated with the lack of SL (Rhenals-Ramos, 2018). As can be expected, the absence of a SL application in PE affects hearing-impaired students' full development of formative processes, due to the complexity and abstruseness of some aspects in this field. In that respect, various scholars state that the majority of the students' academic struggles persist due to the communicative barriers that they face, particularly with people who have no difficulty hearing (Rodríguez-Hernández et al., 2019). In other words, the absence of SL directly affects academic performance, which is characterised as the level of knowledge, skills or abilities that students demonstrate in a specific area or field (Rodríguez-Rosero et al., 2021).

School, as the core of growth, should adapt its practices in relation to the various additional needs of hearing-impaired learners, providing solutions that allow for the advancement and development of teaching strategies. In that respect, Valero (1993) argues that these difficulties in learning are due to the fact that the parameters that regulate the communicative codes are dissimilar, causing difficulties in understanding on the part of the hearing-impaired student, an aspect that limits their access to knowledge. In that regard, studies by Heloir & Nunnari (2016) and Abuzinadah (2020) show that the use of different didactic resources, related to the academic use of SL, favours the learning and performance of these students.

The scarcity of empirical studies associated with the analysis of the performance of hearing-impaired students in PE shows a significant lack of attention to research of this type, leading to limitations related to teaching and learning; therefore, a study aimed at bridging this gap is necessary. In that regard, in previous studies, Bernal-Ruiz (2004) and Rhenals-Ramos (2018) regard necessary the application of SL in PE as a pedagogical alternative to difficulties associated with the performance of these students. In line with this, this study has the following aims: to analyse, in terms of practicality, the procedures used for the planning and implementing the use of sign language in physical education, and to explore its possible effects on academic performance.

## Methodology

The following is a pilot study conducted under a quasi-experimental design, with one experimental group and no control group. Initially, 49 hearing-impaired students from a school in Monteria-Colombia were invited to participate in the study. However, one of the participants

left the school; therefore, the study was carried out with 48 students, aged 13-19 years ( $M = 12.4$ ), 10 of whom had profound hearing loss and the remainder had partial hearing loss (hypoacusis). All of them communicated by means of SL.

According to the selection criteria, the participants had to be hard of hearing; they had to participate voluntarily; they had to be high school or middle school students from the chosen school; and they had to have prior permission and informed consent from a parent, guardian and/or legal representative. The selection of the sample was not randomised; it was distributed by sampling for the sake of convenience. For this analysis, the average academic performance for PE in the first semester of 2018 was used, the raw values corresponding to the performance scores ranged from 1.0 to 5.0 according to the school's marking criteria were taken, which function as a stable variable, and scores were taken in two different assessments, before and after the intervention.

### **Designing the repertoire of signed vocabulary**

Designing the repertoire of signed words involved the participation of a committee of SL experts, made up of SL interpreters, teachers with pedagogical support functions, linguistic models for SL (hearing-impaired people), as well as the participation of PE teachers, the community of hearing-impaired students and graduates from the school.

Initially, words relating to the discipline of PE that the hearing-impaired students found the most complex were chosen, taking into account that those words were not found in the SL dictionary, nor in the publications of FENASCOL related to the pedagogical use of SL. Moreover, several databases and scientific search engines were also examined to check that these terms were not part of other research related to the pedagogical use of SL in PE.

The design of this repertoire of words was based on specific grammatical and linguistic characteristics of SL, highlighted in the studies of Oviedo (2001) and Tovar (2003), in words such as: "aerobic exercise", "anaerobic exercise", "dehydration", "heart rate", "sedentary lifestyle", "muscle tone", "biotype", "biorhythm", "apnoea", "muscle atrophy", "adduction", "abduction", "motor skills", "basic motor skills", "coordination skills", "perceptual skills", "perceptual-motor skills", "conditional physical skills", "somatotype", "neuromotor", "laterality", "right-handed laterality", "left-handed laterality", "cross- laterality", "ambidextrous", "contra-laterality", "homo-laterality", among others, as can be observed in Figure 1.

### **Content validity of the repertoire of signed vocabulary**

The repertoire of signed words was validated through a procedure of content validity by a panel of experts. A total of 6 experts were contacted: 2 experts in education for hearing-impaired students and SL; 2 in SL and interpreting; and 2 in PE and education for hearing-impaired students (one of them was hard of hearing themselves). The experts scored each of the signs, classifying them as: Poor (1), Fair (2), Good (3) or Excellent (4). This process was carried out based on criteria set out in Polit & Beck's (2006) studies, the Content Validity Index was obtained for each sign (I-CVS). For this purpose, scores were counted for each sign, taking into account the number of experts who gave it a score of 3 or 4, dividing this value by the number of experts who rated the sign a 1 or 2. I-CVS values greater than .78 were considered valid in terms of content.

### **Educational intervention**

The intervention was carried out over a period of 5 months, in 24 sessions, and was based on the implementation of signed pedagogical vocabulary in PE, in the Gymnastics and Body Expression unit, in which the unit introduced the general aspects of gymnastics and body expression; basic motor skills; locomotion and manipulation patterns; development of coordination skills and gymnastic skills on the floor or performed hands-free.

Initially, during the first month, a period of learning, socialisation and contextualisation of the signs was developed, during which the students' level of proficiency of the signs was assessed, showing positive results. Taking into account the importance of the explanation of the concept to be represented, emphasis was placed on the relationship between the sign and the content communicated. This process was developed with the students in the SL class and was reinforced throughout the whole intervention. During this initial process, 8 sessions of 2 hours per week were carried out, one hour in the SL class and the other during the PE class. In this development phase, the participation of the PE teachers, the community of hearing-impaired students, SL interpreters and the institution's pedagogical support group was relied on, reinforcing this process during the entire intervention.

Subsequently, the implementation process was carried out in the remaining 4 months, in 16 sessions, using 2 hours per week of PE classes for its development – it is important to note that although not all hearing-impaired students belonged to the same group, both those and hearing students shared the same content regarding the

development of their academic course. In these sessions, the hearing-impaired students' learning was assessed through the execution of various motor tasks, and the conceptual management of some topics, where some limitations associated with the understanding of some concepts to do with PE were evident. Mixed teaching models were used in these classes, due to the students' particular characteristics and diverse needs. Finally, the process was evaluated and verified, analysing difficulties, compliance with the proposed objectives and future lines of work. No modifications were made throughout the intervention.

The RE-AIM tool (Glasgow et al., 1999) was used to validate the procedures used in the design and implementation of signed vocabulary in PE. This model provides a series of criteria used as a measure of internal and external validity adjustment, and in each of the dimensions it offers elements for its use.

In that regard, RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) refers to the following:

*Reach*: refers to the coverage or representativeness of the participants in the study carried out.

*Effectiveness*: refers to the possible changes or positive and/or negative effects that may occur as a result of the intervention.

*Adoption*: refers to representativeness, i.e., the proportion of participants and the environments in which they participate in the programmes or interventions what were carried out.

*Implementation*: this criterion is associated with the follow-up of protocols, measures and parameters related to the analyses or interventions carried out.

*Maintenance*: refers to the institutional appropriation of the programmes or interventions carried out and the follow-up of the implemented measures.

### **Ethical considerations**

Once it was certified that the procedures and ethical norms were fully complied with, together with the reception of informed consent from the students' parents, guardians and/or legal representatives, in which they made clear their awareness and voluntary participation, the study was approved by the Academic Council.

### **Data analysis**

Statistical analysis was carried out with SPSS version 22 statistical software. The age and sex variables were expressed using frequencies (*n*) and percentages (%), while academic performance was described using averages (*M*) and standard deviations (*SD*); additionally, the significance level used for the analysis of performance

was 5% /  $\alpha = .05$ . In addition, the program G\*Power version 3.1.9.2 was used to analyse the statistical power ( $1 - \beta$ ) and the effect size (*d*) of the intervention carried out, the latter from Cohen's (2013) interpretations for small ( $d = 0.2$ ), medium ( $d = 0.5$ ) and large effects ( $d > 0.8$ ).

## **Results**

To present the results initially, an outline of the sample was done. The results show that the 48 hearing-impaired students, varied between the ages of 13 and 19 years. It was also observed that 25 (52.1%) of these students were female and 23 (47.9%) were male. In addition, the level of hearing loss was also shown, in which 79.2% of the students had partial hearing loss (hypoacusis), as presented in Table 1.

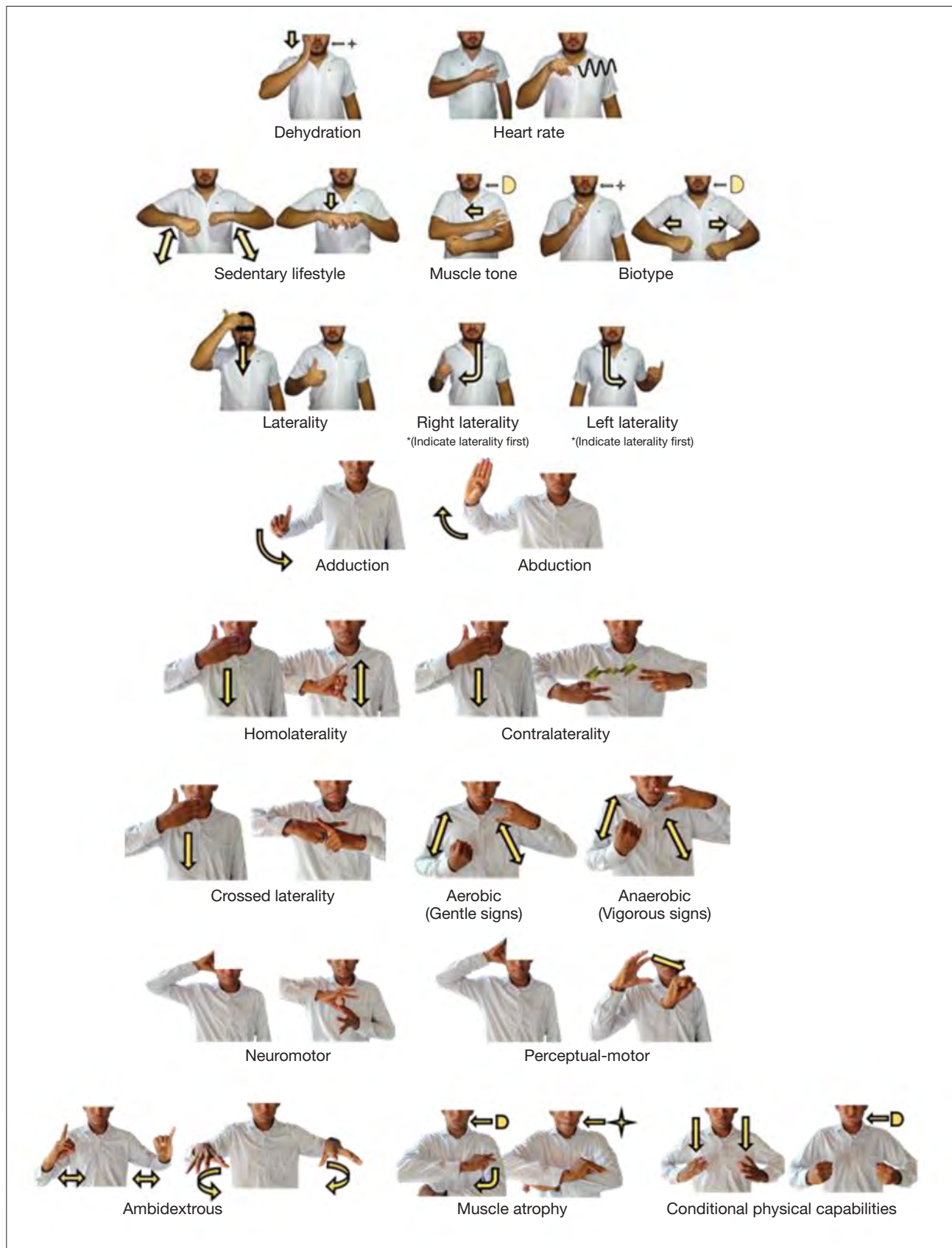
**Table 1**  
*Description of the sample.*

| Variables             | Frequency                         | Percentage |
|-----------------------|-----------------------------------|------------|
|                       | ( <i>n</i> )                      | (%)        |
| Age (years)           | 13                                | 8.3        |
|                       | 14                                | 25.0       |
|                       | 15                                | 12.5       |
|                       | 16                                | 14.6       |
|                       | 17                                | 12.5       |
|                       | 18                                | 16.7       |
|                       | 19                                | 10.4       |
| Total                 | 48                                | 100        |
| Sex                   | Female                            | 52.1       |
|                       | Male                              | 47.9       |
| Level of hearing loss | Profound hearing loss             | 20.8       |
|                       | Partial hearing loss (hypoacusis) | 79.2       |
| Total                 | 48                                | 100        |

Similarly, with respect to the results regarding the designing of the repertoire of signed pedagogical words, Figure 1 shows some of the signs that were designed and later used in the PE classes.

In order to disclose the contents of this photographic archive, prior authorisation was obtained from the participants.

On the other hand, the results with respect to content validity by panel or expert judgment show that the signed words show an I-CVS with values above .78. These factors

**Figure 1**

*Pedagogical vocabulary of sign language used in PE classes.*

NB. The Figure represents some of the signs used in PE classes.

Source: own elaboration

are important indicators to assume that each sign shows a satisfactory value with respect to content validity.

Regarding the results of the use of the RE-AIM as a validity tool, these elements were considered favourable, since they contributed important elements in each of the criteria analysed, as described below.

At the *reach* level, it was possible to verify the representativeness of the participants and the selection criteria used for the implementation of the use of SL, based on the characteristics of the hearing-impaired student population. The intervention reached 48 hearing-impaired students, representing 100% of the school's hard of hearing student population.

Regarding the level of *effectiveness*, this was used to provide information on changes made during the execution of the study or effects found with the implementation of the use of SL. In this sense, the devised repertoire of signed vocabulary had a positive effect on students' academic performance in PE classes.

In *adoption*, criteria related to the participants' environment and their characteristics were verified to make possible the implementation of the use of SL and the specification of the methods used. The study was developed in a school setting and the vocabulary designed was adopted to be implemented in PE classes.

On the other hand, at the *implementation* level, measures were reviewed, type of intervention carried

out, time used, or modifications to the vocabulary made during the intervention. During the execution of the study, the proper application of the designed vocabulary was verified.

Finally, at the *maintenance* level, aspects related to compliance, changes made and development were analysed, verifying that the implementation of the use of SL coincided with the objectives of the school. The devised repertoire of vocabulary continued to be implemented after the completion of the study.

All the criteria described above provided elements to increase the levels of external validity in the methods used for the design and implementation of the vocabulary.

Moreover, in order to present the results regarding the analysis of the effectiveness of the signed pedagogical vocabulary, the data was initially analysed using the Shapiro-Wilk test, confirming that the data did meet this criterion ( $p > .05$ ), as can be seen in Table 2.

For this purpose, the parametric Student's t-test for related samples was selected. The results of this test indicate that hearing-impaired students presented a significant change in academic performance in PE when comparing their scores before ( $M = 3.03$ ;  $SD = 0.38$ ) and after the introduction of the use of SL ( $M = 3.45$ ;  $DE = 0.37$ ;  $t: -14.25$ ;  $gl: 47$ ;  $p = .001 < .05$ ), with sufficient statistical power and effect size ( $1 - \beta = 1$ ;  $d = 2.05$ ). These results can be observed in Table 3.

**Table 2**

Shapiro-Wilk test of normality for academic performance.\*\*

|                             | Female      |    |      | Male        |    |     |
|-----------------------------|-------------|----|------|-------------|----|-----|
|                             | Statistical | gl | Sig. | Statistical | gl | P   |
| Academic-performance before | 0.969       | 25 | 0.61 | 0.969       | 23 | .67 |
| Academic-performance after  | 0.931       | 25 | 0.09 | 0.971       | 23 | .71 |

\* Significant differences.  $\alpha = .05$ .

\*\* Measured considering academic performance in PE

**Table 3**

Differences in academic performance\*\* before and after the intervention.

| Variables            | Before |      | After |      | t      | gl | p     | 1- $\beta$ | d    |
|----------------------|--------|------|-------|------|--------|----|-------|------------|------|
|                      | M      | DE   | M     | DE   |        |    |       |            |      |
| Academic performance | 3.03   | 0.38 | 3.45  | 0.37 | -14.25 | 47 | .000* | 1          | 2.05 |

\* Significant differences.  $\alpha = .05$ .

\*\* Measured considering academic performance in PE

**Table 4***Sex-related differences before and after the intervention.*

| Variables                   | Female<br><i>n</i> = 25 |           | Male<br><i>n</i> = 23 |           | <i>t</i> | <i>gl</i> | <i>p</i> | 1- $\beta$ | <i>d</i> |
|-----------------------------|-------------------------|-----------|-----------------------|-----------|----------|-----------|----------|------------|----------|
|                             | <i>M</i>                | <i>DE</i> | <i>M</i>              | <i>DE</i> |          |           |          |            |          |
| Academic-performance before | 3.06                    | 0.38      | 2.99                  | 0.38      | 0.56     | 46        | .577     |            | 0.16     |
| Academic performance after  | 3.47                    | 0.38      | 3.43                  | 0.36      | 0.29     | 46        | .773     |            | 0.10     |

\* Significant differences.  $\alpha = .05$ .

Regarding the analysis of differences between sexes, initially through Levene's test it was possible to prove homogeneity of differences (*before*:  $F: .085$ ;  $p = .772 > .05$ ; *after*:  $F: .103$ ;  $p = .750$ ). Therefore, assuming this criterion, the *t* results for independent samples indicate that there were no differences in the average academic performance between sexes, both before (*female*:  $M = 3.06$ ;  $SD = 0.38$  vs. *male*:  $M = 2.99$ ,  $SD = 0.38$ ;  $t: 0.56$ ;  $gl: 46$ ;  $p = .577$ ), and after the intervention carried out (*female*:  $M = 3.47$ ;  $SD = 0.38$  vs. *male*:  $M = 3.43$ ;  $SD = 0.36$ ;  $t: 0.29$ ;  $gl: 46$ ;  $p = .773$ ). These differences, besides not being significant ( $p > .05$ ), did not present relevant effect sizes ( $d = 0.16$ ;  $d = 0.10$ ), as shown in Table 4.

## Discussion and conclusions

The teaching of hearing-impaired students presents a unique structure in comparison to traditional education. This is because hearing-impaired students' means of communication is different from that of hearing people. In that regard, it is important to understand that SL is the main means of communication for such students, and although significant efforts have been made to use this language at the pedagogical level, they are still not sufficient (Tovar, 2003). These conditions make necessary the pursuit for methodologies and adaptations that can contribute to the development of the teaching strategies for hearing-impaired students' teaching and learning.

The aim of this study was to analyse, in terms of practicality, the methods and procedures used for the planning and implementation of the use of sign language in PE, and to explore its possible effects on academic performance. In that regard, from the Spanish context, authors such as Bernal-Ruiz (2004), highlight the requirement presented by hearing-impaired students regarding the use of SL in PE. These linguistic signs present varied elements with respect to the context, according to Beckner & Helme (2018). This is because the linguistic and cultural needs are different depending on the context.

Previous studies have attempted to analyse some of the academic challenges presented by hearing-impaired students in PE (Tanure-Alves et al., 2021). However, it is argued that this study offers a more in-depth analysis, since it provides novel elements from the empirical and conceptual foundation. Moreover, it is thought that this study presents greater elaboration compared to previous studies.

The initial results of the study show that the devised repertoire of vocabulary yielded a set of 27 signs for pedagogical use in PE. Preliminary findings from its implementation suggest that the introduction of signed pedagogical vocabulary in PE produced a large effect ( $d = 2.05$ ) and significant changes in the hearing-impaired students' academic performance of ( $p < .05$ ), showing that their averages were higher after the intervention. These results relate to what is presented by authors such as Rodríguez-Ruiz (2015), Xiang (2018) and Marschark et al. (2015). These studies show educational interventions that seek to improve hearing-impaired students' academic performance. In this sense, as stated by Taylor et al. (2017) the academic success of these students in regular settings does not depend simply on satisfying their need for interpretation, rather all the necessary efforts must be gathered so that they do not face academic failure.

These facts demonstrate the need for analysis of academic performance as a variable of study, as an element of growth and adjustment to teaching strategies. These statements are supported by several studies (Hrastinski & Wilbur, 2016; Rhenals-Ramos, 2018; Rodríguez-Ruiz, 2015; Taylor et al., 2017). Regarding the intervention processes, authors such as Garrote et al. (2017) state that they provide important benefits in the face of the educational complexity that arises in attention to the diversity of learning. In that sense, from pedagogical and research work, it is considered necessary to study the factors that affect hearing-impaired students' performance at school (Taylor et al., 2017), as a social and linguistic minority group (Beckner & Helme, 2018).

Moreover, the findings provided by the statistical findings show that no significant differences were found

regarding the scores of male and female participants before and after the intervention carried out ( $t: .290$ ;  $gl: 46$ ;  $p > .05$ ). These results are similar to those presented by Dammeyer & Marschark (2016) and Adigun (2020) where no evidence was found to establish differences associated with the sex of the participants. Moreover, the results contrast with those found in studies by Awori et al. (2019), Powers (2003) and Rodríguez-Ruiz (2015), where sex differences were significant in hearing-impaired students.

However, although these differences were not found in the present study, it is pertinent to comment that it is necessary to establish future lines of work associated with the analysis of these variables, since many authors in their research results support, through statistical analysis, the existence of sex differences in relation to students' academic performance (Awori et al., 2019; Powers, 2003; Rodríguez-Ruiz, 2015).

In regards to the methods used, the RE-AIM provided criteria considered favourable in each of its components for the implementation of signed vocabulary in PE. These elements provide adjustment measures to improve the validity of the processes developed (Glasgow et al., 1999).

These findings call for further research to analyse these variables, especially with regard to the hearing-impaired population. In terms of the positive implications that these projects can contribute at various levels and training scenarios (Rodríguez de Salazar et al., 2008), they can respond to hearing-impaired students' characteristics and requirements, with a focus on the complexity of their learning.

Regarding the limitations of the study, the randomisation of groups for future analysis should be considered, as well as the assessment of the intervention's long term effects in order to analyse the sustainability of the results. Carrying out similar research in other educational contexts, i.e., in primary, middle or higher education, should be considered. Moreover, carrying out an analysis with a control group and an experimental group should be considered, since this would provide greater methodological rigor to the research. In addition, increasing the size of the population sample for future research should be considered. Another important aspect to consider is the possibility that academic performance may be affected by variables other than signed pedagogical vocabulary. Although the signed vocabulary was designed for formative purposes to serve as a tool in PE classes, it is possible that the vocabulary may have had an effect on integration and social relationships, something that was not researched in this study. However, these elements also provide insights and new perspectives that could be addressed in future studies.

Finally, it can be concluded that the preliminary findings of this educational intervention suggest that the implementation of signed pedagogical vocabulary in PE produces positive results in hearing-impaired students' academic performance. The study intends to serve as a reference for the analysis of the different aspects that can affect the academic success of hearing-impaired students. These findings could have practical implications at various levels and training settings related to hearing-impaired students' academic activity in PE. For example, to complement the efforts of institutional inclusion of these students, it is suggested to expand SL to other courses or subjects in an integrated, articulated and consistent manner, despite the variety in the technical terminology of each subject. It is also considered necessary to continue with future lines of work associated with the study of these variables.

## References

- Abuzinadah, N. E. (2020). An Avatar-Based System for Arabic Sign Language to Enhance Hard-of-hearing and Deaf Students' Performance in a Fundamentals of Computer Programming Course. <https://doi.org/10.15126/thesis.00858041>
- Adigun, O. T. (2020). Computer-assisted instruction, project based learning and achievement of Deaf learners in Biology. *Journal of e-Learning and Knowledge Society*, 16(1), 23–32. <https://doi.org/10.20368/1971-8829/1135190>
- Asún-Dieste, S., Rosario Romero-Martín, M., Aparicio-Herguedas, J. L., & Fraile-Aranda, A. (2020). Proxemic Behaviour in Pre-service Teacher Training in Physical Education. *Apunts Educacion Fisica y Deportes*, 141, 41–48. [https://doi.org/10.5672/apunts.2014-0983.es.\(2020/3\).141.05](https://doi.org/10.5672/apunts.2014-0983.es.(2020/3).141.05)
- Awori, B. B., Karugu, G. K., Mugo, J., & Orodho, J. A. (2019). Self-Esteem and Academic Achievement: What are the Explanatory Variables among Girls with Hearing Impairment in Selected Secondary Schools for the Deaf in Kenya? *Greener Journal of Educational Research*, 9(1), 16–26. <https://doi.org/10.15580/gjer.2019.1.013119025>
- Beckner, B. N., & Helme, D. W. (2018). Deaf or Hearing: A Hard of Hearing Individual's Navigation Between Two Worlds. *American Annals of the Deaf*, 163(3), 394–412. <https://doi.org/10.1353/aad.2018.0025>
- Bernal-Ruiz, J. A. (2004). *El profesor de Educación Física y el alumno sordo*. Wanceulen SL.
- Cohen, J. (2013). Statistical Power Analysis for the Behavioral Sciences. In *Statistical Power Analysis for the Behavioral Sciences*. <https://doi.org/10.4324/9780203771587>
- Dammeyer, J., & Marschark, M. (2016). Level of Educational Attainment Among Deaf Adults Who Attended Bilingual-Bicultural Programs. *Journal of Deaf Studies and Deaf Education*, 21(4), 394–402. <https://doi.org/10.1093/deafed/enw036>
- Garrote, A., Sermier Dessemontet, R., & Moser Opitz, E. (2017). Facilitating the social participation of pupils with special educational needs in mainstream schools: A review of school-based interventions. *Educational Research Review*, 20, 12–23. <https://doi.org/10.1016/j.edurev.2016.11.001>
- Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: The RE-AIM framework. In *American Journal of Public Health* (Vol. 89, Issue 9, pp. 1322–1327). *American Public Health Association Inc.* <https://doi.org/10.2105/AJPH.89.9.1322>
- Heloir, A., & Nunnari, F. (2016). Toward an intuitive sign language animation authoring system for the deaf. *Universal Access in the Information Society*, 15(4), 513–523. <https://doi.org/10.1007/s10209-015-0409-0>

- Hrastinski, I., & Wilbur, R. B. (2016). Academic Achievement of Deaf and Hard-of-Hearing Students in an ASL/English Bilingual Program. *Journal of Deaf Studies and Deaf Education*, 21(2), 156–170. <https://doi.org/10.1093/deafed/env072>
- Marschark, M., Shaver, D. M., Nagle, K. M., & Newman, L. A. (2015). Predicting the Academic Achievement of Deaf and Hard-of-Hearing Students From Individual, Household, Communication, and Educational Factors. *Exceptional Children*, 81(3), 350–369. <https://doi.org/10.1177/0014402914563700>
- Morilla-Portela, P. (2016). Relación entre la educación inclusiva y la calidad de vida. *International Journal of Developmental and Educational Psychology. Revista INFAD de Psicología*, 1(2), 499. <https://revista.infad.eu/index.php/IJODAEP/article/view/17/589>
- Oviedo, A. (2001). Apuntes para una gramática de la Lengua de Señas Colombiana. *Universidad del Valle. Instituto Nacional para Sordos*.
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, 29(5), 489–497. <https://doi.org/10.1002/nur.20147>
- Powers, S. (2003). Influences of Student and Family Factors on Academic Outcomes of Mainstream Secondary School Deaf Students. *Journal of Deaf Studies and Deaf Education*, 8(1), 57–78. <https://doi.org/10.1093/deafed/8.1.57>
- Quiroz-Pelayo, C. B., Fajardo-Flores, S. B., & Gutierrez-Pulido, J. R. (2018). Natural Language Processing for Improving Hearing Impaired Student Reading Skills. *Proceedings - 2017 International Conference on Information Systems and Computer Science, INCISCOS 2017, 2017-Novem*, 201–206. <https://doi.org/10.1109/INCISCOS.2017.54>
- Rhenals-Ramos, J. C. (2018). Señas pedagógicas en educación física. Una herramienta necesaria para mejorar el aprendizaje del estudiante sordo. *Libro de Memorias, I Congreso Internacional de Educación Física, Recreación, Deporte y Actividad Física: "Aportes Para La Convivencia y La Paz"*, 218–227. <https://repositorio.unicordoba.edu.co/bitstream/handle/ucordoba/2500/MEMORIAS%20CONGRESO1.pdf?sequence=1&isAllowed=y>
- Rodríguez-Hernández, Y., Muñoz-Vilagrón, K. A., Sánchez-Bravo, A., & Sastre, C. O. (2019). Communicative and cognitive abilities of deaf students: protocol design. *Revista de Investigación en Logopedia*, 9(2), 129–149. <https://doi.org/10.5209/rlog.62184>
- Rodríguez-Rosero, D. D., Ordoñez-Ortega, R. E., & Hidalgo-Villota, M. E. (2021). Academic Performance Determinants of High School Students in the Department of Nariño, Colombia. *Lecturas de Economía*, 94, 87–126. <https://doi.org/10.17533/UDEA.LE.N94A341834>
- Rodríguez-Ruiz, J. (2015). Rendimiento académico del alumnado con discapacidad auditiva que cursa educación secundaria obligatoria en la provincia de Granada. *Revista de Educación Inclusiva*, 8(3), 218–241. <https://revistaeducacioninclusiva.es/index.php/REI/article/view/99>
- Rodriguez de Salazar, N., Garcia Rios, D. P., & Jutinico Fernández, M. del S. (2008). Inclusión de estudiantes sordos a la vida universitaria: Una experiencia significativa en la Universidad Pedagógica Nacional. *Revista Colombiana de Educación*, 0(54), 170.195. <https://doi.org/10.17227/01203916.54rce170.195>
- Rozo-Melo, N. (2015). La lengua de señas colombiana. *Portal de Lenguas de Colombia: Diversidad y contacto*. <https://lenguasdecolumbia.caroycuervo.gov.co/contenido/Lenguas-de-senas-colombiana/introduccion>
- Tanure-Alves, M. L., de Souza, J. V., Grenier, M., & Lieberman, L. (2021). The invisible student in physical education classes: voices from Deaf and hard of hearing students on inclusion. *International Journal of Inclusive Education*, In press. <https://doi.org/10.1080/13603116.2021.1931718>
- Taylor, E., Callahan, E., Pinta, K., Yeatts, L., & Winiecki, D. (2017). Increasing Academic Performance of Deaf Students at Alpha University: A Case Study. *Performance Improvement*, 56(8), 16–26. <https://doi.org/10.1002/pfi.21720>
- Tovar, L. (2003). La necesidad de planificar una norma lingüística en lengua de señas para usos académicos. *Lengua y Habla*, 8(0), 97–132. <http://erevistas.saber.ula.ve/index.php/lenguyahabla/article/view/3570>
- Valero, J. (1993). Los elementos facilitadores de la comprensión oral empleados por el profesor del aula regular con adolescentes sordos. *Comunicación, Lenguaje y Educación*, 5(18), 101–114. <https://doi.org/10.1080/02147033.1993.10821077>
- Xiang, L. (2018). Construction of educational intervention model based on deaf students' English learning disabilities. [https://webofproceedings.org/proceedings\\_series/ESSP/ICECBN%202018/ICECBN122817.pdf](https://webofproceedings.org/proceedings_series/ESSP/ICECBN%202018/ICECBN122817.pdf)

**Conflict of interests:** the authors have not declared any conflict of interest.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Emotions According to Type of Motor Task, Sports and Gender Experience

Joana Niubò-Solé<sup>1\*</sup>, Pere Lavega-Burgués<sup>2</sup> & Pedro Sáenz-López<sup>3</sup>

<sup>1</sup>INS Quercus. Barcelona (Spain).

<sup>2</sup> National Institute of Physical Education of Catalonia (INEFC), University of Lérida (UdL), Lérida (Spain).

<sup>3</sup> Faculty of Education, Psychology and Sport Sciences. Huelva (Spain).

## Cite this article:

Niubò-Solé, J., Lavega-Burgués, P., & Sáenz-López, P. (2022). Emotions According to Type of Motor Task, Sports and Gender Experience. *Apunts Educación Física y Deportes*, 148. 26-33. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.04](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.04)

## Edited by:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Joana Niubó  
[joana.niubo.sole@gmail.com](mailto:joana.niubo.sole@gmail.com)

## Section:

Physical Education

## Original language:

Spanish

## Received:

July 15, 2021

## Accepted:

November 25, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Abstract

Physical activity generally, and motor play in particular, are an ideal framework for creating emotional experiences of great educational value. Based on the theoretical foundations of motor praxeology and Bisquerra and Lazarus' emotional education model, the aim of this study was to find out which emotions are triggered by different types of motor activities (motor action domains). An additional aim was to discern whether sporting experience and gender are determining factors in the expression of these emotions. To this end, a study involving 69 university students was designed. The students were given theoretical and practical training related to emotions and they were subsequently asked to carry out different physical activities and assess the emotions these triggered, using the *Games and Emotion Scale* (GES) questionnaire. The results showed that physical-sport activities generate more intense positive emotions than ambiguous or negative ones, and that socio-motor activities generally trigger more intense emotions than psychomotor activities. Individuals with sporting experience express positive and ambiguous emotions more intensely, and males express positive emotions more intensely than females.

**Keywords:** domains of motor action, emotional awareness, emotional education, motor behaviour, motor praxeology, physical activity.

## Introduction

Human beings live, feel and are moved by what happens around them. The performance of physical activities is a unique moment in which bodies, immersed in the activity, perceive, receive, invent, reproduce, learn and, among many other things, experience emotion. There are various emotions or sensations that are experienced through physical practices (Lagardera, 1999) and in the educational field, these are beginning to be understood. Understanding what is being felt and experienced at each moment of existence requires a certain amount of work, as humans have to learn to identify and recognise these emotions (Bisquerra & Pérez, 2007 and Bisquerra, 2018).

The identification and recognition of the different emotions perceived in each domain of motor action can be very useful for educators, sports coaches and professionals in the world of physical activity who must develop emotional competences (Lagardera, 1999; Lavega et al., 2011). The development of these competences in the educational environment is now a social necessity (Bisquerra 2007, 2018; Mestre & Fernández, 2007; Sáenz-López, 2020). Physical activity and, consequently, Physical Education (PE) can contribute to learning to control and regulate emotions (Lagardera, 1999), as well as influencing an individual's healthy behaviours, since, in order to create commitment to sport practice, it is necessary to ensure that the practices carried out are satisfactory and perceived as fun and motivating (Moreno & Hellín, 2007).

Each family of motor practices, or domain of motor action, activates different motor sensations, associated with the experience of relationships, learning and unique processes, which will have different consequences for the individual experiencing them. Therefore, depending on the pedagogical objectives set, it will be very useful to understand which domain of motor action is the most suitable in order to activate positive emotions, reduce negative emotions or orient ambiguous emotions in a positive direction (Duran & Costes, 2018; Falcón et al., 2020; Gil et al., 2020; Lavega et al., 2013b; Lavega et al., 2011; Miralles et al., 2017). In this sense, the teacher, coach or PE instructor should have sufficient knowledge to be able to plan with judgment the set of motor sensations that should be experienced by students and be able to identify what they feel, what they experience and how they react emotionally.

The study of the type and intensity of emotions triggered by different sporting practices is a line of work that has provided scientific evidence and educational guidelines on how and which practices we should include within a programme, according to our intentionality

(Alonso et al., 2019, Alonso et al., 2013; Duran & Costes, 2018; Lavega et al., 2013a; Lavega et al., 2013b; Lavega et al., 2011; Miralles et al., 2017). It has been demonstrated that gender and sporting history variables can influence the pleasure and enjoyment of practice, it is particularly highlighted that, in cooperative activities, women reach more intense values of enjoyment than men (Duran & Costes, 2018; Duran et al., 2014). They also express ambiguous emotions differently to men (Lavega, et al., 2011). Regarding competitive games, males reach more intense values of negative emotions and sporting experience is a factor that affects the emotions triggered in males, with negative emotions being more intense (Duran & Costes, 2018; Duran et al., 2014; Sáez, et al., 2014).

Another important aspect revealed by these studies is that socio-motor activities and cooperative games intensify triggered emotions, particularly positive ones (Falcón, et al., 2020; Gil-Madróna et al., 2020; Lavega et al., 2013b; Lavega et al., 2011; Miralles, et al., 2017; Muñoz-Arroyave, et al., 2020), compared to psychomotor activities, which trigger a lower intensity of positive emotions (Falcón, et al., 2020); thus revealing that the peer and adversary component, and the relationship with them, is a highly influential factor in the practice experience.

This data is of interest when planning and managing the activities envisaged for groups, because if positive experiences are desired, the right decisions have to be made.

Based on the approach from motor praxeology and the emotional education foundations of Bisquerra (2018) and Lazarus' (1991) model, this study set out the following objectives:

The main objective was to determine exactly which domains of motor action triggered the different types of emotions with more or less intensity and whether there were differences between socio-motor and psychomotor activities. An additional aim was to discover whether there were differences between participants with and without sporting experience and whether having a background in one domain or another, or having more or less years of sporting experience also had a bearing on the intensity of emotions in the different physical practices. Finally, it was investigated whether gender was a decisive factor when it came to experiencing emotions in the different motor practices.

Based on previous studies (Alonso et al., 2019; Duran et al., 2014; Falcón et al., 2020; Lavega et al. 2013b; Lavega et al. 2013a; Lavega et al. 2011; Miralles et al. 2017; Muñoz-Arroyave et al., 2020; Pic et al., 2019) the hypotheses put forward were: a priori, that the practice of different motor activities would trigger a greater intensity

of positive emotions than negative and ambiguous ones in the participants. That in each of the motor action domains, the different types of emotions would be experienced differently. Regarding sporting history, it was predicted that there would be differences between those participants who had sporting experience, who would tend to express greater intensity of emotions than those who did not have such a sporting history. Finally, regarding gender, it was predicted that both the intensity and type of emotions would be experienced similarly and that there might be differences in some specific motor action domains.

## Methodology

### Participants

The participants consisted of one group of university students studying Early Childhood Education and two groups of students studying Physical Education Teaching, a total of 69 students, with a mean age of 20.13 ( $SD = 3.9$ ). 27 were female and 42 were male; 82.2% had sporting experience and 36.8% of this experience consisted of psychomotor sports or activities, whilst 63.2% consisted of socio-motor sports.

The groups were selected out of convenience, capitalising on the fact that practical physical activity sessions were held at the university. Participants were informed in advance of the research objectives and procedure and signed an informed consent form designed according to the ethical provisions of the Declaration of Helsinki (2013).

### Instruments and procedure

In order to carry out the research, students were first trained and subsequently completed the GES questionnaire (Lavega, et al., 2013a) with common criteria.

### Student training on emotions

A training session was organised by the researchers. The objective was for the students to learn to identify, recognise and express the emotions presented by the Bisquerra (2018) and Lazarus (1991) model and the different groups into which they are classified. In this session, the theoretical content, the definition of emotion, its dimensions and functions were explained. Subsequently, hypothetical situations were posed and the students had to contemplate what they would feel in each

of them. Emotions and concepts were defined in order to ensure the same criteria of meaning for each. Finally, a practical section was carried out in which, through different body expression activities, the different emotions, their gestural and expressive characteristics and their expression with different intensities were worked with.

### Data collection simulation

The data collection simulation followed, the GES questionnaire was used to measure intensity and identify the causes of the type of emotions triggered in different motor situations. The students were asked to give a number from 0 to 10 for each of the emotions and each of the practices carried out (depending on the domain to which they belong), according to the perceived intensity of that emotion. The answers were subsequently discussed to adjust ideas and clarify concepts.

### Data collection

In this last phase, the students completed the GES questionnaire in the scheduled physical activity sessions, selecting the activities according to the motor action domain. This third phase was carried out as many times as necessary in order to obtain sufficient information on activities in each of the domains.

### Data analysis

The internal consistency of the questionnaire was measured by Lavega et al. (2013a) through Cronbach's alpha and the following values were obtained:  $n = 271$ ;  $\alpha = .92$ . The results were very similar for each type of positive ( $\alpha = .93$ ), negative ( $\alpha = .90$ ) and ambiguous ( $\alpha = .95$ ) emotions.

The SPSS 17.0 programme was used to analyse the data. A descriptive study was initially carried out by recoding the variables according to Bisquerra's (2018) classification criteria for emotions. This resulted in three categories of dependent variables (positive, negative and ambiguous) for each of the domains analysed (collaboration, opposition, collaboration-opposition and psychomotor), in addition to three new variables of positive, negative and ambiguous emotions without distinction of domain, a recoding of the mean of each of the emotions separately and a recoding of the positive, negative and ambiguous emotions according to psychomotor and socio-motor activities. An inferential analysis based on Kendall's W, Mann Whitney and Kruskal Wallis non-parametric tests with  $p < .05$  was performed to compare the variables.

## Results

Focusing on the intensity of the emotion type, the results showed significant differences according to Kendall's W test ( $\chi^2 = 116,623$ ,  $gl = 2$ ,  $p < .05$ ). Positive emotions were more intense than negative and ambiguous emotions.

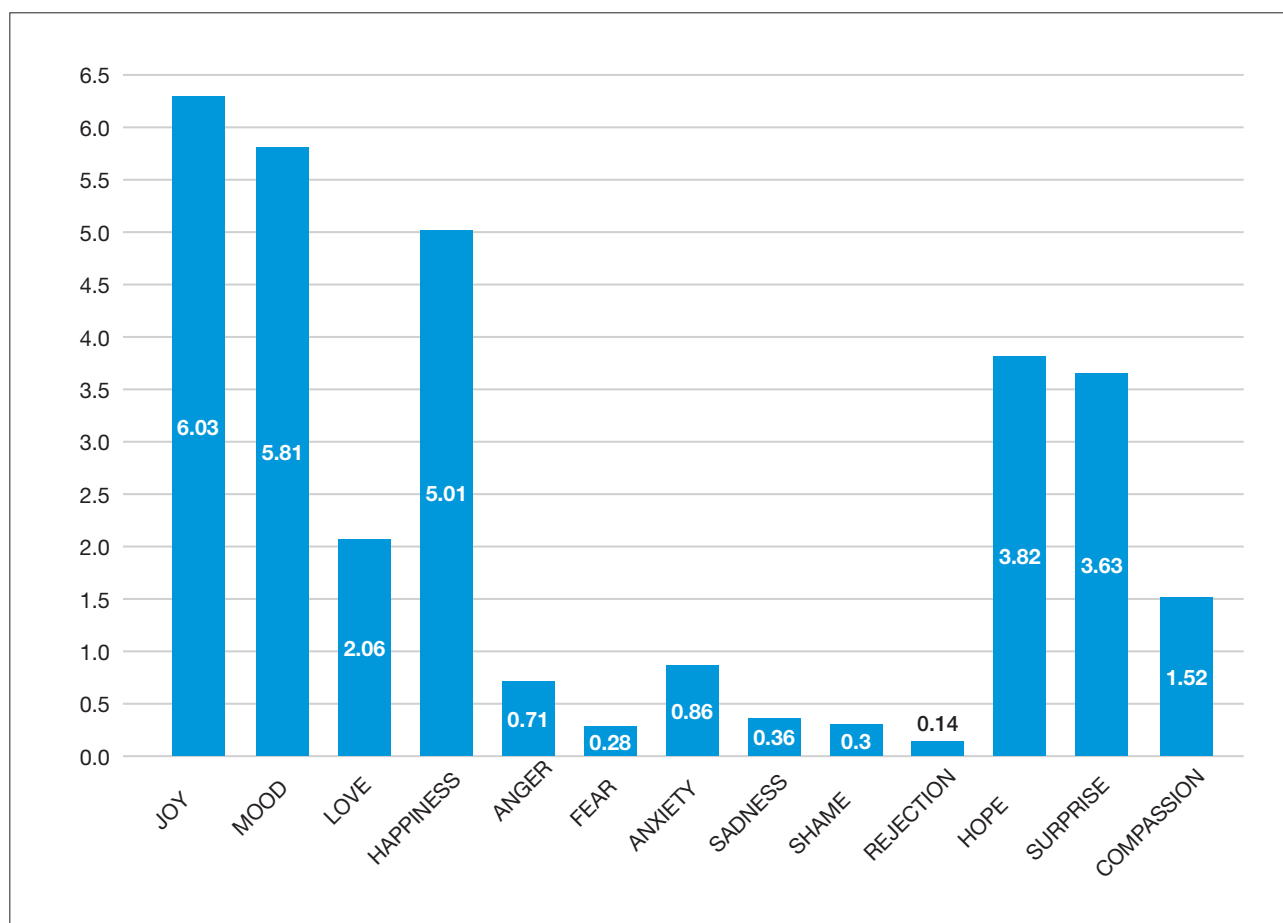
In relation to the behaviour of each of the thirteen emotions separately, it was observed that the emotion experienced with the greatest intensity was joy, followed by humour, happiness and love, which has relatively low values in comparison with emotions of the same group. As regards negative emotions, the emotion experienced with the greatest intensity was anxiety and with the least intensity, rejection. As for ambiguous emotions, the most frequently experienced emotions were hope, surprise and finally compassion, as can be seen in Figure 1:

In relation to the domains of motor action, as shown in Figure 2, it should be highlighted that the highest mean for positive emotions was collaboration-opposition, followed by opposition, collaboration and finally psychomotor

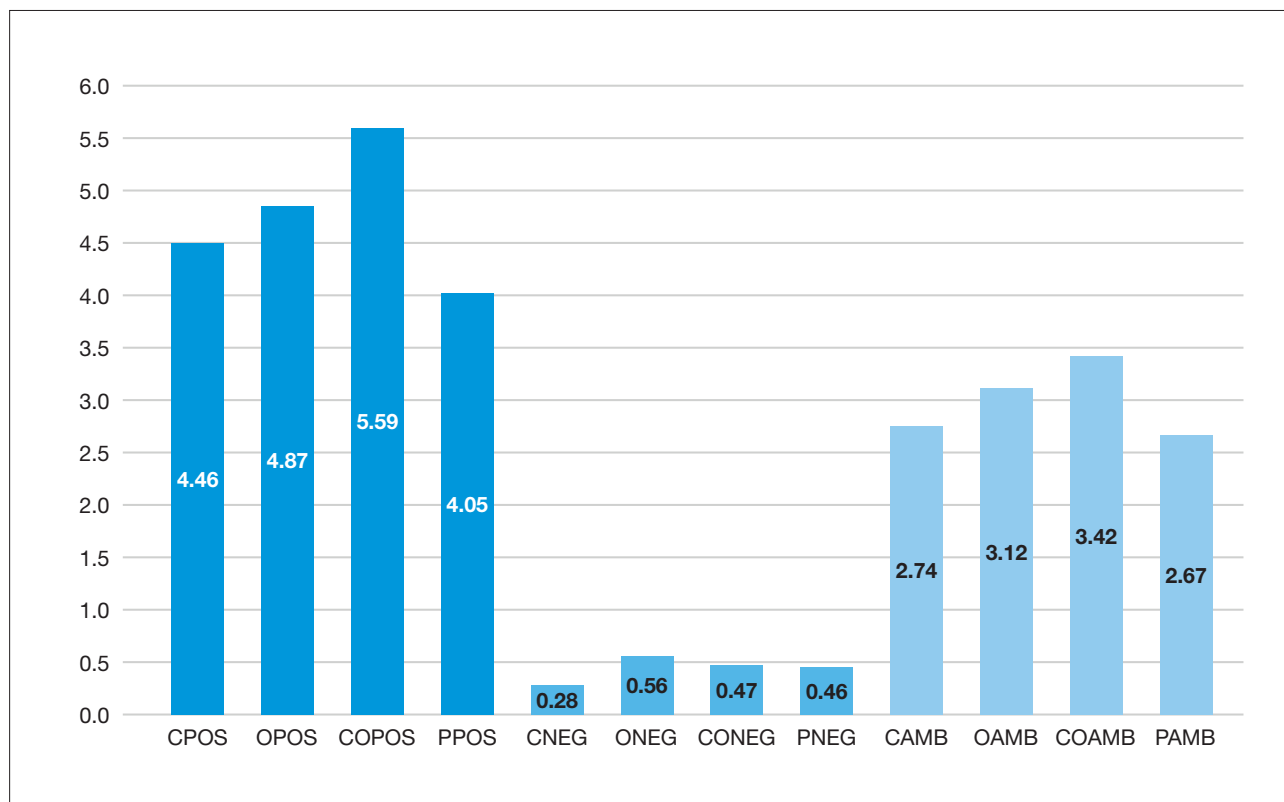
activities. The lowest ratio of negative emotions was found in collaborative activities, followed by psychomotor activities, collaborative-oppositional activities and finally oppositional activities. Ambiguous emotions were most intense in collaborative-oppositional activities, followed by oppositional, collaborative and finally psychomotor activities.

If the four domains analysed are compared according to the three types of emotions using Kendall's W test, it is observed that there were differences in all cases: in positive emotions,  $\chi = 79,824$  y  $gl = 3$ ; in negative emotions,  $\chi^2 = 9,529$  y  $gl = 3$ ; and, in ambiguous emotions,  $\chi^2 = 33,861$ ,  $gl = 3$  with  $p < .05$  in all cases.

If the criterion of relationship with the others are observed and the activities are divided into socio-motor and psychomotor, the data showed significant differences in the intensity of positive and ambiguous emotions (Kendall's W,  $\chi = 37.69$   $gl = 1$  for positive and  $\chi = 6.78$   $gl = 1$  with  $p < .05$ ), but not negative emotions ( $\chi = 2.86$   $gl = 1$   $p = .091$ ).



**Figure 1**  
Averages of emotion intensity.

**Figure 2**

Averages of emotion intensity per domain of action.

C = Collaborative; POS = Positive; O = Oppositional; NEG = Negative; P = Psychomotor; AMB = Ambiguous; CO = Collaborative-oppositional

In relation to the sporting history variable and in accordance with the hypotheses put forward, it was observed that, in general, there are differences between the participants who did and did not have sporting experience when perceiving the intensity of emotions, for positive and ambiguous emotions (Table 1): those who did have sporting experience presented higher intensities than those who did not.

**Table 1**

Mann-Whitney test for sporting history.

|                             | POSITIVE | NEGATIVE | AMBIGUOUS |
|-----------------------------|----------|----------|-----------|
| Mann-Whitney U test         | 161.5    | 269.5    | 178.5     |
| Asymptotic sig. (bilateral) | .004     | .250     | .010      |

$n_1 = 57$   $n_2 = 12$ ,  $*p < .05$

If the relationship of the participants with sporting experience is analysed, no differences were found according to the domain of the sporting practice performed (psychomotor or socio-motor) using the same Mann Whitney test, nor between whether the practice performed was for leisure, competition or performance according to the Kruskal Wallis ANOVA test. In this last section, no differences were found in the categories established according to years and hours spent on the activity.

In relation to gender, differences were found in the intensity of positive emotions: perceived intensities for males were higher than for females.

It was observed that in some of the categories and groups of emotions, namely positive collaboration (CPOS), positive opposition (OPOS), negative opposition (ONEG), positive collaboration-opposition (COPOS) and positive psychomotor (PPOS), there were significant differences in the intensity of the emotions (Table 2). In all cases, it was males who presented the highest values.

**Table 2***Averages of emotion intensity per domain of action.*

|                             | CPOS   | OPOS   | ONEG | COPOS | PPOS |
|-----------------------------|--------|--------|------|-------|------|
| Mann-Whitney U test         | 244    | 225    | 398  | 331   | 287  |
| Asymptotic sig. (bilateral) | < .001 | < .001 | .035 | .004  | .001 |

 $n_1 = 42$   $n_2 = 27$ , \* $p < .05$ 

## Discussion

The main aim of the research was to determine exactly which domains of motor action trigger the different types of emotions more and less intensely and whether there were differences between socio-motor and psychomotor activities. It was also investigated whether there were differences between participants with and without sporting experience and whether the characteristics of this background were related to the intensity of emotions in the different physical practices. It was further investigated whether gender was a decisive factor in the perception of emotions.

Physical activities and sports generate more intense positive emotions than negative and ambiguous ones. This assertion is confirmed by studies already carried out on emotions (Duran & Costes, 2018; Duran et al., 2014; Lavega et al., 2013a, Lavega et al., 2011; Miralles et al., 2017; Muñoz-Arroyave et al., 2020; Pic et al., 2019). Physical exercise increases levels of serotonin and dopamine, neurotransmitters that affect emotional stability (Bisquerra, 2018), as well as improving well-being and confidence and increasing psychological welfare (Sáenz-López, 2020). Studies on reasons for practising sport show that desire for enjoyment and pleasure are some of the aspects that are most valued (Moreno & Hellín, 2007); therefore, it seems logical that these activities are a positive experience for those who practise them. From a pedagogical point of view, enhancing positive experiences in the field of physical activities during periods of growth will condition physical practice in adulthood (Moreno & Hellín, 2007) and, for that reason, it therefore seems to be of vital importance.

If the way in which the emotions triggered in the different motor action domains behaved are analysed, it is observed that the results coincided with the studies in some cases and differed in others:

In this study, the activities with the highest intensity of positive emotions were collaborative-oppositional activities, whereas in other studies, collaborative games or activities presented the highest intensity of positive

emotions (Falcón et al., 2020; Gil et al., 2020; Lavega et al., 2013b; Lavega et al., 2011; Miralles et al., 2017). The results coincided in confirming that psychomotor activities generated positive emotions with least intensity (Duran & Costes, 2018; Duran et al., 2014; and Lavega et al., 2011; Miralles et al., 2017). According to Bisquerra (2018), interaction with people and the environment generates emotions and people are the essential elements; perhaps it could be this socialising effect that makes humans feel emotions more intensely.

This and similar studies found that psychomotor activities present low medians for positive emotions (Duran & Costes, 2018; Duran et al., 2014; Lavega et al., 2013a; Lavega et al., 2011; Miralles et al., 2017) and the second lowest (in this study) for negative emotions, although the latter difference is not representative. The two former are, suggesting that socio-motor activities tend to produce emotions more intensely than psychomotor activities.

Some studies confirm that meeting basic psychological needs – autonomy, competence and relationship with others – leads to higher levels of task involvement, effort and even performance, thus creating states of intrinsic motivation (Moreno & Hellín, 2007). Once again, when it comes to physical exercise, the relationship with others proves to be of real importance. From a pedagogical point of view, it is of great interest and extremely important to take this social interaction into account as a beneficial element, to understand how to adapt it to objectives and to redirect it so that it contributes to growth and learning.

Focusing on negative emotions, and coinciding with some research (Duran et al., 2014; Lavega et al., 2013a; Lavega et al., 2011), the activity that generates negative emotions with the least intensity is collaboration. It seems important to consider this point, as the second or first domain (Falcón et al., 2020) that provokes negative emotions with least intensity is the psychomotor domain. Both domains lack opposition; leading to the conclusion that perhaps the oppositional element generates negative emotions.

It is important to note that in this study, joy, humour and happiness were the emotions that obtained the highest means out of the thirteen and that, in the same questionnaire, GES (Lavega et al., 2013a) offered the words fun, enthusiasm, pleasure, well-being, enjoyment and satisfaction as synonyms.

The simple act of perceiving positive emotions already influences a person's health, because the more positive emotions one feels, the better. Lagardera (1999) states that emotions condition us in our daily tasks, and generating positive emotions for students through physical activity has a positive impact on their well-being and increases their quality of life.

Students with sporting experience express positive and ambiguous emotions more intensely. In previous studies, higher intensity emotion values were found when comparing those who had practised socio-motor sports with those who had practised psychomotor sports or who did not practise sports (Lavega et al., 2011). In the present study, no difference is found between the latter distinction. Regarding the values for negative emotions, it is evident that they are all very low, with the highest average not exceeding 1. In this case, the sporting experience variable was insignificant, but, differs from some studies where, precisely, those who had sporting experience presented a higher perception of negative emotions than those who did not (Duran et al., 2014).

Taking into account the type of practice carried out in terms of competition, leisure or performance and the years and hours of sporting experience, no differences were found, in contrast to other studies (Duran et al., 2014 and Lavega et al., 2013b) where the sporting experience led to a greater intensity of negative emotions.

In relation to the gender variable, some studies showed differences in ambiguous emotions (Lavega et al., 2011), as in the present study. In the results obtained, besides finding differences according to gender and according to the different domains of activities, it was found in all cases that positive emotion were more intense in males. Although the differences are not significant, they are also present for the ambiguous emotion groups in all cases. Females only outperform males in the intensity of perceived negative emotions and in collaborative and psychomotor activities.

Some data indicated varying results: for example, collaborative and psychomotor practices, precisely those in which there is no opposition, were preferred by women (Pavón & Moreno, 2008). Differences were also found in a study that stated that women preferred cooperative activities to individual activities or competitive situations, which were preferred by men (Ruiz et al., 2004). Psychomotor activities, together with oppositional activities, were the activities in which women perceived negative emotions most intensely. It is worth noting that some university studies such as the

present one detected higher intensities of positive emotions in women relative to men in collaborative activities (Duran & Costes, 2018).

Some data, such as that which suggests women prefer social activities compared to men, that they prioritise sport for leisure time and that they generally rate themselves as not very competent in sport compared to men (Castillo, et al. 2004 and Pavón & Moreno, 2008) is relevant. Also of interest are some studies conducted in primary schools, where boys attributed the experience of positive emotions to elements of internal logic in a generalised way (e.g., winning or losing); in contrast, girls made comments related to aspects of both internal and external logic, thus attributing positive emotions to cooperating with peers or laughing with them (Alcaraz-Muñoz, et al., 2017).

The present results reinforce the data confirming that there are differences between males and females in terms of the enjoyment of physical-sports practice, with a higher level in males (Castillo et al., 2004), except in some studies and specific areas (Duran & Costes, 2018).

It also appears relevant, although it was not taken into account in this study, whether activities are carried out competitively, since, in this line, research affirms that activities carried out non-competitively increase perceived positive emotions (Duran & Costes, 2018; Lavega et al., 2011; Muñoz-Arroyave et al., 2020).

The sample for the present study prevented the generalisability of the results. This cross-sectional representation in a given context helps to further compare the results with similar studies.

## Conclusions

The different domains analysed trigger emotions in different ways and, in all of them, the most intensely perceived emotions are positive. Socio-motor activities are generally more emotionally intense than psychomotor activities.

Participants with sporting experience perceive positive and ambiguous emotions more intensely than those without sporting experience, regardless of the type, scope and years or hours of sporting experience. Finally, in relation to gender, males express positive emotions more intensely than females.

## References

- Alcaraz-Muñoz, V., Alonso Roque, J.I., & Yuste Lucas, J. (2017). Play in Positive: Gender and Emotions in Physical Education. *Apunts Educación Física y Deportes*, 129, 51-63. [https://doi.org/10.5672/apunts.2014-0983.es.\(2017/3\).129.04](https://doi.org/10.5672/apunts.2014-0983.es.(2017/3).129.04)
- Alonso Roque, J. I., Gea García, G., & Yuste Lucas, J.L. (2013). Formación emocional y juego en futuros docentes de Educación física. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 16(1), 97-108. <https://doi.org/10.6018/reifop.16.1.179461>

- Alonso Roque, J. I., Marín Gullén, M., Yuste, J., Lavega Burgués, P., & Gea García, G. (2019). Conciencia emocional en situaciones motrices cooperativas lúdicas y expresivas en Bachillerato: perspectiva de género. *Educatio Siglo XXI*, 37(1). <https://doi.org/10.6018/educatio.363461>
- Bisquerra, R., & Pérez, N. (2007). *Las competencias emocionales*. Educación XXI, 10, 61-82.
- Bisquerra, R. (2018). *Universo de emociones*. Valencia: PalauGea comunicación.
- Castillo, I., Balaguer, I., Duda, J., & García, M.L. (2004). Factores psicosociales asociados con la participación deportiva en la adolescencia. *Revista Latinoamericana de Psicología*, 36(3), 505-515. <https://www.redalyc.org/articulo.oa?id=80536310>
- Declaración de Helsinki de la AMM (2013). Principios éticos para las investigaciones médicas en seres humanos (64 Asamblea General). Fortaleza, Brasil.
- Duran, C., & Costes, A. (2018). Efecto de los juegos motores sobre la toma de conciencia emocional. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte* 18(70). <https://doi.org/10.15366/rimcafd2018.70.003>
- Duran Delgado, C., Lavega Burgués, P., Salas Santandreu, C., Tamarit, M., & Invernó i Curó, J. (2014). Educación Física emocional en adolescentes. Identificación de variables predictivas de la vivencia emocional. *Cultura, Ciencia y Deporte*, 10(28), 5-18. <http://hdl.handle.net/10459.1/63126>
- Falcón Miguel, D., Castellar Otín, C., Ortega Zayas, M. A., & Pradas de la Fuente, F. (2020). Elementos de la lógica interna y externa de los juegos que explican la experiencia afectiva del alumnado de educación física en secundaria. *Publicaciones*, 50(1), 355-370. <https://doi.org/10.30827/publicaciones.v50i1.15991>
- Gil-Madrona, P., Pascual-Francés, L., Jordá-Éspi, A., Mujica-Johnson, F., & Fernández-Revelles, A. B. (2020). Affectivity and Motor Interaction in Popular Motor Games at School. *Apunts Educación Física y Deportes*, 139, 42-48. [https://doi.org/10.5672/apunts.2014-0983.es.\(2020/1\).139.06](https://doi.org/10.5672/apunts.2014-0983.es.(2020/1).139.06)
- Lagardera Otero, F. (1999). La lógica deportiva y las emociones. Sus implicaciones en la enseñanza. *Apunts Educación Física y Deportes*, 56, 99-107. <http://hdl.handle.net/10459.1/65402>
- Lavega, P.; Araujo, P., & Jaquira, A. R. (2013b). Teaching motor and emotional competencies in university students. *Cultura Ciencia y Deporte*, 8(22), 5-15. <https://www.redalyc.org/articulo.oa?id=163026245002>
- Lavega, P.; Filella, G.; Agulló, M<sup>a</sup>. J.; Soldevilla, A., & March, J. (2011). Understanding emotions through games: Helping trainee teachers to make decisions. *Electronic Journal of Research in Educational Psychology*, 9(2), 617-640. <https://doi.org/10.25115/ejrep.v9i24.1459>
- Lavega Burgués, P. March Llanes, J., & Filella Guiu, G. (2013a). Juegos deportivos y emociones. Propiedades psicométricas de la escala GES para ser aplicada en la Educación Física y el Deporte. *Revista de Investigación Educativa*, 31(1), 151-165. <https://doi.org/10.6018/rie.31.1.147821>
- Lazarus, R.S. (1991). *Emotions and adaptation*. University Press.
- Mestre, J. M., & Fernández-Berrocal, P. (Coords.) (2007). *Manual de inteligencia emocional*. Madrid: Pirámide.
- Miralles Pascual, R., Filella Guiu, G., & Lavega Burgués, P. (2017). Educación física emocional a través del juego en educación primaria: ayudando a los maestros a tomar decisiones. *Retos: Nuevas tendencias en Educación Física, Deporte y Recreación*, 31, 88-93. <http://hdl.handle.net/10459.1/59188>
- Moreno, J.A., & Hellín, G. (2007). El interés del alumnado de Educación Secundaria Obligatoria hacia la Educación Física. *REDIE, Revista Electrónica de Investigación Educativa*, 9 (2), 0. <http://redie.uabc.mx/vol9no2/contenido-moreno.html>
- Muñoz-Arroyave, V., Lavega-Burgués, P., Costes, A., Damian, S., & Serna, J. (2020). Los juegos motores como recurso pedagógico para favorecer la afectividad desde la educación física. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación*, 38, 166-172. <https://doi.org/10.47197/retos.v38i38.76556>
- Pavón Lores, A., & Moreno Murcia, J.A. (2008). Actitud de los universitarios ante la práctica físico-deportiva: diferencias por géneros. *Revista de Psicología del Deporte*, 17(1), 7-23. <https://www.redalyc.org/articulo.oa?id=235119246001>
- Pic, M., Lavega-Burgués, P., Muñoz-Arroyave, V., March-Llanes, J., & Echeverri-Ramos, J. A. (2019). Predictive variables of emotional intensity and motivational orientation in the sports initiation of basketball. *Cuadernos De Psicología Del Deporte*, 19(1), 241-251. <https://doi.org/10.6018/cpd.343901>
- Ruiz, L.M., Graupera, J.L., Rico, I., & Mata, E. (2004). Preferencias participativas en Educación Física de los chicos y chicas de la Educación Secundaria mediante la "escala GR de participación social en el aprendizaje". *European Journal of Human Movement*, 12, 151-168.
- Sáenz-López, P. (2020). *Educación Emocionando. Propuesta para la (r) evolución en las aulas del siglo XXI*. Huelva: Servicio de publicaciones de la Universidad de Huelva.
- Sáez de Ocariz Granja, U., Lavega Burgués, P., Lagardera Otero, F., Costes Rodríguez, A., & Serna Bardavío, J. (2014). ¿Por qué te peleas? Conflictos motores y emociones negativas en la clase de Educación Física: el caso de los juegos de oposición. *Educatio Siglo XXI* 32(2), 71-90. <https://doi.org/10.6018/j/194091>

**Conflict of interests:** the authors have not declared any conflict of interest.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Changes in Front Crawl Technique Caused by Different Technical Exercises

Gracia Lopez-Contreras<sup>1\*</sup> , María Paz Campaña-Montilla<sup>1</sup>,  
Francisco Cuenca-Fernández<sup>1</sup>  and Raul Arellano<sup>1</sup> 

<sup>1</sup> Physical Activity and Sports in the Aquatic Environment Research Group, Department of the University of Granada. Physical Education and Sports. Carretera de Alfacar, s/n 18001 – Granada. University of Granada. Granada (Spain)

## Cite this article:

López-Contreras, G., Campaña-Montilla, M. P., Cuenca-Fernández, F., & Arellano, R. (2022). Changes in Front Crawl Technique Caused by Different Technical Exercises. *Apunts Educación Física y Deportes*, 148, 34-41. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.05](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.05)

## Abstract

Some swimming exercises alter the rotation around the longitudinal axis of the body. This study determined the differences in, and the symmetry of, shoulder and hip rotation caused by different exercises. In a cross-sectional design, 16 trained swimmers performed six different freestyle swimming protocols: i) breathing holding (BH); ii) breathing right (BR); iii) arm extended breathing right (AEBR) or iv) breathing left (AEBL); v) arm close breathing right (ACBR) or vi) left (ACBL). The exercises were recorded on video using two frontal cameras and the angles were measured by Kinovea®. Two-way ANOVA was used to explore protocol-exercise interaction. Differences between the executing arm (AE) side and non-executing arm (NEA) side were compared using paired-sample t-tests. The shoulders rotated more than the hips and reached their maximum rotation earlier. Breathing increased rotation by ~7-12°. ACBR and ACBL showed lower rotation ranges than the other protocols, but produced significant asymmetries between the executing arm side (shoulder: 8-19°; hip: 12-17°) and non-executing arm side (shoulder: 66-77°; hip: 51-68°). ACBR and ACBL showed similar rotational ranges to normal swimming, but had a different stroke cycle time (1.5 s vs. 1.3 s). The changes between the rotation of shoulders and hips were not uniform and were especially favoured by swimming exercises, especially when breathing. Coaches should reconsider including these exercises in swimming programs.

**Keywords:** biomechanics, laterality, learning, swimming, training.

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Francisco Cuenca-Fernández  
[cuenca@ugr.es](mailto:cuenca@ugr.es)

## Section:

Sports training

## Original language:

Spanish

## Received:

July 2, 2021

## Accepted:

October 28, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Introduction

Front crawl swimming often presents persistent problems while it is learnt, such as difficulty breathing and lack of rhythm or coordination (Zhang, 2014). For this reason, specific exercises (also called drills) to teach and correct swimming techniques are applied (Bielec et al., 2008; Lucero, 2015; Wen et al., 2016). Some swimming drills require excessive skill and cognitive involvement and therefore can be difficult for beginners, however, others, such as breath-hold swimming drills and one-arm front crawl are commonly used to reproduce certain competition conditions or as a procedure to force the swimmer to focus more on a specific aspect of their technique (Zhang, 2014; Lucero, 2015).

Although the scientific literature has not produced a detailed study on this topic, there is evidence based on studies focused on changes in the longitudinal rotation of the body during swimming (i.e., the roll). Basically, this rotation increases the effectiveness of the arm pull, since it allows the use of large muscle groups (Prichard, 1993; Andersen et al., 2020). Breathing and arm recovery are also smoother, as the head and shoulders are given more room to move as the body rotates (Payton et al., 1997; Psycharakis & Sanders, 2010). However, some studies have shown that arm trajectories can be modified and negatively affected by excessive body rotation (Payton et al., 1997; Psycharakis & Sanders, 2010; Lecrivain et al., 2010). Furthermore, since these changes are modulated by swimming speed (Psycharakis & Sanders, 2010), increasing upper body actions would reduce the overall range and duration of that rotation (Andersen et al., 2020; Yanai, 2001; Sanders & Psycharakis, 2009), thus restricting the turning effect in non-propulsive directions and keeping the body more hydrodynamic (Cappaert et al., 1995; Yanai, 2003). In fact, a common error found in the pool is the tendency to include these practices during low intensity sessions or as recovery between high intensity series, since this leads to a reduction in swimming rhythm and a transfer to actual competitive swimming. Therefore, regardless of the changes in technique, swimming exercises performed at low speeds would also result in increased rotation of the shoulders and hips.

Some authors have shown that, in swimmers, it is normal to find an asymmetry in the rotation of the body between the breathing side and the non-breathing side (Psycharakis & Sanders, 2010; Psycharakis & McCabe,

2011; de Souza-Castro et al., 2007; Payton et al., 1999). However, the asymmetry caused by the actions of breathing can increase during swimming exercises if the swimmer is forced into a position that creates additional asymmetry *per se*. For example, single-arm front crawl exercises are common in swimming practices to improve breath coordination, to work more on one arm, or as a way to modify the swimmer's technique (Lucero, 2015; Yanai and Hay, 2000; López-Contreras & Arellano, 2002). However, it is important to point out that the loss of propulsion and body stability that comes from restricting the actions of the non-executing arm (NEA) would produce a compensatory increase in the actions of the executing arm (EA), which could be related to a loss of stroke length (Cuenca-Fernández et al., 2020a). Therefore, little or no benefit may be obtained from these swimming exercises, especially if a consistent stroke rate is not maintained during the practice (Funai et al., 2019).

Lastly, although the shoulders have been shown to rotate more than the hips regardless of swimming speed (Andersen et al., 2020; Cappaert et al., 1995; Yanai, 2003), hip rotation increases during swimming trials as swimmers' fatigue progresses, possibly due to less compensatory action from the legs (Psycharakis & Sanders, 2008). This suggests that a swimmer's stability in the water seems to be affected by aspects of a multifactorial nature such as those caused by the breathing and kicking actions, as well as those caused by the slow swimming speed (Psycharakis & Sanders, 2010; Sanders & Psycharakis, 2009). Therefore, there is no reason to ignore the possible alterations that swimming exercises can produce.

At this point, and given that the intrinsic objective of a *drill* is to cause changes in actual swimming after continuous repetitive practice, we set out to see if those exercises performed at maximum speed would actually improve or worsen the swimming technique before incorporating them into a long-term training programme. Therefore, the purpose of this study was to determine the biomechanical differences between various common front crawl swimming exercises on the shoulder and hip rotation and their symmetry between the executing and non-executing arm (EA; NEA) sides. Our hypothesis was that certain swimming exercises would cause potentially critical alterations in technique.

## Methodology

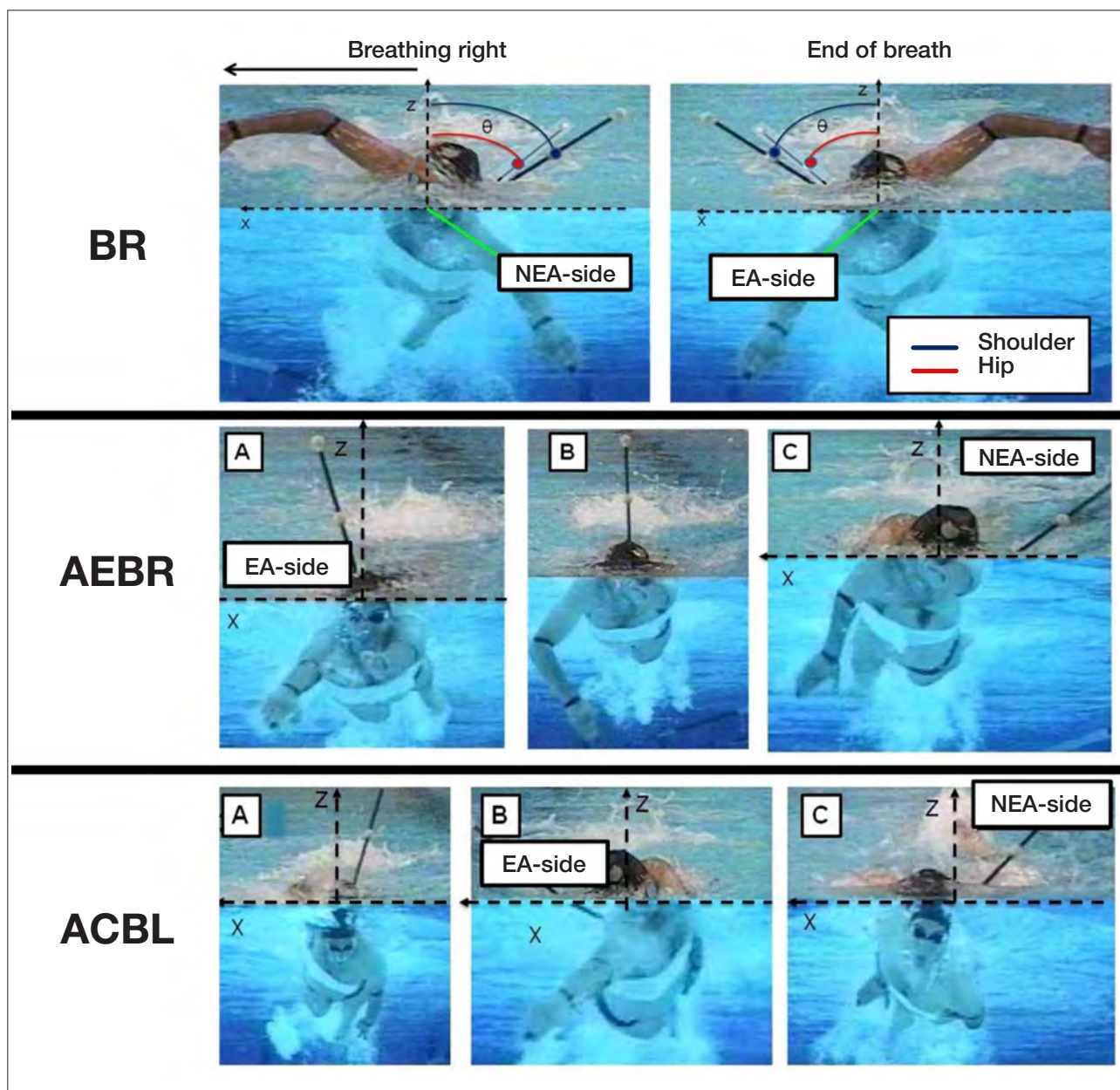
### Experimental design

A cross-sectional design was used to explore swimming technique during six different front crawl protocols. The protocols consisted of: i) breathing holding (BH); ii) breathing right (BR); non-executing arm (NEA) extended breathing on the side of the executing arm (EA): iii) to the right (AEBR) and iv) to the left (AEBL); NEA close breathing on that side: v) to the right (ACBR) and vi) to

the left (ACBL) (Figure 1). The six protocols were applied in a randomised fashion and differences in shoulder and hip rotation were observed among the participants.

### Participants

A group of 16 national competitive swimmers (men  $n = 10$ ; women  $n = 6$ ), aged between 14 and 18 years, were informed of the possible risks and requirements of the test, and provided signed informed consent to participate in the experiment. Those under the age of 18 also provided



**Figure 1**

Swimming exercises and registration system used to calculate the rotation of the shoulder and hip relative to the vertical axis of the body. Breathing right (BR); extended arm extended breathing right (AEBR); arm close breathing left (ACBL); executing arm side (EA); non-executing arm side (NEA).

parental consent. The inclusion criteria were: i) having the front crawl as their primary competition stroke; ii) breathing on the right side to maintain equality between the dominant side and the laterality of our subjects (21); and iii) have at least 5 years of regulated training. The study was designed in accordance with the Declaration of Helsinki for research on humans and was approved by the ethics committee of the University of Granada (code 852).

### Procedure: materials and instruments

Before the test, the swimmers attended a familiarisation session to practice the swimming exercises and the evaluation process. The experimental context was a 25 x 12.5 m pool (water temperature = 27 °C). The swimmers arrived at the pool within their usual afternoon training hours, having refrained from strenuous exercise for the previous 24 hours. On arrival, the elbow and wrist joints and the tip of the index finger were marked with black tape, and a warm-up consisting of 8 x 25 m front crawl swims before the start of the test. Each test protocol consisted of six 15-metre exercises and swimmers were asked to avoid swimming underwater.

Two dorsal acrylic bars were placed (length and width: 50 x 1 cm) on the swimmers through a base attached to a tightly fitting belt around the lower edges of the scapula and between the iliac crests (i.e., the lumbar region) (Figure 1). The black tape markings on the joints allow for precise digitisation (Andersen et al., 2020), and the bars are firmly attached to the body and do not slip (Payton et al., 1997; Liu et al., 1993). Once the bars were in place, the subjects were photographed lying in a ventral position in front of a reference fixed to the wall. This allowed calibration and ensured the correct positioning of the bar in a vertical position. The values for the maximum rotation of the shoulder and hip around the longitudinal axis of the body were measured by the position of the bars relative to the vertical position (in degrees °) (Figure 1).

### Measured variables

The maximum rotation angles achieved on the EA side were measured during the first half of the total arm action, while the NEA side values were measured during breathing on the EA side (with the exception of ACBR and ACBL, because the breathing was on the NEA side). Two-dimensional (2D) photogrammetric techniques were used with two video cameras (S-VHS NV-MS4, 50 Hz, Panasonic Corp., Japan), located in the frontal plane (one of them on the surface and the other underwater), and the records were superimposed in space and

time by means of a video switcher (Digital video switcher SE -900, Whittier, USA). Each swimmer performed the exercises through an area that had been previously calibrated using a reference system (1.50 m long, 0.88 m wide and 0.93 meters high). This system, containing 15 landmarks of known locations, was placed in the centre of the lane used, and the established registration area ranged from 5 to 6.50 m from the front camera. The digitisation and the measurement of the angles were carried out with version 0.7.10 of Kinovea®.

### Analysis of data

Descriptive statistics were expressed as mean  $\pm$  SD (standard deviation) and confidence intervals (CI 95%). The effect sizes (d) of the differences obtained (small if  $0 \leq d \leq .5$ ; medium if  $.5 < d \leq .8$ ; and large if  $d > .8$ ) (Andersen et al., 2020). The normality of the distribution was analysed using the Kolmogorov-Smirnov method. The differences between the "protocol" factor and the "shoulder vs. hip" were analysed using repeated measures two-way ANOVA and the subsequent *post hoc* tests were carried out using the Bonferroni method. Paired sample t-tests were performed to compare EA and NEA side shoulder and hip values under all conditions. Statistical significance was set at  $p < .05$  and all statistical procedures were performed using the SPSS 23.0 program (IBM, Chicago, IL, USA). Test-retest (intraclass correlation coefficient [ICC]), intra- and inter-observer reliability was used to assess the reliability of the data. The intra-observer ICC ranged from 0.95% and 0.96%, and the inter-observer ICC, between 0.97% and 0.99%.

### Results

The total range of rotation showed significant differences depending on the protocol ( $F_5, 11 = 61.42$ ;  $p < .01$ ), of the differences between shoulder and hip ( $F_5, 11 = 335.19$ ;  $p < .01$ ) and an interaction between the protocol and the shoulder vs. hip factor ( $F_5, 11 = 18.45$ ;  $p < .01$ ). Shoulder rotation was greater than hip rotation in the six protocols studied (Figure 2A) ( $F_5, 11 = 61.422$ ;  $p < .01$ ). The lowest values were obtained for both cases in AEBCR ( $p < .00$ ;  $p = .01$ ), while they were similar in BR, ACBR and ACBL (Table 1). On the NEA side, shoulder rotation was greater than hip rotation for the six protocols studied ( $F_5, 11 = 395.402$ ;  $p < .01$ ). The highest value of rotation in shoulders and hips was obtained in AEBCR (Table 1). On the EA side, the rotation of the shoulders was greater than that of the hips in BH, BR, ACBR and ACBL ( $F_5, 11 = 154.336$ ,  $p < .01$ ), but was similar to hips in AEBCR and AEBCR (Table 1).

**Table 1**

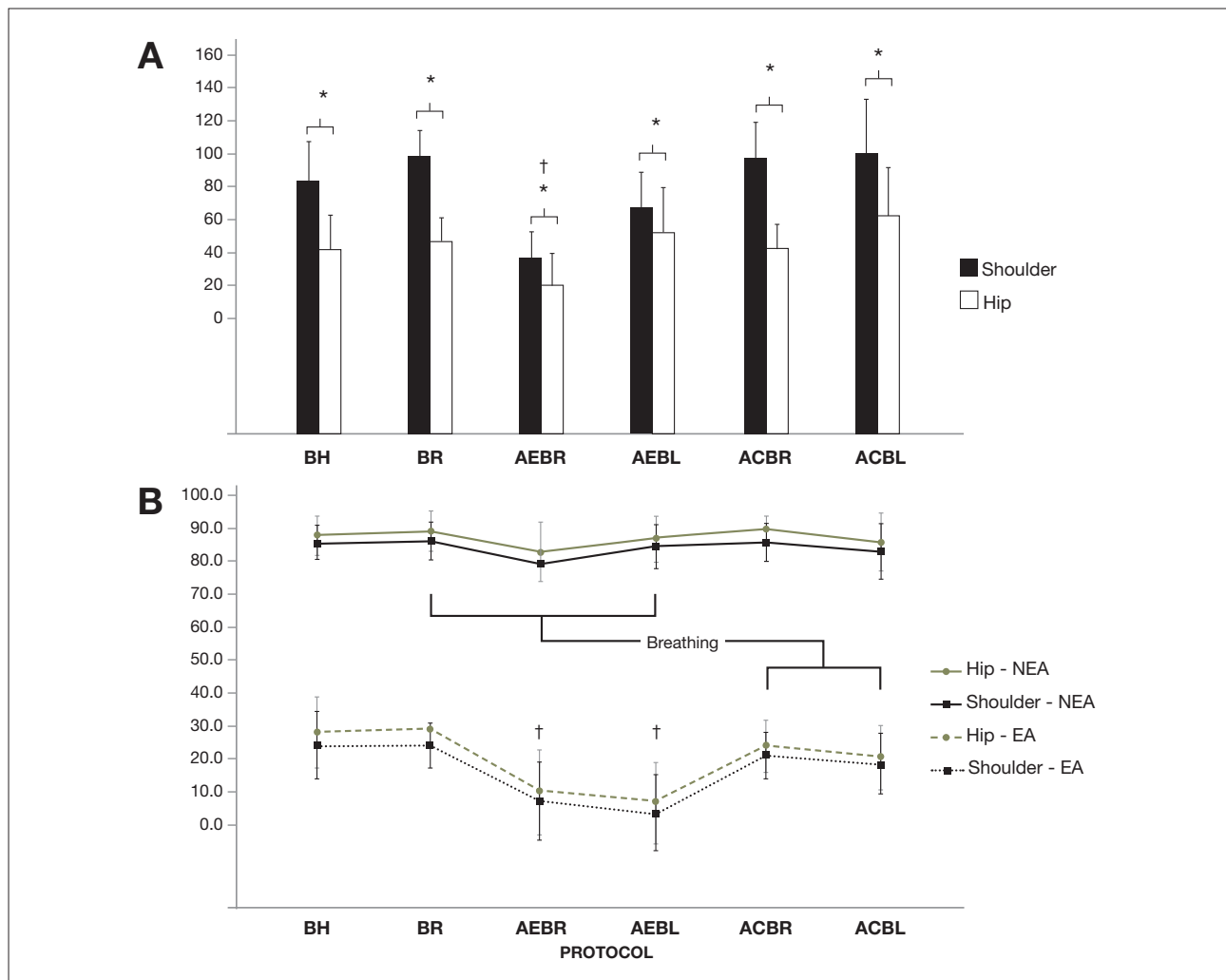
Total arm stroke time for each protocol.

| Total arm |              |               | Shoulder        |          |                | Hip              |          |  |
|-----------|--------------|---------------|-----------------|----------|----------------|------------------|----------|--|
| Protocol  | Time         | EA            | NEA             | <i>d</i> | EA             | NEA              | <i>d</i> |  |
| NR        | 1.29 ± 0.14  | 53.50 ± 7.62  | 53.25 ± 10.69   | -0.02    | 39.68 ± 7.04#  | 38.12 ± 10.73#   | -0.17    |  |
| BR        | 1.31 ± 0.16  | 52.75 ± 6.76  | 64.87 ± 7.21*†  | -1.73    | 34.75 ± .53#   | 47.06 ± 8.01*#   | -1.89    |  |
| AEBR      | 1.33 ± 0.12  | 8.37 ± 6.19†  | 66.50 ± 8.50*†  | -7.81    | 12.12 ± 6.38#† | 51.18 ± 10.66*†  | -4.44    |  |
| AEBL      | 1.29 ± 0.14  | 18.56 ± 7.43† | 77.56 ± 11.23*† | -6.19    | 17.25 ± 6.88#† | 67.93 ± 14.00*†  | -4.59    |  |
| ACBR      | 1.50 ± 0.19† | 61.93 ± 8.99  | 54.31 ± 8.81*   | 0.69     | 42.93 ± 6.04#  | 35.62 ± 7.03*#   | 1.11     |  |
| ACBL      | 1.52 ± 0.18† | 65.43 ± 12.81 | 53.06 ± 13.73*  | 0.93     | 52.12 ± 14.45# | 39.81 ± 10.99*#† | 0.95     |  |

Differences and effect sizes (*d*) of the maximum rotation of the shoulders and hips of the executing arm (EA) and the non-executing arm (NEA). Values expressed in degrees (°). BH: Breathing holding; breathing right (BR); AEBR: non-executing arm (NEA) extended breathing on the side of the executing arm (EA); AEBL: breathing to the left; ACBR: NEA close breathing on that side (the right); ACBL: to the left.

\* Significant differences between the EA and NEA sides (asymmetry) ( $p < .05$ ). # Statistical differences between shoulder and hip ( $p < .05$ ).

† Statistical differences compared to BH ( $p < .05$ ).

**Figure 2**

Panel A: Total rotation range in degrees (°); Panel B: Percentage (%) of the total stroke cycle time required to reach maximum rotation on the executing arm (EA) and non-executing arm (NEA) sides. Data obtained for the six protocols. BH: Breathing holding; breathing right (BR); AEBR: non-executing arm (NEA) extended breathing on the side of the executing arm (EA); AEBL: breathing to the left; ACBR: NEA close breathing on that side (the right); ACBL: to the left. (n = 16).

\* Statistical differences between the shoulder and hip ( $p < .05$ ). † Statistical differences to BH ( $p < .05$ ).

Significant differences in shoulder rotation symmetry were shown in all protocols ( $F_{5, 11} = 60.151$ ,  $p < .01$ ) between EA side and NEA side ( $F_{5, 11} = 379.238$ ;  $p < .01$ ), except in BH (Table 1). Similar differences were found in the symmetry of hip rotation ( $F_{5, 11} = 18.745$ ;  $p < .01$ ) comparing the EA side with the NEA side ( $F_{5, 11} = 279.26$ ;  $p < .01$ ). In particular, the asymmetry in the BR, AEBR and AEBL protocols achieved more rotation on the NEA side, in both shoulders and hips, while the asymmetry in ACBR and ACBL achieved more rotation on the EA side (Table 1). Total stroke time was greater in ACBR ( $p = .02$ ) and ACBL ( $p = .01$ ) compared to the other protocols ( $F_{5, 11} = 5.75$ ,  $p < .01$ ) (Figure 2B). Rotation at the shoulders and hips followed a similar trajectory, although the hips took longer than the shoulders to reach the maximum amount of rotation in all six protocols ( $F_{5, 11} = 141.46$ ;  $p < .01$ ). On the EA side, in the BH, BR and ACBR protocols, the maximum rotation of the shoulders and hips was obtained later in the total stroke duration compared to the AEBR and AEBL ( $F_{5, 11} = 6.83$ ;  $p = .04$ ).

## Discussion

The objective of this study was to determine the differences in shoulder and hip rotation caused by different front crawl exercises and the symmetry of that rotation. Our results showed that breath-holding (which acted as a control) achieved shoulder and hip rotation symmetrically on both sides, while asymmetry was observed in all protocols when breathing, as rotation values increased in  $\sim 7$ - $12^\circ$  on the non-breathing side (NEA). Swimming exercises that allowed the arm to be extended forward produced a reduction in the range of total rotation, at both the shoulders and the hips. However, there were greater asymmetries between EA and NEA, with a notable rotation towards the NEA side. In the swimming exercises with the arm close to the body, the ranges of total rotation and asymmetry were similar to those for normal conditions, although a greater rotation was achieved on the EA side, which was the opposite of that found in the other protocols. Therefore, swimming exercises altered shoulder and hip rotation, especially when breathing.

Rotation was greater in all protocols on the side opposite the one on which the breath was taken (NEA). This result was expected, given that asymmetries of body rotation have been considered as a way of adapting to breathing (Psycharakis & Sanders, 2010). In fact, it is important to bear in mind that the duration of the breathing action could also modify the traction cycle of the arm and the magnitude of the torque applied on

the EA side, since the arm leaves the water before the breath (Psycharakis & McCabe, 2011). According to the buoyancy model proposed by Yanai (2004), the recovery actions of the arms are enough to drive the rotation of the body on the opposite side. Therefore, a recovery action that includes breathing would increase that buoyant torque towards the centre of mass of the body and, therefore, its rotation. Our results agree with previous studies; Payton et al. (1999) found a rotation of  $62 \pm 4^\circ$  and  $55 \pm 4^\circ$  between breathing and non-breathing conditions. López-Contreras & Arellano (2002) found values of  $60^\circ$  and  $48^\circ$ , while Psycharakis & McCabe (2011) found values of  $59^\circ$  and  $51^\circ$  for the tests with and without breathing. Therefore, it appears that the difference in rotation in swimming between breathing and breathing holding tends to be  $\sim 10 \pm 3^\circ$  greater when breathing.

The swimming exercises with the NEA extended (AEBR and AEBL) were the ones that most altered the rotation. The total rotation range was lower than the means obtained in other protocols (Figure 2A), but a significantly lower rotation was achieved on the EA side ( $\sim 8$ - $19^\circ$ ) compared to the values obtained in the other protocols ( $\sim 50$ - $60^\circ$ ). This was explained mainly by the fact that the extended arm restricted the rotation of the body, which caused the swimmer's body to lie flat in the water (Figure 1). In contrast, rotation was significantly greater on the NEA side, producing a large asymmetry relative to the EA side. This difference in asymmetry was particularly large for the AEBL ( $50$ - $59^\circ$  difference). Possibly due to differences in laterality dominance or neck flexibility, swimmers exaggerated a movement they were not used to (Psycharakis & Sanders, 2008). In any event, some authors have stated that this position can place the EA trajectory in a different position to its usual one, causing the hand to pass well beyond the midline of the body towards the opposite hip (Payton et al., 1999; López-Contreras & Arellano, 2002; Liu et al., 1993). Thus, if swimmers do not compensate for changes in body rotation, the stroke may not be able to reach its optimal depth and its propulsion effectiveness could be compromised (Lecrivain et al., 2010; Liu et al., 1993).

On the other hand, these changes could be greater if the frequency of the strokes is not kept constant, since an excessive increase in the actions of the EA could cause a shortening of the stroke, thus reducing its propulsive capacity (Cuenca-Fernández, 2020a; Funai et al., 2019). When considering the stroke cycle time (Table 1), the AEBR and AEBL protocols did not give any significant differences to the normal swimming time, so it cannot be confirmed that the propulsive efficiency could have been reduced with a faster stroke. However, this possibility should not be

completely ruled out by coaches when including this exercise. Additionally, it is important to note that repetitive overhead positioning of the arms, coupled with forced adduction and internal rotation of the shoulders, could lead to shoulder impingement and rotator cuff tendinosis, and ultimately could cause shoulder pain or instability and incorrect swimming technique. Therefore, this exercise should be considered with caution if shoulder impingement of the outstretched arm is to be avoided (Yanai & Hay, 2000).

The ACBR and ACBL protocols offered rotation values similar to those found in BH and BR (Figure 2A). However, because one arm was immobile next to the body and breathing was on that side, the body needed to create additional rotation to bring the head into a position out of the water that would allow breathing. This caused a unique increase in rotation on the EA side, at both the shoulders and hips, and explained why the angle of rotation was greater on the EA side than on the NEA side. López-Contreras & Arellano (2002) studied underwater front crawl trajectories that restrict one arm and showed that the time spent in the first part of the stroke (i.e. extension and catch) was reduced in favour of adopting a body position that allows breathing. Consequently, swimmers increased the duration of the hand-thrusting motion to create tangible propulsion, but also as a way to produce enough body rotation to the opposite side to release that arm from the water (Figure 1). However, the fact that the ACBR and ACBL protocols had the longest stroke cycle times (Table 1), possibly indicated that either i) no time was wasted on extension and catch, or ii) a higher than normal resistance was produced by the positioning of the body. The propulsion of the swimmer depends on the hydrodynamic forces created by the movements of their extremities, therefore the application of propulsive forces with a single arm could increase the inertial forces to overcome the resistance of the water, decreasing the propulsive capacity and the swimming speed (Cuenca-Fernández et al., 2020a; Cuenca-Fernández et al., 2020b; Marinho et al., 2009). Further, this speed would be offset by the resistance imposed by the front surface, as the position with one arm extended produces 12.5% more resistance than the sliding position with both arms extended, and this quotient rises to 21.5% in the position with both arms close to the body (Vorontsov & Rumyantsev, 2000; Marinho et al., 2009). Therefore, apart from lower efficiency when using only one arm, this exercise would offer more resistance in the water, which would produce a lower swimming speed.

Temporal analysis showed that the shoulders reached maximum rotation earlier than the hips, with total cycle time

values of ~86-89% for shoulders and ~89-92% for hips on the NEA side; and values of ~35-40% and ~37-44% for the EA side, respectively (Figure 2B). This agrees with the study by Psycharakis & Sanders (2008), who showed values of  $78.3 \pm 7.3\%$  of total cycle time for shoulders and  $79.7 \pm 9.6\%$  for hips on the side opposite the breathing side (i.e., the NEA side). Considering the total rotation achieved by the shoulders and hips (Figure 2A), the rotation of the hips on the NEA side (~40-60°) was less than that of the shoulders (~50-80°), but the rotation of the hips was performed over a longer time than that of the shoulders. In any case, while the AEHL produced the greatest shoulder rotation, this increase was also accompanied by a marked increase in rotation at the hips (Table 1). This supports the theory that longitudinal rotation can be transferred from the shoulder to the hips (Andersen et al., 2020; Sanders & Psycharakis, 2009). For the ACBR and ACBL protocols, the increase in shoulder rotation on the side opposite the breathing side (EA side) was consistent with the increase found at the hips on the same side of the body. Therefore, according to other authors (Yanai, 2001; Psycharakis & Sanders, 2008), increased shoulder rotation increased hip rotation, but the hips rotated less, and later, than the shoulders. Thus, we deduce that shoulders and hips followed a parallel trajectory, but they did not achieve the same range of motion nor did they do so at the same time (Andersen et al., 2020; Cappaert et al., 1995; Yanai, 2003).

This study shows the limitation of not having measured the trajectory of the hand using 3D techniques, which could have provided an accurate approximation of how changes in body rotation could generate different hand trajectories. In addition, future studies should observe how the rotation of the anteroposterior axis is modified with swimming exercises from a zenithal point of view, since this rotation could increase water resistance. In any case, since shoulder and hip rotation affect joint movements and paraspinal muscle development, the impact of these exercises on the swimmer's body could improve health depending on personal goals and should also be considered for back ailments.

## Conclusions

Swimming exercises with one arm extended produced a high asymmetry in body rotation during breathing and modified the body position during the stroke. Swimming exercises with the arm close to the body were the most similar in terms of the general rotation of the body while swimming front crawl. However, these exercises generated changes

in the stroke cycle time that indicated that the swimmer's technique worsened due to the body positioning. Therefore, its transference could be questionable. In any case, it is important to keep in mind that the effects that these exercises can produce depend on the time, intensity and frequency with which the instructors apply them, so their long-term effects have yet to be determined.

## Acknowledgements

This study was supported by a grant from the Ministerio de Ciencia, Innovación y Universidades (Agencia Española de Investigación) and the European Regional Development Fund (ERDF); PGC2018-102116-B-I00 "SWIM II: Innovative measures specific to water: Applied to performance improvement".

## References

- Andersen JT., J.T., Sinclair, P.J., McCabe, C.B., & Sanders, R.H. (2020). Kinematic Differences in Shoulder Roll and Hip Roll at Different Front Crawl Speeds in National Level Swimmers. *J Strength Cond Res.* 2020; 34(1):, 20-5. DOI:25. <https://doi.org/10.1519/JSC.0000000000003281>
- Bielec, G., Makar, P., & Foliński, P. (2008). Biomechanical effects of application of the technique exercises in young swimmer training. *Wroclaw: Science in Swimming II.* 2008; 51-959.
- Cappaert, J.M., Pease DL., & Troup J.P. (1995). Three-Dimensional Analysis of the Men's 100-m Freestyle during the 1992 Olympic Games. *J Appl Biomech.* 1995; 11(1):, 103-12. DOI:112. <https://doi.org/10.1123/jab.11.1.103>
- Cuenca-Fernández, F., Ruiz-Navarro, J.J., & Arellano Colomina, R., editors. (2020a). Strength-velocity relationship of resisted swimming: A regression analysis. *ISBS-Conference Proceedings Archive.* 2020a, 38(1), 99.
- Cuenca-Fernández, F., Gay, A., Ruiz-Navarro JJ., Morales-Ortiz, E., López-Contreras, G., & Arellano, R. (2020b). Swimming performance after an eccentric post-activation training protocol. *Apunts Educación Física y Deportes.* 140, 44-51. [https://doi.org/10.5672/apunts.2014-0983.es.\(2020/2\).140.07](https://doi.org/10.5672/apunts.2014-0983.es.(2020/2).140.07)
- de Souza-Castro, F.A., Villas-Boas JP., & Stringhini-Guimarães., A.C. (2007). Effects of swimming intensity and breathing in front crawl body roll angles for swimmers and triathletes. *Brazilian J Biomech.* 2007; 7(13):, 85-90.
- Funai, Y., Matsunami, M., & Taba, S. (2019). Physiological Responses and Swimming Technique During Upper Limb Critical Stroke Rate Training in Competitive Swimmers. *J Hum Kinet.* 2019, 70(1), 61-8. DOI:68. <https://doi.org/10.2478/hukin-2019-0026>
- Leclivain, G., Payton, C., Slaouti, A., & Kennedy, I. (2010). Effect of body roll amplitude and arm rotation speed on propulsion of arm amputee swimmers. *J Biomech.* 2010; 43(6), 1111-7. DOI:1117. <https://doi.org/10.1016/j.jbiomech.2009.12.014>
- Liu, Q., Hay J.G., & Andrews, J.G. (1993). Body roll and handpath in freestyle swimming: an experimental study. *J Appl Biomech.* 1993, 9(3), 238-53. DOI:253. <https://doi.org/10.1123/jab.9.3.238>
- López-Contreras, G., & Arellano, R. (2002). Análisis del efecto de las modificaciones de la ejecución del estilo crol en la rotación longitudinal del cuerpo. *Colección icdICD: investigación en ciencias del deporte.* 2002, (32):, 183-218.
- Lucero, B. (2015). *The 100 best swimming drills:* (3<sup>rd</sup> ed.). Meyer & Meyer Verlag; 2015.
- Marinho D.A., Reis V.M., Alves F.B., Vilas-Boas J.P., Machado, L., Silva A.J., & Rouboa, A.I. (2009). Hydrodynamic drag during gliding in swimming. *J Appl Biomech.* 2009; 25(3), 253-7. DOI:257. <https://doi.org/10.1123/jab.25.3.253>
- Payton, C.J., Bartlett, R.M., Baltzopoulos, V., & Coombs, R. (1999). Upper extremity kinematics and body roll during preferred-side breathing and breath-holding front crawl swimming. *J SportSports Sci.* 1999; 17(9), 689-96. DOI:696. <https://doi.org/10.1080/026404199365551>
- Payton, C.J., Hay J.G., & Mullineaux D.R. (1997). The effect of body roll on hand speed and hand path in front crawl swimming: a simulation study. *J Appl Biomech.* 1997, 13(3), 300-15. DOI:315. <https://doi.org/10.1123/jab.13.3.300>
- Prichard, B. (1993) A new swim paradigm: Swimmers generate propulsion from the hips. *Swimming Technique.* 1993, 30(1),17-23.
- Psycharakis S.G., & McCabe, C. (2011). Shoulder and hip roll differences between breathing and non-breathing conditions in front crawl swimming. *J Biomech.* 2011, 44(9), 1752-6. DOI:1756. <https://doi.org/10.1016/j.jbiomech.2011.04.004>
- Psycharakis S.G., & Sanders R.H. (2008). Shoulder and hip roll changes during 200-m front crawl swimming. *Med Sci Sport Exerc.* 2008; *Sports Exerc.* 40(12), 2129-36. DOI:2136. <https://doi.org/10.1249/mss.0b013e31818160bc>
- Psycharakis, S.G., & Sanders, R.H. (2010). Body roll in swimming: A review. *J SportSports Sci.* 2010, 28(3), 229-36. DOI:236. <https://doi.org/10.1080/02640410903508847>
- Sanders, R.H., & Psycharakis, S.G. (2009). Rolling rhythms in front crawl swimming with six-beat kick. *J Biomech.* 2009, 42(3), 273-9. DOI:279. <https://doi.org/10.1016/j.jbiomech.2008.10.037>
- Vorontsov, A., & Rumyantsev, V. (2000). Propulsive forces in swimming. In V. Zatsiorsky (Ed.), *Biomechanics in sport: Performance, enhancement and injury prevention.* 2000; (pp. 205-31.231). Oxford: Blackwell Science Ltd. <https://doi.org/10.1002/9780470693797.ch10>
- Wen, Y., Peng, Y., Zhao, F., & Zhen, K. (2016). The effects of specific drills on the flip turns of freestyle swimmers based on a kinesiology analysis. *J Hum Kinet.* 2016, 52(1), 165-73. DOI:173. <https://doi.org/10.1515/hukin-2016-0004>
- Yanai, T. (2001) What causes the body to roll in front-crawl swimming? *J Appl Biomech.* 2001, 17(1), 28-42. DOI: <https://doi.org/10.1123/jab.17.1.28>
- Yanai, T. (2003). Stroke frequency in front crawl: its mechanical link to the fluid forces required in non-propulsive directions. *J Biomech.* 2003, 36(1), 53-62. DOI: [https://doi.org/10.1016/S0021-9290\(02\)00299-3](https://doi.org/10.1016/S0021-9290(02)00299-3)
- Yanai, T. (2004). Buoyancy is the primary source of generating bodyroll in front-crawl swimming. *J Biomech.* 2004, 37(5), 605-12. DOI:612. <https://doi.org/10.1016/j.jbiomech.2003.10.004>
- Yanai, T., & Hay J.G., J.G. (2000). Shoulder impingement in front-crawl swimming: II. Analysis of stroking technique. *Med Sci Sport Exerc.* 2000; *Sports Exerc.* 32(1), 30. DOI: <https://doi.org/10.1097/00005768-200001000-00006>
- Zhang, P.(2014). Basic Land Drills for Swimming Stroke Acquisition. *JTRM in Kinesiology.* 2014, 1-16

**Conflict of interests:** the authors have not declared any conflict of interest.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Systematic Review: Technical-Tactical Behaviour in Small-Sided Games in Men's Football

Ángel Ferreira-Ruiz<sup>1</sup> , Francisco García-Banderas<sup>1</sup> & Ignacio Martín-Tamayo<sup>2\*</sup>

<sup>1</sup> Department of Physical and Sports Education. Faculty of Physical Activity and Sports Sciences. University of Granada, Granada (Spain).

<sup>2</sup> Department of Methodology of Behavioural Sciences. Faculty of Psychology. University of Granada, Granada (Spain)

## Cite this article:

Ferreira-Ruiz, Á., García-Banderas, F., & Martín-Tamayo, I. (2022). Systematic Review: Technical-Tactical Behaviour in Small-Sided Games in Men's Football. *Apunts Educación Física y Deportes*, 148, 42-61. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.06](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.06)

## Abstract

*Small-Sided Games* (SSGs) have become a widely used tool by football coaches, yet there are few studies on their influence on technical-tactical behaviour. The aim of this study was to carry out a review of the technical-tactical behaviours that appear in the main formats of SSG tasks. Following instructions from the PRISMA's guide (Preferred Reporting for Items for Systematic Reviews and Meta-Analyses), a search was made in the Google Scholar, Pubmed, Scopus, SportDiscus and Web of Science databases, which yielded 48 papers were included in the review as they met the pre-established requirements. These have been grouped for analysis into the following categories: 1. Imbalanced interactions; 2. Playing field dimensions; 3. Players' age; 4. Number of players; 5. Modification of the game's principles, sub grouped into the following: 5.1 Goals; 5.2 Aim; 5.3 Limit of touches. The included articles were subjected to a methodological quality assessment and all of them scored good or excellent. This assessment was performed by two researchers and resulted in a Cohen's Kappa agreement index of .96. As a result, all the modifications in the SSG formats have led to the development of different actions on the part of the players: the distribution of players on the field, the development of certain tactical behaviours or the number and type of technical actions, are among the most important ones. This information is very useful for coaches as they are able to tailor the formats of the SSG in terms of the games' desired goal in order to achieve the upmost occurrence of certain actions or work with a certain conditional load.

**Keywords:** analysis of performance, collective behaviour, modified games, technical-tactical performance, small-sided situations.

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Ignacio Martín Tamayo  
[imartin@ugr.es](mailto:imartin@ugr.es)

## Section:

Sports training

## Original language:

Spanish

## Received:

June 2, 2021

## Accepted:

November 11, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Introduction

Football is a complex sport of teamwork and competition, a shared space whose objective is to kick the ball into the opposite goal more times than the opposition (Parlebás, 2020). The fact that several players share a space, fighting over possession of the ball gives the sport one of its most defining characteristics: spontaneity and, therefore, makes it more difficult to predict events (Praça et al., 2016). This reality is recognised by coaches and new sport professionals who understand that training environments should resemble those that are found in a real competitive contexts (Ros & Oliva, 2005). As a result, *Small Sided Games* (SSG) have become a widely used training tool in football (Clemente et al., 2020b). SSGs are down-sized situations where one, several, or all phases of the game can be trained in a smaller space and where there are fewer players than in a real situation.

SSGs are frequently used in football; however, they do not always match their design to the desired training objective. Therefore, in recent decades, a multitude of studies have emerged to investigate the influence of SSGs. These studies have shown that each modification in the design of an SSG influences the achievement of the desired objectives and the event of certain behaviours (Praça et al., 2016). Therefore, it is important for the coach to appreciate this relationship and understand its influence in order to design tasks according to the desired objectives.

SSG are training situations that somewhat replicate competitive contexts with the aim of optimising the different components that make up an athlete (Pons, et al., 2020). can be modified or impacted by multiple pathways or factors: creating imbalanced offensive and defensive interactions (Moreira et al., 2020); varying the dimensions of the playing field (Coutinho et al., 2019); according to the age of the participants (Coutinho, et al., 2020); modifying the number of players (Machado et al., 2019); changing the game's principles (Gonet et al., 2020); introducing position changes or including the competitive element (Navarro-Adelantado, 2002). The multitude of possibilities for SSG modifications may hinder this practical knowledge. Thus, some systematic reviews synthesising the main effects of SSG tasks on technical-tactical behaviour have been elaborated (Clemente et al., 2020b; Ometto et al., 2018; Sarmiento et al., 2018).

The awareness of the possible actions or specific effects that each modification in SSG tasks entails is of enormous importance since it can influence: the accuracy of the game, making it similar to reality or decontextualising it by introducing certain principles of stimulation (Serra-Olivares et al., 2015); the conditional load, since it can lead to a disproportionate number of accelerations and decelerations (Martone et al., 2017); the interactions between opponents and teammates (Clemente et al., 2018), etc. Therefore, this study is highly

useful as it provides practical knowledge to coaches and can help them in adjusting their tasks to the desired objectives.

Being an area of great interest where new researches emerge every year, and with the aim of providing coaches with practical and relevant information that can help them properly design tasks in order to achieve the desired technical-tactical objective, this paper is developed with the aim of reviewing, studying and analysing the scientific literature on the influence of SSG tasks on football players' technical-tactical behaviour. In this study a grouping by categories of the most global SSG modifications with a greater number of studies is made, which allows comparing them and concluding which of them and in what way they alter the actions of the players. In this study a grouping by categories of the most global SSG modifications with a large number of studies is made, which allows them to be compared and conclude which of them, and in what way they, affect players' actions.

## Methodology

### Search strategy: databases and selection criteria

This systematic review followed the recommendations of the PRISMA guidelines for the production of systematic reviews and meta-analyses (Liberati et al., 2009). The search was performed in the following databases: a) Google Scholar; b) Pubmed; c) Scopus; d) SportDiscus; y e) Web of Science; 4th December, 2020, using the keywords "Soccer" OR "Football" associated with the terms: "Small Sided Games" OR "Small Sided and Conditioned Games" OR "Modified Games" and associated in turn with the terms: "Tactical Behaviour" OR "Tactical Decision" OR "Decision Making" OR "Team Behaviour" OR "Tactical Performance".

The selection criteria were as follows: a) written in English o Spanish; b) exclusively in the realm of football; c) completed and available; d) competitive context; and e) that included training through SSGs. And these were the non-inclusion criteria: a) carried out by women; b) educational environment; c) no available in English or Spanish; d) did not concern technical-tactical behaviour in football; e) only evaluate the influence of SSG tasks on conditional performance; f) did not have a scientific research framework; g) dealt with the coach's influence on technical-tactical behaviour; h) studied the goalies' behaviour; i) Systematic reviews or congress proceedings and j) did not present their findings.

The papers found in this search were reviewed and those that were considered potential research because of

their title or abstract were selected. From these articles, full versions of the works were obtained, which were analysed and evaluated, and those that met any non-inclusion criteria were discarded. The complete selection was carried out independently by two authors with the intervention of a third in case of any disagreement.

## Quality of research

To assess the included papers, a questionnaire of 16 specific and validated items was used for the assessment of research regarding SSGs (Sarmiento et al., 2018). Each item was scored on a scale from 0 to 1, with 0 meaning not met. To obtain the score for each study, the percentage of completed questions with respect to the total was calculated.

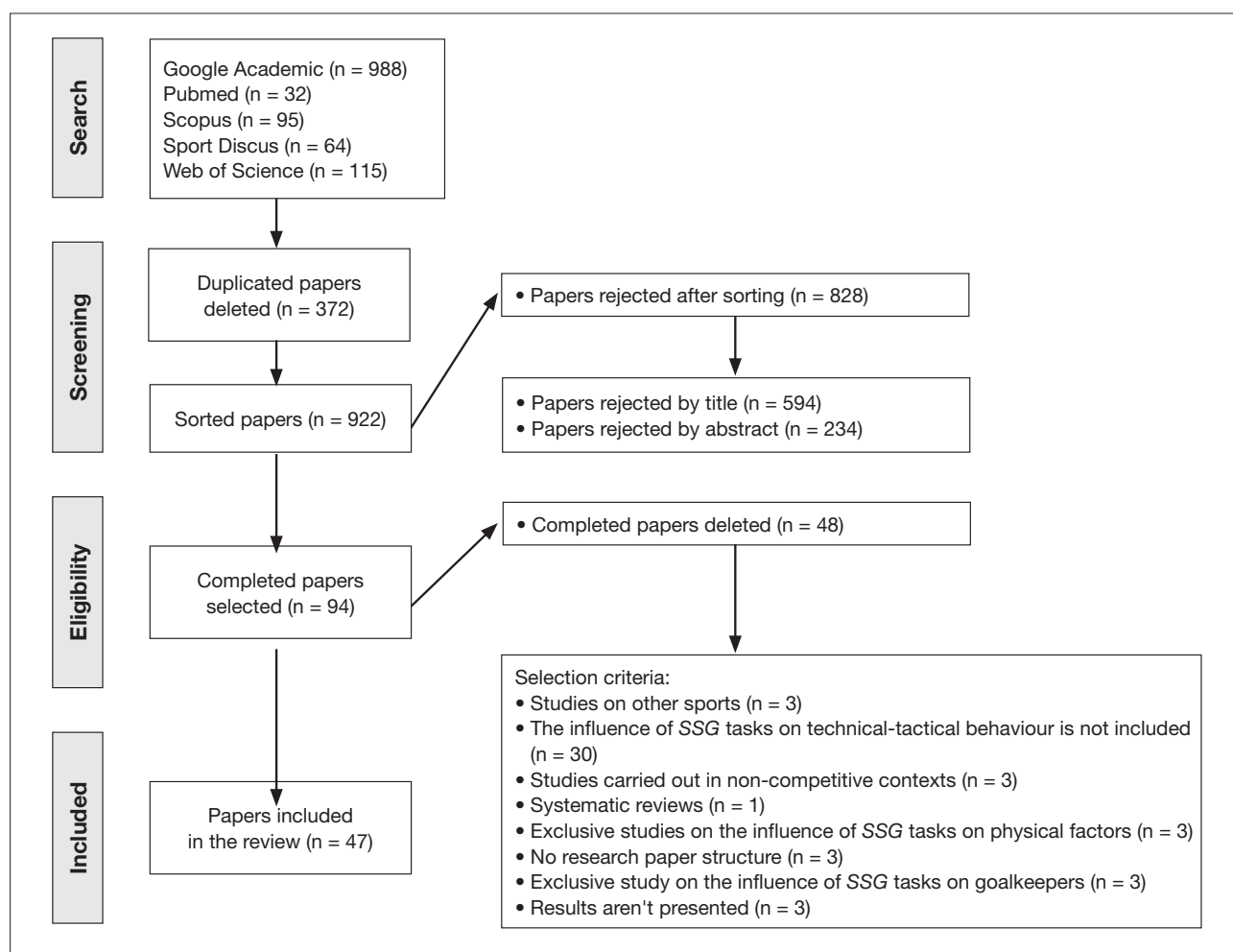
Research with scores less than or equal to 50% were rated as having low methodological quality, while those with scores between 51% and 75% were considered as having good methodological quality and those with scores above 75% were considered as having excellent methodological quality (Sarmiento et al., 2018).

## Results

### Search, sorting and selection of articles

In the database search, 1294 articles were found. These articles were imported into the Mendeley Reference Manager (Mendeley Desktop, Version 1.9.18, 2008-2020). Duplicate articles (372) were discarded. The remaining 922 articles were sorted according to their relevance or coincidence with the subject matter, by title and abstract, resulting in a total of 94 articles.

The full versions of the 94 articles gathered were analysed in detail: 48 articles were rejected according to the non-selection criteria. Another article was rejected because no other work could be found with which a comparison could be made. After the sorting process, a total of 47 articles were obtained, which were reviewed and analysed in depth for this study (see Figure 1). Of these, 16 were included in more than one category as they investigated more than one variable. Of the total number of classified articles, 23 (48.93%) were published in the last 4 years (between 2017 and 2020) and the oldest article was published in 2010.



**Figure 1:**  
Flowchart of the selection process of the articles.

**Table 1**

Summary of the most relevant characteristics of each of the studies included in this review.

| 1. Imbalanced interactions |   |   |  |                               |                                    |                    |   |
|----------------------------|---|---|--|-------------------------------|------------------------------------|--------------------|---|
| Study (year)               | Sample  | Aim   | SSG format                                     | Field size (m)                | Area per player ( m <sup>2</sup> ) | Training programme | Variables analysed  |
| Bach Padilha et al. (2017) | 168 players<br>16.61 ± 0.65 years   | To study the effects of multivalent inside players  | GK + 3 vs 3 + GK<br>GK + 3 vs 3 + GK + 2       | 36 x 27                       | 162<br>162                         | 1 x 4'             | General principles of the game analysed by FUT-SAT  |
| Bredt et al. (2016)        | 18 players<br>16.4 ± 0.4 years<br>68.4 ± 8.0 kg   | To investigate the physical, physiological and tactical demands in situations of numerical equality and inferiority | 3 vs 3<br>4 vs 3                               | 36 x 27                       | 162<br>138.8                       | 12 x 4'/4'         | Physical demands measured with SPIProX2 GPS, heart rate measured with Polar, and tactical demands measured with FUT-SAT                       |
| Clemente et al. (2014)     | 10 players<br>26.4 ± 5.3 years<br>8.4 ± 3.2 exp.<br>179.3 ± 4.3 cm<br>71.2 ± 7.1 kg             | To study the influence of players and the method of recording heart rate and technical-tactical actions             | 2 vs 2 + 2<br>3 vs 3 + 2<br>4 vs 4 + 2         | 19 x 19<br>23 x 23<br>27 x 27 | 90                                 | 3 x 5'/3'          | Physical and physiological variables measured with Polar RC3 GPS and technical-tactical demands measured with TSAP                            |
| Gonçalves et al. (2016)    | 24 players<br>25.6 ± 4.9 years<br>180.5 ± 4.3 cm<br>74.7 ± 4.8 kg                               | To study the influence of the number of players and numerical inequality on player positioning                      | 4 vs 3<br>4 vs 5<br>4 vs 7                     | 40 x 30                       | 171.4<br>133.3<br>109.0            | 1 x 4'             | Distance to the team's centre, distance of the opponents to the team's centre and distance of the nearest opponent, measured with GPS SPI-Pro |
| Moreira et al. (2020)      | 18 players<br>13.1 ± 0.6 years<br>18 players<br>14.3 ± 0.7 years                                | To compare the influence of manipulating total and relative area per player on tactical behaviour                   | 3 vs 3<br>3 vs 3 + 1<br>3 vs 3 + 1             | 36 x 27<br>36 x 27<br>40 x 29 | 162<br>139<br>162                  | 4 x 4'/4'          | General principles of the game measured with FUT-SAT. Team interactions measured with Social Network Analysis applied to Team Sport           |
| Nunes et al. (2020a)       | 20 players<br>22.3 ± 2.0 years<br>71.4 ± 7.0 kg<br>177.1 ± 6.8 cm<br>12.1 ± years of experience | To study the effect of numerical inequalities in external physical load, tactical demands and internal load         | 4 vs 2<br>4 vs 3<br>4 vs 4<br>4 vs 5<br>4 vs 6 | 30 x 25                       | 125<br>107.1<br>93.7<br>83.3<br>75 | 4 x 4'/4'          | External load and tactical actions measured with GPS and ZEPP Player Soccer System. Internal load measured with Borg Scale                    |

**Table 1** (Continuation)

*Summary of the most relevant characteristics of each of the studies included in this review.*

| 1. Imbalanced interactions |   |  |  |                |                                    |                    |  |
|----------------------------|---|--|--|----------------|------------------------------------|--------------------|--|
| Study (year)               | Sample  | Aim  | SSG format   | Field size (m) | Area per player ( m <sup>2</sup> ) | Training programme | Variables analysed   |
| Praça et al. (2016)        | 18 players<br>16.4 ± 0.7 years  | To investigate the influence of procedural knowledge and numerical dominance on tactical behaviour                           | 3 vs 3<br>4 vs 3   | 36 x 27        | 162<br>138.8                       | 2 x 4'/4'          | Procedural tactical knowledge measured with PTKT and tactical behaviour measured with FUT-SAT                                  |
| Praça et al. (2016)        | 18 players<br>16.4 ± 0.7 years<br>4.2 years of experience                       | To compare tactical behaviour in equal and numerical superiority situations  | 3 vs 3<br>3 vs 3 + 1<br>3 vs 3 + 2                       | 36 x 27        | 162<br>138.5<br>121.5              | 2 x 4'/4'          | Distribution behaviour in length, amplitude and distance to the team's centre and distance between players with GPS SPI-Pro X2 |
| Práxedes et al. (2016)     | 20 players<br>10.5 ± 0.6 years<br>4.8 ± 1.4 exp.                                | To analyse the influence of equalities and numerical superiorities on tactics  | 3 vs 2<br>3 vs 3   | 35 x 20        | 140<br>116.6                       | 2 x 4'/1           | Decision-making analysed by GPET   |
| Ric et al. (2016)          | 8 players<br>26 ± 4.9 years<br>16.9 ± 4.9 exp.                                  | To study tactical behaviour in different numerical inequalities  | 4 vs 3<br>4 vs 5<br>4 vs 7                               | 40 x 30        | 171.4<br>133.3<br>109.0            | 2 x 3'/4'          | Player distribution measured with GPS SPI-Pro X and tactical behaviour measured with AD-HOC tool                               |
| Sampaio et al. (2014)      | 24 players<br>20.8 ± 1 years<br>173.2 ± 6.3 cm<br>5.2 ± 1.3 years of experience | To compare temporal variables, cardiac variability and tactical behaviour in different match paces, results and inequalities | 4 vs 5<br>5 vs 4   | 60 x 40        | 266.6<br>266.6                     | 3 x 5'/3'          | Position data, speed and distance travelled measured with GPS SPI-Pro  |
| Torrents et al. (2016)     | 22 professionals<br>25.6 ± 4.9 years<br>22 amateur<br>23.1 ± 0.7 years          | To study the effect of the number of teammates and opponents on tactical behaviour   | GK + 4 vs 7 + GK<br>GK + 4 vs 5 + GK<br>GK + 4 vs 3 + GK | 40 x 30        | 109.0<br>133.3<br>171.4            | 2 x 3'/4'          | Tactical actions measured with observational tool  |
| Travassos et al. (2014)    | 15 players<br>19.6 ± 1.9 years<br>6.7 ± 4.5 exp                                 | To compare tactical behaviour in 4 vs 3 situations   | GK + 4 vs 3 + GK<br>GK + 3 vs 3 + GK                     | 40 x 20        | 114.2<br>133.3                     | 6 x 5'             | Spatial positioning measured with the TACT programme   |

**Table 1** (Continuation)

*Summary of the most relevant characteristics of each of the studies included in this review.*

| 2. Field size                  |                                  |   |                                      |                |                           |                       |   |
|--------------------------------|----------------------------------|---|--------------------------------------|----------------|---------------------------|-----------------------|---|
| Study (year)                   | Sample                           | Aim   | SSG<br>format                        | Field size (m) | Area per<br>player ( m² ) | Training<br>programme | Variables<br>analysed   |
| Castellano et al.<br>(2017)    | 14 players                       | To study the influence of<br>different field lengths on<br>SSG 7 vs 7 tasks in U-13<br>and U-14 players   | GK + 6 vs 6 + GK                     | 60 x 40        | 200                       | 1 x 7'4'              | Spatial positioning measured with<br>GPS  |
|                                | 13 ± 0.3 years                   |   |                                      | 50 x 40        | 167                       |                       |   |
|                                | 14 players                       |   |                                      | 40 x 40        | 133                       |                       |   |
|                                | 14 ± 0.3 years                   |   |                                      | 30 x 40        | 100                       |                       |   |
| Frencken et al.<br>(2013)      | 10 players                       | To assess the effect<br>of field dimensions on<br>tactical behaviour  | GK + 4 vs 4 + GK                     | 30 x 20        | 75                        | 1 x 8'                | Spatial positioning measured with<br>LPM (Inmotion Object Tracking BV)  |
|                                | 22 ± 3 years                     |   |                                      | 24 x 20        | 60                        |                       |   |
|                                | 14 ± 0.3 years                   |   |                                      | 30 x 16        | 60                        |                       |   |
|                                |                                  |   |                                      | 24 x 16        | 48                        |                       |   |
| García Ángulo<br>et al. (2020) | 40 players                       | To analyse the effect of<br>the reduction of number<br>of players, goal size<br>and field size on tactical<br>behaviour                                       | GK + 7 vs 7 + GK<br>GK + 4 vs 4 + GK | 58 x 38        | 136.7                     | 2 x 20'/10'           | Technical-tactical actions<br>measured with observational tool  |
|                                | 11.7 ± 0,4 years                 |   |                                      | 38 x 20        | 47.6                      |                       |   |
|                                | 2.9 ± 1,1 years of<br>experience |   |                                      | 58 x 38        | 220.4                     |                       |   |
|                                |                                  |   |                                      | 38 x 30        | 76                        |                       |   |
| Gollin et al.<br>(2016)        | 22 players                       | To assess the influence<br>of dimensions in breadth<br>and depth and the<br>presence of multivalent<br>players on tactical<br>behaviour and motor<br>activity | 4 vs 4 + 3                           | 35 x 25        | 79.5                      | 8 x 3'/3'             | Spatial positioning measured with<br>SPI HPU GPS  |
|                                | 14 ± 1 years                     |   |                                      | 25 x 35        | 79.5                      |                       |   |
|                                | 168 ± 8 cm                       |   |                                      |                |                           |                       |   |
|                                | 56 ± 8 kg                        |   |                                      |                |                           |                       |   |
| Martone et al.<br>(2017)       | 17 players                       | To evaluate the effect of<br>various areas per player<br>on exercise intensity and<br>technical-tactical actions  | 3 vs 3<br>4 vs 4<br>5 vs 5           | 20 x 30        | 66.6                      | 3 x 4'/3'             | Heart rate measured with FIT<br>PULSE 1.37 and technical-<br>tactical actions measured with<br>observational tool |
|                                | 10 ± 0.5 years                   |   |                                      | 30 x 30        | 150.50                    |                       |   |
|                                | 16 players                       |   |                                      |                | 112.6                     |                       |   |
|                                | 13.2 ± 0.2 years                 |   |                                      |                | 40.90                     |                       |   |

**Table 1** (Continuation)

Summary of the most relevant characteristics of each of the studies included in this review.

| 2. Field size           |                               |   |                  |                |                                    |                    |   |
|-------------------------|-------------------------------|---|------------------|----------------|------------------------------------|--------------------|---|
| Study (year)            | Sample                        | Aim   | SSG format       | Field size (m) | Area per player ( m <sup>2</sup> ) | Training programme | Variables analysed  |
| Moreira et al. (2020)   | 18 players                    | To compare the influence of manipulating total and relative area per player on tactical behaviour           | 3 vs 3           | 36 x 27        | 162                                | 4 x 4'/4'          | General principles of the game measured with FUT-SAT. Team interactions measured with Social Network Analysis applied to Team Sport |
|                         | 13.1 ± 0.6 years              |   | 3 vs 3 + 1       | 36 x 27        | 139                                |                    |   |
|                         | 18 players                    |   | 3 vs 3 + 1       | 40 x 29        | 162                                |                    |   |
| Nunes et al. 2020b)     | 14.3 ± 0.7 years              | To study the effect of numerical inequalities on physical external load, tactical demands and internal load | 4 vs 2           | 30 x 25        | 125                                | 4 x 4'/4'          | External load and tactical actions measured with GPS and ZEPP Player Soccer System. Internal load measured with Borg Scale          |
|                         | 22.3 ± 2.0 years              |   | 4 vs 3           |                | 107.1                              |                    |   |
|                         | 71.4 ± 7.0 kg                 |   | 4 vs 4           |                | 93.7                               |                    |   |
|                         | 177.1 ± 6.8 cm                |   | 4 vs 5           |                | 83.3                               |                    |   |
|                         | 12.1 exp.                     |   | 4 vs 6           |                | 75                                 |                    |   |
| Olthof et al. (2018)    | 148 players                   | To analyse the influence of different field sizes on young players  | GK + 4 vs 4 + GK | 40 x 30        | 150                                | 1 x 4'/4'          | Spatial positioning measured with LPM   |
|                         | 12-18 years                   |   |                  | 68 x 47        | 399.5                              |                    |   |
| Silva, P. et al. (2015) | 24 players                    | To analyse the influence of same field size per player on different field sizes on player coordination      | 6 vs 6           | 52.9 x 34.4    | 152                                | 3 x 6'/4'          | Spatial positioning measured with GPS   |
|                         | 14.5 ± 0.5 years              |   | 7 vs 7           | 49.5 x 32.2    | 133                                |                    |   |
|                         | 165.6 ± 7.6 cm                |   | 8 vs 8           | 46.7 x 30.3    | 118                                |                    |   |
|                         | 55.6 ± 7.2 kg                 |   | 9 vs 9           | 57.3 x 37.1    | 152                                |                    |   |
|                         | 6.1 ± 2.0 exp.                |   |                  | 57.3 x 37.1    | 133                                |                    |   |
|                         |                               |   |                  | 57.3 x 37.1    | 118                                |                    |   |
| Vilar et al. (2014)     | 15 players                    | To study the influence of field size on ball possession, passes to teammates and goal attempts              | 5 vs 5           | 40 x 20        | 80                                 | 3 x 10'/5'         | Spatial positioning measured with the TACT programme  |
|                         | 21.8 ± 1.9 years              |   |                  | 52 x 26        | 135.2                              |                    |   |
|                         | 9.8 ± 4.6 years of experience |   |                  | 28 x 14        | 39.2                               |                    |   |

**Table 1** (Continuation)

Summary of the most relevant characteristics of each of the studies included in this review.

| 3. Players' age       |   |   |  |   |                                   |                    |  |
|-----------------------|---|---|--|---|-----------------------------------|--------------------|--|
| Study (year)          | Sample  | Aim   | Ssg format                             | Field size (m)                              | Area per player (m <sup>2</sup> ) | Training programme | Variables analysed   |
| Almeida et al. (2017) | 8 players<br>12.6 ± 0.6 years<br>4.6 ± 0.5 years of experience<br>8 players<br>14.8 ± 0.4 years<br>6.3 ± 1.5 years of experience  | To examine the influence of scoring mode and age on passing actions.  | GK + 4 vs 4 + GK                       | 30 x 20                                     | 75                                | 18 x 10'/5'        | Number of passes, passing zones and passing direction recorded by the observational method with the LINC programme   |
| Barnabé et al. (2016) | 12 players<br>15.2 ± 0.6 years<br>4.6 ± 0.5 years of experience<br>12 players<br>16.3 ± 0.5 years<br>7 ± 1.4 years of experience<br>12 players<br>17.4 ± 0.5 years<br>8.7 ± 2.8 years of experience | To examine offensive and defensive behaviours in players of different ages  | GK + 5 vs 5 + GK                       | 33 x 60                                     | 165                               | 1 x 8'             | Spatial positioning measured with GPS SPI Pro  |
| Borges et al. (2017)  | 48 players<br>14.8 ± 1.5 years<br>0.5 ± 1.4 differences in somatic maturation   | To compare tactical performance, anthropometric measures and physical capacities between groups of varying maturity | GK + 3 vs 3 + GK                       | 36 x 27                                     | 108                               | 1 x 4'             | Anthropometric measurements (height, weight). Maturation measured through peak growth rate; physical capacities measured with Yo-Yo test, manual pressure test, CMJ test, SJ test and sit-and-reach test; technical-tactical performance measured with FUT-SAT |
| Brito et al. (2019a)  | 53 players<br>6.9 ± 0.7 years<br>44 players<br>8.5 ± 0.6 years<br>41 players<br>11.2 ± 0.4 years<br>59 players<br>13.4 ± 0.5 years  | To study the effect of different SSG formats in different age groups (U-8, U-10, U-12 and U-14)                     | 5 vs 5<br>7 vs 7<br>9 vs 9<br>11 vs 11 | 45.5 x 29<br>64 x 41<br>82 x 52<br>100 x 64 | 131.9<br>187.4<br>236.6<br>290.0  | 12 x 30'           | Spatial distribution of players by measuring the magnitude of the individual spatial distribution. The area covered per player measured by the players' elliptical space   |

**Table 1** (Continuation)

*Summary of the most relevant characteristics of each of the studies included in this review.*

| <b>3. Players' age</b>      |  |   |                                      |  |  |                       |  |
|-----------------------------|--|---|--------------------------------------|--|--|-----------------------|--|
| Study (year)                | Sample   | Aim   | SOG<br>format                        | Field size (m)                           | Area per<br>player ( m <sup>2</sup> )  | Training<br>programme | Variables<br>analysed  |
| Castellano et al.<br>(2017) | 14 players<br>13 ± 0.3 years<br>14 players<br>14 ± 0.3 years                                       | To study the influence of different<br>field lengths on SOG 7 vs 7 tasks<br>in U-13 and U-14 players                  | GK + 6 vs 6 + GK                     | 60 x 40<br>50 x 40<br>40 x 40<br>30 x 40 | 200<br>167<br>133<br>100               | 1 x 7'4'              | Spatial positioning measured with<br>GPS   |
| Clemente et al.<br>(2020a)  | 16 players<br>13.9 ± 0.3 years<br>16 players<br>15.7 ± 0.5 years<br>16 players<br>18.4 ± 0.8 years | To compare the team dynamics<br>between three age groups (U-13,<br>U-15 and U-18) in SOG 4 vs 4<br>tasks              | GK + 4 vs 4 + GK                     | 30 x 20                                  | 75                                     | 3 x (4 x 4'3')        | Spatial positioning measured with<br>GPS WIMU PRO  |
| da Costa et al.<br>(2010)   | 524 players<br>11-17 years   | To examine the relationship<br>between tactical performance<br>and players born in the same<br>four-month period      | GK + 3 vs 3 + GK                     | 36 x 27                                  | 121.5                                  | 1 x 4'                | Tactical performance measured<br>with FUT-SAT  |
| Folgado.<br>(2015)          | 10 players<br>8.5 ± 0.5 years<br>10 players<br>10.4 ± 0.5 years<br>10 players<br>12.7 ± 0.4 years  | To identify how tactical behaviour<br>varies according to age and<br>different SOG task conditions                    | GK + 3 vs 3 + GK<br>GK + 4 vs 4 + GK | 30 x 20                                  | 75<br>60                               | 3 x (1 x 8'6')        | Spatial positioning measured with<br>the TACT programme  |
| García et al.<br>(2014)     | 54 players<br>U-9 and U-14   | To observe the behaviour of two<br>age groups (U-9 and U-14) in<br>different SOG formats with player<br>variability   | 5 vs 5<br>7 vs 7<br>9 vs 9           | 20 x 30<br>30 x 45<br>45 x 60            | 60<br>96.4<br>150                      | 18 x 20               | Technical-tactical actions recorded<br>by observational method   |
| Machado et al.<br>(2019)    | 10 players<br>13.5 ± 1.2 years<br>10 players<br>16.3 ± 0.5 years                                   | To investigate how tactical<br>behaviour varies in different age<br>groups and under different SOG<br>task conditions | GK + 3 vs 3 + GK<br>GK + 4 vs 4 + GK | 36 x 27<br>47.7 x 29.5                   | 121.5<br>140.7                         | 9 x 10'10'            | Tactical behaviour measured<br>with Offensive Sequences<br>Characterisation System and Lag<br>Sequential Analysis              |
| Martone et al.<br>(2017)    | 17 players<br>10 ± 0.5 years<br>16 players<br>13.2 ± 0.2 years                                     | To evaluate the effect of different<br>areas per player on exercise<br>intensity and technical-tactical<br>actions    | 3 vs 3<br>4 vs 4<br>5 vs 5           | 20 x 30<br>30 x 30                       | 66.6<br>150<br>50<br>112.6<br>40<br>90 | 3 x 4'3'              | Heart rate measured with FIT<br>PULSE vers 1.37 TTSports<br>and technical-tactical actions<br>measured with observational tool |

**Table 1** (Continuation)

*Summary of the most relevant characteristics of each of the studies included in this review.*

| <b>3. Players' age</b>    |                               |   |                  |                |                                       |                       |   |
|---------------------------|-------------------------------|---|------------------|----------------|---------------------------------------|-----------------------|---|
| Study (year)              | Sample                        | Aim   | SOG<br>format    | Field size (m) | Area per<br>player ( m <sup>2</sup> ) | Training<br>programme | Variables<br>analysed   |
| Moreira et al.<br>(2020)  | 18 players                    | To compare the influence of<br>manipulating total and relative<br>area per player on tactical<br>behaviour  | 3 vs 3           | 36 x 27        | 162                                   | 4 x 4'/4'             | General principles of the game<br>measured with FUT-SAT. Team<br>interactions measured with Social<br>Network Analysis applied to Team<br>Sport |
|                           | 13.1 ± 0.6 years              |   | 3 vs 3 + 1       | 36 x 27        | 139                                   |                       |   |
|                           | 18 players                    |   | 3 vs 3 + 1       | 40 x 29        | 162                                   |                       |   |
|                           | 14.3 ± 0.7 years              |   |                  |                |                                       |                       |   |
| Nunes et al.<br>(2020a)   | 20 players                    | To study the effect of numerical<br>inequalities in external physical<br>load, tactical demands and<br>internal load  | 4 vs 2           | 30 x 25        | 125                                   | 4 x 4'/4'             | External load and tactical actions<br>measured with GPS and ZEPP<br>Player Soccer System. Internal<br>load measured with Borg Scale             |
|                           | 22.3 ± 2.0 years              |   | 4 vs 3           |                | 107.1                                 |                       |   |
|                           | 71.4 ± 7.0 kg                 |   | 4 vs 4           |                | 93.7                                  |                       |   |
|                           | 177.1 ± 6.8 cm                |   | 4 vs 5           |                | 83.3                                  |                       |   |
|                           | 12.1 ± years of<br>experience |   | 4 vs 6           |                | 75                                    |                       |   |
| Olthof et al.<br>(2018)   | 148 players                   | To analyse the influence of<br>different pitch sizes (traditional<br>and derived from match format)<br>on young players   | GK + 4 vs 4 + GK | 40 x 30        | 150                                   | 1 x 4'/4'             | Spatial positioning measured with<br>LPM  |
|                           | 12-18 years                   |   |                  | 68 x 47        | 399.5                                 |                       |   |
| Olthof et al.<br>(2015)   | 23 players                    | To determine tactical behaviours<br>in SOG tasks in two age groups<br>(U-17 and U-19)   | GK + 5 vs 5 + GK | 40 x 30        | 100                                   | 2 x (12 x 6'/1,5')    | Positioning measured with LPM   |
|                           | 15.4 ± 0.7 years              |   |                  |                |                                       |                       |   |
| Praça et al.<br>(2018)    | 14 players                    | To present a new analysis between<br>tactical principles of defence and<br>fall-back; to compare defensive<br>cooperation between different<br>age groups and to compare the<br>defensive level between different<br>positions and age groups | 3 vs 3           | 36 x 27        | 162                                   | 2 x 4'/4'             | Frequency of technical-tactical<br>actions measured with FUT-SAT<br>and tactical interactions measured<br>with Social Network Visualizer        |
|                           | 13.1 ± 0.6 years              |   |                  |                |                                       |                       |   |
| Reis y Almeida.<br>(2020) | 14.3 ± 0.7 years              | To compare differences in<br>tactical behaviour between<br>groups of different maturational<br>age  | GK 6 vs 3 + GK   | 36 x 27        | 121.5                                 | 1 x 4'                | Somatic maturation measured by<br>distance between age and peak<br>growth rate. Tactical performance<br>measured with FUT-SAT                   |
|                           | 45 players                    |   |                  |                |                                       |                       |   |
|                           | 13.2 ± 1.1 years              |   |                  |                |                                       |                       |   |
|                           | 23 players                    |   |                  |                |                                       |                       |   |
|                           | 15 ± 0.8 years                |   |                  |                |                                       |                       |   |
|                           | 10 players                    |   |                  |                |                                       |                       |   |
|                           | 15.7 ± 0.8 years              |   |                  |                |                                       |                       |   |

**Table 1** (Continuation)

*Summary of the most relevant characteristics of each of the studies included in this review.*

| 4. Number of players      |  |   |               |                |                                       |                       |  |
|---------------------------|--|---|---------------|----------------|---------------------------------------|-----------------------|--|
| Study (year)              | Sample   | Aim   | SOG<br>format | Field size (m) | Area per<br>player ( m <sup>2</sup> ) | Training<br>programme | Variables<br>analysed  |
| Abrantes et al.<br>(2012) | 16 players   | To determine cardiac variation,<br>perceived exertion and tactical<br>actions between two SOG<br>situations with different numbers<br>of players  | 3 vs 3        | 20 x 30        | 100                                   | 4 x 4'/2'             | Heart rate measured with Polar<br>Team System; perceived exertion<br>measured with RPE; technical-<br>tactical actions recorded by<br>observational method                           |
|                           | 15.7 ± 0.4 years<br>8.0 ± 1.8 years of<br>experience |   | 4 vs 4        | 20 x 40        | 100                                   |                       |  |
| Aguir et al.<br>(2015)    | 10 players   | To compare different tactical<br>behaviours in 2 vs 2, 3 vs 3,<br>4 vs 4 y 5 vs 5 SOG situations  | 2 vs 2        | 28 x 21        | 147                                   | 3 x 6'/1'             | Spatial positioning measured with<br>GPS SPI-PRO   |
|                           | 18.0 ± 0.6 years                                     |   | 3 vs 3        | 35 x 36        | 151.6                                 |                       |  |
|                           | 10.2 ± 1.8 years of<br>experience                    |   | 4 vs 4        | 40 x 30        | 150                                   |                       |  |
|                           |  |   | 5 vs 5        | 44 x 34        | 149.6                                 |                       |  |
| Brito et al.<br>(2019a)   | 53 players   | To study the effect of different<br>SOG formats in different age<br>groups (U-8, U-10, U-12 and<br>U-14)  | 5 vs 5        | 45.5 x 29      | 131.9                                 | 12 x 30'              | Spatial distribution of players by<br>measuring the magnitude of the<br>individual spatial distribution. The<br>area covered per player measured<br>by the players' elliptical space |
|                           | 6.9 ± 0.7 years                                      |   | 7 vs 7        | 64 x 41        | 187.4                                 |                       |  |
|                           | 44 players   |   | 9 vs 9        | 82 x 52        | 236.6                                 |                       |  |
|                           | 8.5 ± 0.6 years                                      |   | 11 vs 11      | 100 x 64       | 290.0                                 |                       |  |
|                           | 41 players   |   |               |                |                                       |                       |  |
| Chung et al.<br>(2019)    | 11.2 ± 0.4 years                                     | To study the effect of different<br>numbers of players on the<br>attacking and defensive<br>coordination of the general<br>principles of the game | 3 vs 3        | 36 x 28        | 168                                   | 1 x 5'/5'             | Spatial positioning measured with<br>Qstarsz BT-Q1000Ex  |
|                           | 59 players   |   | 4 vs 4        |                | 126                                   |                       |  |
|                           | 13.4 ± 0.5 years                                     |   | 5 vs 5        |                | 100.8                                 |                       |  |
|                           |  |   |               |                |                                       |                       |  |
| Clemente et al.<br>(2018) | 12 players   | To study the change in frequency<br>of technical-tactical actions<br>between two SOG formats  | 3 vs 3        | 15 x 20        | 50                                    | 3 x 3'/2'             | Technical-tactical actions<br>measured by observational tool   |
|                           | 7.5 ± 0.5 years                                      |   | 6 vs 6        | 22 x 30        | 55                                    |                       |  |
|                           | 2.5 ± 0.5 years of<br>experience                     |   |               |                |                                       |                       |  |
| Cofano et al.<br>(2017)   | 10 players   | To evaluate and compare the<br>internal load and frequency of<br>occurrence of some technical-<br>tactical actions                                | 3 vs 3        | 18 x 30        | 90                                    | 3 x 3-4'/90"          | Heart rate measured with Polar<br>Electro Oy; perceived exertion<br>measured with RPE; technical-<br>tactical actions recorded by<br>observational method                            |
|                           | 15.6 ± 0.5 years                                     |   | 4 vs 4        | 24 x 36        | 108                                   | 3 x 3-6'/90"          |  |
|                           | 66 ± 7.3 kg  |   | 5 vs 5        | 30 x 42        | 126                                   | 3 x 3-6'/90"          |  |
|                           | 172 ± 5 cm   |   |               |                |                                       |                       |  |

**Table 1** (Continuation)

Summary of the most relevant characteristics of each of the studies included in this review.

| 4. Number of players           |   |  |                                      |  |  |                    |  |
|--------------------------------|---|--|--------------------------------------|--|--|--------------------|--|
| Study (year)                   | Sample  | Aim  | SSG format                           | Field size (m)                           | Area per player ( m <sup>2</sup> )     | Training programme | Variables analysed   |
| Folgado. (2014)                | 10 players<br>8.5 ± 0.5 years<br>10 players<br>10.4 ± 0.5 years<br>10 players<br>12.7 ± 0.4 years | To identify how tactical behaviour varies according to age and different SSG task conditions                 | GK + 3 vs 3 + GK<br>GK + 4 vs 4 + GK | 30 x 20                                  | 75<br>60                               | 3 x (1 x 8'/6'')   | Spatial positioning measured with the TACT programme   |
| García et al. (2014)           | 54 players<br>U-9 and U-14  | To observe the behaviour of two age groups (U-9 and U-14) in different SSG formats with player variability   | 5 vs 5<br>7 vs 7<br>9 vs 9           | 20 x 30<br>30 x 45<br>45 x 60            | 60<br>96.4<br>150                      | 18 x 20            | Technical-tactical actions recorded by observational method  |
| García Ángulo et al. (2020)    | 40 players<br>11.7 ± 0.4 years<br>2.9 ± 1.1 years of experience                                   | To analyse the effect of reducing the number of players, goal size and field size on tactical behaviour      | GK + 7 vs 7 + GK<br>GK + 4 vs 4 + GK | 58 x 38<br>38 x 20<br>58 x 38<br>38 x 30 | 136.7<br>47.6<br>220.4<br>76           | 2 x 20'/10'        | Technical-tactical actions measured with observational tool  |
| González-Víllora et al. (2017) | 16 players<br>11.6 ± 0.8 years<br>3 ± 1.4 years of experience                                     | To analyse and compare the effect of different SSG formats on heart rate and technical-tactical performance  | 3 vs 3<br>5 vs 5                     | 25.7 x 17.1<br>42.8 x 28.6               | 73.2<br>122.4                          | 3 x 5'/3'          | Heart rate measured with Polar Team App; technical-tactical actions recorded with TSAP; interactions between teammates recorded with SocNetv |
| Machado et al. (2019)          | 10 players<br>13.5 ± 1.2 years<br>10 players<br>16.3 ± 0.5 years                                  | To investigate how tactical behaviour varies in different age groups and under different SSG task conditions | GK + 3 vs 3 + GK<br>GK + 4 vs 4 + GK | 36 x 27<br>47.7 x 29.5                   | 121.5<br>140.7                         | 9 x 10'/10'        | Tactical behaviour measured with Offensive Sequences Characterisation System and Lag Sequential Analysis                                     |
| Martone et al. (2017)          | 17 players<br>10 ± 0.5 years<br>16 players<br>13.2 ± 0.2 years                                    | To evaluate the effect of different areas per player on exercise intensity and technical-tactical actions    | 3 vs 3<br>4 vs 4<br>5 vs 5           | 20 x 30<br>30 x 30                       | 66.6<br>150<br>50<br>112.6<br>40<br>90 | 3 x 4'/3'          | Heart rate measured with FIT PULSE vers 1.37 TTSports and technical-tactical actions measured with observational tool                        |

**Table 1** (Continuation)

Summary of the most relevant characteristics of each of the studies included in this review.

| 4. Number of players         |  |   |                                      |                      |                                    |                    |  |
|------------------------------|--|---|--------------------------------------|----------------------|------------------------------------|--------------------|--|
| Study (year)                 | Sample   | Aim   | SSG format                           | Field size (m)       | Area per player ( m <sup>2</sup> ) | Training programme | Variables analysed   |
| Silva. B. et al. (2014)      | 18 players<br>U-18   | To compare tactical performance between two SSG formats   | GK + 3 vs 3 + GK<br>GK + 6 vs 6 + GK | 30 x 19,5<br>60 x 39 | 73.1<br>167.1                      | 1 x 8'             | Technical-tactical actions measured with FUT-SAT   |
| Silva P. et al. (2016)       | 10 players<br>13-6 ± 0.5 years<br>4.1 ± 1.7 years of experience  | To study how player variation influences inter-player coordination during SSG tasks   | 3 vs 3<br>4 vs 4<br>5 vs 5           | 36 x 28              | 168<br>126<br>100.8                | 1 x 5'/5'          | Spatial positioning measured with GPS SPI-Pro  |
| 5. Game principles           |  |   |                                      |                      |                                    |                    |  |
| 5.1 Goals                    |  |   |                                      |                      |                                    |                    |  |
| Almeida et al. (2017)        | 8 players<br>12.6 ± 0,6 years<br>4.6 ± 0 5 years of experience<br>8 players<br>14.8 ± 0.4 years<br>6.3 ± 1.5 years of experience | To examine the influence of scoring style and age on passing actions  | GK + 4 vs 4 + GK                     | 30 x 20              | 75                                 | 18 x 10'/5'        | Number of passes, passing yards and passing direction recorded by observational method with the LINCCE programme |
| Gonet et al. (2020)          | 20 players<br>21.2 ± 1.5 years<br>13.3 ± 3.2 years of experience   | To compare technical-tactical performance and perceived effort between different SSG formats with manipulation of the number of goals | 5 vs 5                               | 20 x 25              | 50                                 | 2 x (3 x 4'/2')    | Perceived exertion measured with RPE; technical-tactical performance recorded with TSAP and BTS                  |
| Serra-Olivares et al. (2015) | 21 players<br>8-9 years  | To study tactical behaviours in game representative tasks and tasks with stimulus overload  | 3 vs 3                               | 30 x 20              | 100                                | 4 x 2'/2'          | Technical-tactical actions measured with GPET  |
| Travassos, et al. (2014)     | 20 players<br>24.8 ± 4.1 years   | To study how goal modification influences tactical behaviour during SSG tasks   | GK + 5 vs 5 + GK<br>5 vs 5           | 30 x 25              | 75                                 | 4 x 5'/3'          | Spatial positioning measured with GPS SPI-PRO  |

**Table 1** (Continuation)

Summary of the most relevant characteristics of each of the studies included in this review.

| 5.2 Aim of the task                |  |  |                                      |                        |                                    |                    |  |
|------------------------------------|--|--|--------------------------------------|------------------------|------------------------------------|--------------------|--|
| Study (year)                       | Sample   | Aim  | SSG format                           | Field size (m)         | Area per player ( m <sup>2</sup> ) | Training programme | Variables analysed   |
| Lizana et al. (2015)               | 24 players<br>U-20   | To investigate the technical-tactical differences in SSG tasks according to their aim                        | GK + 6 vs 6 + GK                     | 52 x 32                | 208                                | 2 x (1 x 30')      | Technical-tactical actions recorded by observational method  |
| Machado et al. (2019)              | 10 players<br>13.5 ± 1.2 years<br>10 players<br>16.3 ± 0.5 years                             | To investigate how tactical behaviour varies in different age groups and under different SSG task conditions | GK + 3 vs 3 + GK<br>GK + 4 vs 4 + GK | 36 x 27<br>47.7 x 29.5 | 121.5<br>140.7                     | 9 x 10'/10'        | Tactical behaviour measured with Offensive Sequences Characterisation System and Lag Sequential Analysis   |
| Serra-Olivares et al. (2015)       | 21 players<br>8-9 years  | To study tactical behaviours in game representative tasks and tasks with stimulus overload                   | 3 vs 3                               | 32 x 22<br>20 x 20     | 117<br>666                         | 2 x 4'/3'          | Technical-tactical actions measured with GPET  |
| 5.3 Limit of touches               |  |  |                                      |                        |                                    |                    |  |
| Brito et al. (2019b)               | 35 players<br>15.1 ± 0.1 years<br>68.2 ± 9.3 kg<br>173.4 ± 7.3 cm                            | To study the influence of the number of touches on the occurrence of technical-tactical actions              | GK + 3 vs 3 + GK                     | 36 x 27                | 121.5                              | 2 x (4 x 4'/4')    | Technical-tactical actions measured with FUT-SAT; intra-team interactions recorded with Social Network Analysis  |
| Torreblanca-Martínez et al. (2018) | 8 players<br>21.1 ± 1.5 years<br>174.7 ± 3.5 cm<br>71.3 ± 4.7 kg<br>14.5 years of experience | To analyse the conditional and technical-tactical variables according to the number of touches allowed       | 4 vs 4                               | 25 x 25                | 78.1                               | 3 x (2 x 10')      | Spatial positioning and physical demands measured with SPI Elite GPS; number of passes, number of dropped balls and percentage of successful passes recorded by observational method |

## Evaluation of the quality and grouping of research studies

In the SSG research evaluation questionnaire (Sarmiento et al., 2018), of the selected articles, none scored 100%; the highest score was 93.75%. No paper scored below 50%; the lowest score was 56.25%. Of the 47 papers evaluated, 21 (44%) were rated as good quality studies. The remaining 26 (56%) were rated excellent quality.

Cohen's Kappa index was calculated for the inter-rater agreement study, with a score of .96.

The papers were grouped into the following categories (Table 1): 1. Imbalanced interactions (n = 13); 2. Playing field dimensions (n = 10); 3. Age of players (n = 17); 4. Number of players (n = 14); 5. Principles of the game (n = 9); these were further subdivided into: 5.1 Goals (n = 4); 5.2 Aim (n = 3); 5.3 Limit of touches (n = 2).

## Discussion

The aim of this systematic review was to study the influence of SSG tasks on the technical-tactical behaviour of football players. All the SSG situations studied have caused differences in technical-tactical behaviour. This finding is very valuable for coaches as it will help them in designing Small-Sided tasks that provoke or favour the occurrence of certain actions or behaviours.

In terms of the influence of **imbalanced interactions**, four of the reviewed papers kept the area per player the same: Bach Padilha et al. (2017), Clemente et al. (2014), Moreira et al. (2020), and Sampaio et al., (2014). This could be an influential variable that has not always been taken into account. In the remaining papers, the authors used two ways to create situations of numerical inequalities, such as inside or outside multivalent attacking players (Bach Padilha et al., 2017; Clemente et al., 2014; Moreira et al., 2020; Praça et al., 2016) or creating fixed situations of inequality (Gonçalves et al., 2016; Nunes, et al., 2020a).

Praça et al., (2016) concluded that, in situations of numerical superiority with outside multivalent players, attacking players were distributed by occupying more of the width of the space, whereas, when this superiority occurred with a single inside multivalent player, attacking players were distributed by occupying more spaces in terms of depth. This was corroborated by Bach Padilha et al., (2017) who stated that, in situations of attacking superiority created through the use of multivalent players, attacking players distributed more in depth and width. This pattern was found in work where numerical superiority was permanently established.

Meanwhile, Gonçalves et al. (2016) concluded that, as the number of teammates in superiority increased,

the distance to the team's centre, the distance of the opponents to the team's centre and the distance to the nearest opponent increased. This was explained by the players' tendency to spread out over a larger space, occupying more positions in breadth and depth. Nunes et al., (2020a) found this tendency by observing how players in attacking numerical superiority used more space to maintain possession of the ball.

In situations of defensive numerical inferiority, players tended to group together more and to position themselves in areas closer to their own goal (Bach Padilha et al., 2017; Ric et al., 2016; Sampaio et al., 2014; Travassos et al., 2014).

Another factor studied was the occurrence of technical-tactical actions depending on the context. From the review of the research it was established that in situations of numerical inequality there was a greater number of group technical-tactical actions (Moreira et al., 2020; Nunes, et al., 2020a; Praça et al., 2016). In situations of numerical equality in attacking, players used more individual actions such as penetration (Praça et al., 2016) as teammates were more likely to have an opposing defender nearby, while, in situations of attacking numerical superiority, they utilised a greater number of group technical-tactical actions such as attacking cover or attacking units (Praça et al., 2016) as they were more likely to have unmarked teammates.

In terms of defence, in situations of numerical equality, defenders opted for individual defences and away from their own goal; in situations of inferiority, they opted for gathering closer to the goal and executed more collective defensive actions, such as defensive coverage and playing a high line (Praça et al., 2016).

As a conclusion of this section, in situations of numerical superiority in attacking, the players executed a greater number of group attacking actions and occupied more attacking space both in depth and width, while, in situations of defensive numerical inferiority, the players gathered increasingly closer to their goal and carried out a greater number of group defensive actions.

Regarding the influence of the **field size** on play, of the ten studies grouped under this category, six of them kept the number of participating players stable (Castellano et al., 2017; Frencken et al., 2013; Gollin et al., 2016; Nunes, et al., 2020b; Olthof et al., 2018; Vilar et al., 2014). In the other studies, it is worth noting that they modified the number of participants without taking into account that this alternation implied a modification of the area per player, which obviously influenced the judgement of the results. This was only kept stable in Silvia et al., (2015) study.

The first finding was that, as field size increased, the distance between team's centres also increased (Castellano

et al., 2017; Frencken et al., 2013; Olthof et al., 2018), as well as the distance to the nearest opponent (Silva et al., 2015).

Similarly, when increasing the field size in only one of the depth and breadth dimensions, players tended to spread out towards the increased dimension (Gollin et al., 2016).

In studies by Frencken et al. (2013) in which they analysed the teams' distance and spreading out movements in different area sizes, they found that, in SSG tasks where the pitch size was smaller, the team's centres moved in the same directions, i.e. they moved towards the same spaces.

This may explain why a greater number of technical-tactical actions occurred in Small-Sized situations (García-Ángulo et al., 2020; Martone et al., 2017) since, with less space available, the occurrence of attacking and defensive technical-tactical actions of concentration increased (Moreira et al., 2020). Also, with players heading in a similar direction, the number of lengthy ball possessions was likely to be reduced and the possessions that did occur were of shorter duration (Olthof et al., 2018; Vilar et al., 2014). Possession fluctuations of the ball between teams were more frequent in defensive or attacking technical-tactical actions.

Another factor affected by the size of the pitch was the type of actions that appeared or the players' tendency to play. Olthof et al. (2018) concluded that, in smaller pitches, a greater number of transitions occurred, while in larger pitch formats, the attacking tendency was to possess the ball for longer periods of time, which was corroborated by Vilar et al.'s (2014) study.

To summarise this section, it can be noted that players tended to occupy the space available to them for the course of the game. Likewise, the pitch sizes influenced the number of technical-tactical actions that appeared, which is higher in smaller pitches, and the players' tendency to play, where the duration of possession of the ball was shorter and transitions were more frequent in smaller pitches, while longer periods of ball possession were more frequent in larger pitches.

Most of the research collected in this section regarding the **influence of age** shared other variables (pitched size, number of players, scoring method, etc.) that affected the format of the SSG tasks. Specifically, eight investigations studied the effect of age on technical-tactical behaviour without modifying other variables (Almeida et al., 2017; Barnabé et al., 2016; Borges et al., 2017; Clemente et al., 2020a; Costa et al., 2010; Olthof et al., 2015; Praça et al., 2018; Reis & Almeida, 2020).

Among the findings that were repeated throughout these eight studies, it can be highlighted how, as age increased, the area of the playing field used for attacking

was larger (Barnabé et al., 2016; Clemente et al., 2020a; Reis & Almeida, 2020), thus increasing the distance between team centres (Clemente et al., 2020a; Olthof et al., 2015). These findings were also reflected in other studies, even where other SSG task variables were included or modified (Folgado, 2010; Olthof et al., 2018).

Another finding was the improved occupation and adaptation to variations in the pitch's width by older players (Almeida et al., 2017; Castellano et al., 2017; Folgado, 2010; Machado et al., 2019; Olthof et al., 2015; Reis & Almeida, 2020).

Regardless of the fact that older players tended to make better use of space in both directions, younger players tended to carry out more vertical attacks, looking for a quick arrival to the opponent's goal (Machado et al., 2019), while older players tended to carry out more elaborate attacking actions using the width of the pitch to outplay the opponent (Barnabé et al., 2016; Clemente et al., 2020a; Reis & Almeida, 2020).

In terms of the performance of technical-tactical actions, it was concluded that older players performed a greater number of collective technical-tactical actions (Almeida et al., 2017; Borges et al., 2017; Costa et al., 2010; García et al., 2014; Moreira et al., 2020), while their technical-tactical behaviours and group movement patterns remained unaffected (Barnabé et al., 2016; Brito et al., 2019a; Castellano et al., 2017; Martone et al., 2017; Moreira et al., 2020).

The findings in this case can be summarised as follows: older players occupied the available space better, performing more elaborate and stable tactical actions, while performing a greater number of attacking and defensive group technical-tactical actions.

On the other hand, the **influence of the number of players**, recognising that it would make little sense to vary the number of players without varying the size of the pitch, since the dynamics observed would be very different from those found in a real competitive context. It should be noted that, of all the studies reviewed, only three of them kept the same or similar area sizes per player (Abrantes et al., 2012; Clemente et al., 2018; Folgado, 2010), while it was necessary to take into account the influence of other variables in the findings of the rest of the studies.

From the analysis of the findings found in these three studies, it was observed how, in SSG formats involving fewer players, the number of technical-tactical actions increased (Abrantes et al., 2012; Clemente et al., 2018). This coincides with what has been observed in other studies even when modifying other variables of SSG tasks (García-Ángulo et al., 2020). However, it should be

considered that this refers to the total number of actions since, depending on the type of action, these tend to appear more or less frequently in situations with a greater or lesser number of players.

In SSG formats with fewer players, there was a greater number of technical-tactical actions such as transitions (Machado et al., 2019), defensive tackles (Cofano et al., 2017), penetration, deep attacks, retreat and defensive unity (Martone et al., 2017; Silva et al., 2014). In formats involving a larger number of players, the technical-tactical actions of playing a high line and defensive coverage (Silva et al., 2014) and ball possessions (Martone et al., 2017) were more frequent.

From these findings, it could be deduced that, in situations with a smaller number of players, they tended to perform a greater number of individual technical-tactical actions and to group together in defence, a finding already pointed out in other research (Praça et al., 2016); while, in situations with a larger number of players, there was a greater number of group actions.

In terms of the distribution of players on the pitch, the distance between team centres and the opponents' distance to the team centres increased as the number of players increased (Aguiar et al., 2015; Folgado, 2010). This was explained by the increase in the number of players and the tendency to occupy a larger playing surface as the number of players increased (Brito et al., 2019a; Chung et al., 2019; Silva et al., 2016). Furthermore, in SSG tasks involving a more players, players tended to perform tactical movements and occupy more fixed areas of space (Brito et al., 2019a). These behaviours were representative of what occurs in real game contexts.

In summary, the findings found in this category are that, in formats involving a larger number of players, players tended to occupy a larger playing surface, show more stable behaviours and occupy limited areas. In addition, with a greater number of players, group technical-tactical actions tended to appear more frequently, while situations with fewer players favoured the appearance of a greater number of technical-tactical actions in general, with a preference for individual technical-tactical actions.

Finally, regarding the **influence of the rules of the game** in the analysis of the subcategory of Goals, the studies could be grouped into: a study with slight modifications to a real game situation, where the number of goals included was reduced or the progression goal was not suppressed (Almeida et al., 2017; Gonet et al., 2020) and with high modifications due to the inclusion of a large number of goals (Serra-Olivares et al., 2015; Travassos et al., 2014).

When comparing Almeida et al's (2017) results and Gonet et al's (2020), it was observed that when there

are more goals, a greater number of shots and goals are produced (Almeida et al., 2017). However, the percentage of success is lower (Gonet et al., 2020). This could be explained by the fact that, in scenarios with more goals, there was more defensive disorganisation, which may give a false sense of good shot selection. Obviously, as the number of goals increased, the total number of goals was higher; however, shot selection efficiency seemed to worsen. The percentage of successful passes was higher in situations with an increased number of goals, facilitated by the defensive disorganisation caused by having to defend more goals. Another noteworthy finding was the increase in the number of passes in the scoring method after receiving on the opponent's line and that these passes occurred in more attacking zones (Almeida et al., 2017).

In reference to the studies carried out with lots of changes to the real situation, a more delayed defence was found, while in attack the attacking wing spaces were used more (Travassos et al., 2014). In addition, higher values were observed in ball possession and joint progress towards the opponent's goal (Serra-Olivares et al., 2015), as well as a higher number of missed passes (Gonet et al., 2020) in situations with a lower number of goals.

Secondly, in relation to the study of the subcategory aim of the task, it should be noted that, as expected, in all the tasks where, through provocation rules, the objective was to maintain possession of the ball, the number of passes was higher and the possessions were longer (Lizana et al., 2015; Machado et al., 2019). However, an improved percentage of decision-making and execution was obtained in unmodified tasks or tasks whose objective was to progress towards the opponent's goal (Serra-Olivares et al., 2015), which is the aim of a real game scenario, which is none other than scoring a goal.

Finally, regarding the analysis of the subcategory limit of touches, in both studies the results showed that, in situations with a limit of touches per tackle, there was a higher percentage of errors (Brito et al., 2019b; Torreblanca-Martínez et al., 2018), a higher number of intra-team interactions and a higher occupation of the playing surface in SSG situations with a limit of touches per tackle (Brito et al., 2019b).

To summarise this section, it can be established that certain modifications to the rules of the game lead to certain technical-tactical behaviours. However, the success of decision making or correct actions may be reduced. The coach must be aware of these variables in order to decide whether or not to adopt these modifications according to the desired aim.

As limitations of the study, the possibility of a certain information bias is recognised, as the PRISMA guide recommends the inclusion of articles not yet published

by requesting the facilitation of authors with expertise in the subject, as well as the inclusion of works whose objective is not to be published or which have not been accepted for publication.

As possible lines of research, it should be noted that the studies discussed investigate the technical-tactical behaviour in different SSG formats without evaluating whether the effects shown have a transfer and how this is in real game situations. Therefore, future studies are recognised as being of great interest where, after carrying out studies in certain formats to increase certain technical-tactical behaviours, these would be evaluated in real game situations.

In conclusion, the aim of this systematic review is to study the influence of SSG tasks on players' technical-tactical behaviour. All the modifications and variables analysed have caused differences in technical-tactical behaviour, which is useful information for coaches as it will help them to design Small-Sided tasks that encourage or facilitate the appearance of certain desired behaviours or actions.

## References

- Abrantes, I., Nunes, I., Maças, M., Leite, M., & Sampaio, J. (2012). Effects of the Number of Players and Game Type Constraints on Heart Rate, Rating of Perceived Exertion, and Technical Actions of Small-Sided Soccer Games. *The Journal of Strength and Conditioning Research*, 26(4), 976–981. <https://doi.org/10.1519/JSC.0b013e31822dd398>
- Aguiar, M., Gonçalves, B., Botelho, G., Lemmink, K., & Sampaio, J. (2015). Footballers' movement behaviour during 2-, 3-, 4- and 5-a-side small-sided games. *Journal of Sports Sciences*, 33(12), 1259–1266. <https://doi.org/10.1080/02640414.2015.1022571>
- Almeida, C. H., Volossovitch, A., & Duarte, R. (2017). Influence of scoring mode and age group on passing actions during small-sided and conditioned soccer games. *Human Movement*, 18(5), 125–134. <https://doi.org/10.5114/hm.2017.73621>
- Bach Padilha, M., Guilherme, J., Serra-Olivares, J., Roca, A., & Teoldo, I. (2017). The influence of floaters on players' tactical behaviour in small-sided and conditioned soccer games. *International Journal of Performance Analysis in Sport*, 17(5), 721–736. <https://doi.org/10.1080/024748668.2017.1390723>
- Barnabé, L., Volossovitch, A., Duarte, R., Ferreira, A. P., & Davids, K. (2016). Age-related effects of practice experience on collective behaviours of football players in small-sided games. *Human Movement Science*, 48, 74–81. <https://doi.org/10.1016/j.humov.2016.04.007>
- Borges, P. H., Andrade, M. O. C., Rechenchosky, L., da Costa, I. T., Teixeira, D., & Rinaldi, W. (2017). Desempenho tático, antropometria e capacidades físicas de jovens futebolistas: comparação entre diferentes grupos maturacionais. *Journal of Physical Education*, 28(1), e-2826. Retrieved from <https://periodicos.uem.br/ojs/index.php/RevEducFis/article/view/30182>
- Brito, Á., Roriz, P., & Garganta, J. (2019a). Positioning and displacement patterns of young players during 5v5, 7v7, 9v9, and 11v11 soccer matches. *Journal of Human Sport and Exercise*, 15(4), 904–917. <https://doi.org/10.14198/jhse.2020.154.17>
- Brito E. S. R., Bredt, S. D. G. T., Greco, P. J., Clemente, F., Teoldo, I., & Praça, G. M. (2019b). Influence of limiting the number of ball touches on players' tactical behaviour and network properties during football small-sided games. *International Journal of Performance Analysis in Sport*, 19(6), 999–1010. <https://doi.org/10.1080/24748668.2019.1689751>
- Castellano, J., Fernández, E., Echeazarra, I., Barreira, D., & Garganta, J. (2017). Influencia de la longitud del campo en los comportamientos inter e intra-equipo en jóvenes jugadores de fútbol. *Anales de Psicología / Annals of Psychology*, 33(3), 486–496. <https://doi.org/10.6018/analesps.33.3.271051>
- Chung, D., Carvalho, T., Casanova, F., & Silva, P. (2019). Number of players manipulation effect on space and concentration principles of the game representativeness during football small-sided and conditioned games. *Journal of Physical Education and Sport*, 19(January), 381–386. <https://doi.org/10.7752/jpes.2019.s2057>
- Clemente, F., Castillo, D., & Los Arcos, A. (2020a). Tactical Analysis According to Age-level Groups during a 4 vs. 4 Plus Goalkeepers Small-sided Game. *International Journal of Environmental Research and Public Health*, 17(5). <https://doi.org/10.3390/ijerph17051667>
- Clemente, F., Afonso, J., Castillo, D., Arcos, A. L., Silva, A. F., & Sarmento, H. (2020b). The effects of small-sided soccer games on tactical behavior and collective dynamics: A systematic review. *Chaos, Solitons and Fractals*, 134, 109710. <https://doi.org/10.1016/j.chaos.2020.109710>
- Clemente, F., Chen, Y.-S., Bezerra, J. P., Guiomar, J., & Lima, R. (2018). Between-format differences and variability of technical actions during small-sided soccer games played by young players. *Human Movement*, 2018(5), 114–120. <https://doi.org/10.5114/hm.2018.83103>
- Clemente, F., Wong, D. P., Martins, F. M. L., & Mendes, R. S. (2014). Acute Effects of the Number of Players and Scoring Method on Physiological, Physical, and Technical Performance in Small-sided Soccer Games. *Research in Sports Medicine*, 22(4), 380–397. <https://doi.org/10.1080/15438627.2014.951761>
- Cofano, G., Sannicandro, I., & Cofano, G. (2017). Small-Sided Games : Analysis of the Internal Load and Technical Skills in Young Soccer Players. *International Journal of Science and Research*. 6(March), 735–739. <https://doi.org/10.21275/ART20171583>
- da Costa, I. T., Garganta, J., Greco, P. J., Mesquita, I., & Seabra, A. (2010). Influence of Relative Age Effects and Quality of Tactical Behaviour in the Performance of Youth Soccer Players. *International Journal of Performance Analysis in Sport*, 10(2), 82–97. <https://doi.org/10.1080/24748668.2010.11868504>
- Coutinho, D., Gonçalves, B., Travassos, B., Abade, E., Wong, D. P., & Sampaio, J. (2019). Effects of pitch spatial references on players' positioning and physical performances during football small-sided games. *Journal of Sports Sciences*, 37(7), 741–747. <https://doi.org/10.1080/02640414.2018.1523671>
- Coutinho, D., Gonçalves, B., Travassos, B., Folgado, H., Figueira, B., & Sampaio, J. (2020). Different marks in the pitch constraint youth players' performances during football small-sided games. *Research Quarterly for Exercise and Sport*, 91(1), 15–23. <https://doi.org/10.1080/02701367.2019.1645938>
- Folgado, H. (2010). Towards an Understanding of Youth Football Teams Tactical Performance by Analysis of Collective Positional Variables During Small-Sided Game. *Dissertacao de Mestrado em Ciencias do Desporto. Universidade de Trás-os-montes e Alto Douro*.
- Folgado, H., Lemmink, K. A., Frencken, W., & Sampaio, J. (2014). Length, width and centroid distance as measures of teams tactical performance in youth football. *European journal of sport science*, 14(sup1), S487–S492. <https://doi.org/10.1080/17461391.2012.730060>
- Frencken, W., Van Der Plaats, J., Visscher, C., & Lemmink, K. (2013). Size matters: Pitch dimensions constrain interactive team behaviour in soccer. *Journal of Systems Science and Complexity*, 26(1), 85–93. <https://doi.org/10.1007/s11424-013-2284-1>
- García-Angulo, A., Palao, J. M., Giménez-Egido, J. M., García-Angulo, F. J., & Ortega-Toro, E. (2020). Effect of the Modification of the Number of Players, the Size of the Goal, and the Size of the Field in Competition on the Play Actions in U-12 Male Football. *International Journal of Environmental Research and Public Health*, 17(2). <https://doi.org/10.3390/ijerph17020518>
- García, J. D. C., Refoyo-Román, I., Calleja-González, J., & Dellal, A. (2014). Quantification and Analysis of Offensive Situations in Different Formats of Sided Games in Soccer. *Journal of Human Kinetics*, 44(1), 193–201. <https://doi.org/10.2478/hukin-2014-0125>

- Gollin, M., Alfero, S., & Daga, A. (2016). Manipulation of Playing Field's Length/Width Ratio and Neutral Players' Positioning: Activity Profile and Motor Behavior Demands during Positional Possession Soccer Small Sided Games in Young Elite Soccer Players. *International Journal of Sports Science*, 6(3), 106–115. <http://article.sapub.org/10.5923/j.sports.20160603.07.html>
- Gonçalves, B., Marcelino, R., Torres-Ronda, L., Torrents, C., & Sampaio, J. (2016). Effects of emphasising opposition and cooperation on collective movement behaviour during football small-sided games. *Journal of Sports Sciences*, 34(14), 1346–1354. <https://doi.org/10.1080/02640414.2016.1143111>
- Gonet, D. T., Bezerra, L. O., dos Reis, M. A. M., & Vasconcellos, F. V. do A. (2020). Effect of small-sided games with manipulation of small targets on the perceived exertion and tactical and technical performance of college soccer players. *Revista Brasileira de Cineantropometria & Desempenho Humano*, 22. [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S1980-00372020000100301&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1980-00372020000100301&nrm=iso)
- González-Víllora, S., Clemente, F. M., Martins, F. M. L., & Pastor-Vicedo, J. C. (2017). Effects of regular and conditioned small-sided games on young football players' heart rate responses, technical performance and network structure. 18 (5) special/issue: 135-145. <https://doi.org/10.5114/hm.2017.73618>
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *PLOS Medicine*, 6(7). <https://doi.org/10.1371/journal.pmed.1000100>
- Lizana, C. J. R., Reverdito, R. S., Brenzikofer, R., Vaz Macedo, D., Misuta, M. S., & Scaglia, A. J. (2015). Technical and tactical soccer players' performance in conceptual small-sided games. *Motriz: Revista de Educação Física*, 21(3), 312–320. <https://doi.org/10.1590/S1980-65742015000300013>
- Machado, J. C., Ribeiro, J., Palheta, C. E., Alcântara, C., Barreira, D., Guilherme, J., Garganta, J., & Scaglia, A. J. (2019). Changing Rules and Configurations During Soccer Small-Sided and Conditioned Games. How Does It Impact Teams' Tactical Behavior? *Frontiers in Psychology*, 10(JULY). <https://doi.org/10.3389/fpsyg.2019.01554>
- Martone, D., Giacobbe, M., Capobianco, A., Imperlini, E., Mancini, A., Capasso, M., Buono, P., Orrù, S. (2017) Exercise Intensity and Technical Demands of Small-Sided Soccer Games for Under-12 and Under-14 Players: Effect of Area per Player, *Journal of Strength and Conditioning Research*: June 2017 - Volume 31 - Issue 6 - p 1486-1492. <https://doi.org/10.1519/JSC.0000000000001615>
- Moreira, P. E. D., Barbosa, G. F., Murta, C. D. C. F., Pérez Morales, J. C., Bredt, S. D. G. T., Praça, G. M., & Greco, P. J. (2020). Network analysis and tactical behaviour in soccer small-sided and conditioned games: influence of absolute and relative playing areas on different age categories. *International Journal of Performance Analysis in Sport*, 20(1), 64–77. <https://doi.org/10.1080/24748668.2019.1705642>
- Navarro-Adelantado, V. (2002). El afán de jugar: teoría y práctica de los juegos motores (Vol. 24). *INDE*.
- Nunes, N. A., Gonçalves, B., Coutinho, D., & Travassos, B. (2020a). How Numerical Unbalance Constraints Physical and Tactical Individual Demands of Ball Possession Small-Sided Soccer Games. *Frontiers in Psychology*, 11(July). <https://doi.org/10.3389/fpsyg.2020.01464>
- Nunes, N. A., Gonçalves, B., Davids, K., Esteves, P., & Travassos, B. (2020b). How manipulation of playing area dimensions in ball possession games constrains physical effort and technical actions in under-11, under-15 and under-23 soccer players. *Research in Sports Medicine*, 00(00), 1–15. <https://doi.org/10.1080/15438627.2020.1770760>
- Olthof, S. B. H., Frencken, W. G. P., & Lemmink, K. A. P. M. (2015). The older, the wider: On-field tactical behavior of elite-standard youth soccer players in small-sided games. *Human Movement Science*, 41, 92–102. <https://doi.org/10.1016/j.humov.2015.02.004>
- Olthof, S. B. H., Frencken, W. G. P., & Lemmink, K. A. P. M. (2018). Match-derived relative pitch area changes the physical and team tactical performance of elite soccer players in small-sided soccer games. *Journal of Sports Sciences*, 36(14), 1557–1563. <https://doi.org/10.1080/02640414.2017.1403412>
- Ometto, L., Vasconcellos, F. V. A., Cunha, F. A., Teoldo, I., Souza, C. R. B., Dutra, M. B., O'Sullivan, M., & Davids, K. (2018). How manipulating task constraints in small-sided and conditioned games shapes emergence of individual and collective tactical behaviours in football: A systematic review. *International Journal of Sports Science and Coaching*, 13(6), 1200–1214. <https://doi.org/10.1177/1747954118769183>
- Parlebas, P. (2020). The Universals of Games and Sports. *Frontiers in Psychology*, 11, 593877. <https://doi.org/10.3389/fpsyg.2020.593877>
- Pons, E., Martín-García, A., Guitart, M., Guerrero, I., Tarragó, J. R., Seirul-lo, F., Cos, F. (2020). Training in Team Sports: Optimising Training at FCB. *Apunts Educación Física y Deportes*, 142, 55-66. [https://doi.org/10.5672/apunts.2014-0983.es.\(2020/4\).142.07](https://doi.org/10.5672/apunts.2014-0983.es.(2020/4).142.07)
- Praça, G. M., Sousa, R. B., Bredt, S. da G. T., Clemente, F. M., Teoldo, I., Castro, H. de O., Costa, G. D. C. T., & Moreira, P. E. D. (2018). Interações defensivas em pequenos jogos no futebol: uma abordagem integrada dos princípios táticos fundamentais e da social network analysis. *Revista Brasileira de Cineantropometria e Desempenho Humano*, 20(5), 422–431. <https://doi.org/10.5007/1980-0037.2018v20n5p422>
- Praça, G. M., Costa, C. L. A., Costa, F. F., de Andrade, A. G. P., Chagas, M. H., & Greco, J. P. (2016). Tactical behavior in soccer small-sided games: influence of tactical knowledge and numerical superiority. *Journal of Physical Education (Maringá)*, 27(1), 1–12. <https://doi.org/10.4025/jphyseduc.v27i1.2736>
- Práxedes, A., A. Moreno, J. Sevil, D. Pizarro, and F. Del Villar. (2016). "Effect of Equal and Unequal Numbers of Players in Small-Sided Football Games on Tactical Performance in Young Players." *Journal of Sport Pedagogy and Research* 2 (1): 22–29. [http://www.ipg.pt/scpd/files/JSPR\\_2\\_1.pdf](http://www.ipg.pt/scpd/files/JSPR_2_1.pdf)
- Reis, M. A. M. D., & Almeida, M. B. (2020). The role of somatic maturation in the tactical effectiveness, efficiency and variability of young soccer players. *International Journal of Performance Analysis in Sport*, 20(2), 305–321. <https://doi.org/10.1080/24748668.2020.1743165>
- Ric, A., Hristovski, R., Gonçalves, B., Torres, L., Sampaio, J., & Torrents, C. (2016). Timescales for exploratory tactical behaviour in football small-sided games. *Journal of Sports Sciences*, 34(18), 1723–1730. <https://doi.org/10.1080/02640414.2015.1136068>
- Ros, V. L., & Oliva, F. J. C. (2005). La enseñanza integrada técnico-táctica de los deportes en edad escolar. Explicación y bases de un modelo. *Apunts Educación física y deportes*, (79), 40-48.
- Sampaio, J. E., Lago, C., Gonçalves, B., Maças, V. M., & Leite, N. (2014). Effects of pacing, status and unbalance in time motion variables, heart rate and tactical behaviour when playing 5-a-side football small-sided games. *Journal of Science and Medicine in Sport*, 17(2), 229–233. <https://doi.org/10.1016/j.jsams.2013.04.005>
- Sarmiento, H., Clemente, F. M., Harper, L. D., da Costa, I. T., Owen, A., & Figueiredo, A. J. (2018). Small sided games in soccer—a systematic review. *International Journal of Performance Analysis in Sport*, 18(5), 693–749. <https://doi.org/10.1080/24748668.2018.1517288>
- Serra-Olivares, J., González-Víllora, S., & García-López, L. M. (2015). Effects of modification of task constraints in 3-versus-3 small-sided soccer games. *South African Journal for Research in Sport, Physical Education and Recreation*, 37(2), 119–129.
- Silva, B., Garganta, J., Santos, R., & Teoldo, I. (2014). Comparing Tactical Behaviour of Soccer Players in 3 vs. 3 and 6 vs. 6 Small-Sided Games. *Journal of Human Kinetics*, 41(1), 191–202. <https://doi.org/10.2478/hukin-2014-0047>

- Silva, P., Esteves, P., Correia, V., Davids, K., Araújo, D., & Garganta, J. (2015). Effects of manipulations of player numbers vs. field dimensions on inter-individual coordination during small-sided games in youth football. *International Journal of Performance Analysis in Sport*, 15(2), 641–659. <https://doi.org/10.1080/24748668.2015.11868821>
- Silva, P., Vilar, L., Davids, K., Araújo, D., & Garganta, J. (2016). Sports teams as complex adaptive systems: manipulating player numbers shapes behaviours during football small-sided games. *SpringerPlus*, 5(1), 1–10. <https://doi.org/10.1186/s40064-016-1813-5>
- Torreblanca-Martínez, V., Cordero-Ojeda, R., & González-Jurado, J. A. (2018). Análisis de variables condicionales y técnico-tácticas mediante juegos reducidos en futbolistas semiprofesionales (Analysis of physical and technical-tactical demands through small-sided games in semi-professional football players). *Retos*, 2041(35), 87–90. <https://doi.org/10.47197/retos.v0i35.59448>
- Torrents C, Ric A, Hristovski R, Torres-Ronda L, Vicente E, Sampaio J (2016) Emergence of Exploratory, Technical and Tactical Behavior in Small-Sided Soccer Games when Manipulating the Number of Teammates and Opponents. *PLoS ONE* 11(12): e0168866. <https://doi.org/10.1371/journal.pone.0168866>
- Travassos, B., Vilar, L., Araújo, D., & McGarry, T. (2014). Tactical performance changes with equal vs unequal numbers of players in small-sided football games. *International Journal of Performance Analysis in Sport*, 14(2), 594–605. <https://doi.org/10.1080/24748668.2014.11868745>
- Vilar, L., Duarte, R., Silva, P., Chow, J. Y., & Davids, K. (2014). The influence of pitch dimensions on performance during small-sided and conditioned soccer games. *Journal of Sports Sciences*, 32(19), 1751–1759. <https://doi.org/10.1080/02640414.2014.918640>

**Conflict of interests:** the authors have not declared any conflict of interest.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>



# Bullying in Youth Sport: Knowledge and Prevention Strategies of Coaches

Xènia Ríos<sup>1</sup> and Carles Ventura<sup>1</sup>

<sup>1</sup>Social and Educational Research Group of Physical Activity and Sport (GISEAFE), National Institute of Physical Education of Catalonia (INEFC), University of Barcelona (UB), Barcelona (Spain).

## Cite this article:

Ríos, X., & Ventura, C. (2022). *Bullying in Youth Sport: Knowledge and Prevention Strategies of Coaches*. *Apunts Educación Física y Deportes*, 148, 62-70. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/2\).148.07](https://doi.org/10.5672/apunts.2014-0983.es.(2022/2).148.07)

## Abstract

Coaches are key figures in tackling bullying that can occur in the context of formative sport practice. The aim of the study was to evaluate knowledge about bullying among a sample of coaches in Catalonia (Spain), as well as the prevention strategies available to them. The participants were 161 coaches (75.8% male and 24.2% female) from different sports, with a mean age of 20.3 years (SD = 3.15). They were provided with an *ad hoc* questionnaire with the following open questions: "How would you define bullying?", "What typologies of bullying exist?" and "What strategies do you use to prevent bullying in sport?". A content analysis was carried out through, on the one hand, a deductive process for the definition of bullying and its typologies; and, on the other hand, an inductive process for prevention strategies. In turn, the frequencies (%) of responses in each of the categories of the different areas were calculated. It was observed that the definition of the phenomenon was vague in terms of key concepts (repetition, intent to harm and power imbalance). The most frequently displayed typology was physical bullying, followed by cyberbullying. Prevention strategies related to promoting a positive climate among athletes were mentioned, and to a lesser extent those related to observation, awareness-raising, regulation, communication, emotional education and conflict intervention. In general, it was found that coaches had little knowledge about bullying, so it was considered relevant that they be given more specific training on the phenomenon.

**Keywords:** bullying, definition, preventive strategies, sport, typology.

## Editor:

© Generalitat de Catalunya  
Departament de la Presidència  
Institut Nacional d'Educació  
Física de Catalunya (INEFC)

ISSN: 2014-0983

## \*Correspondence:

Carles Ventura  
[carlesventura@gencat.cat](mailto:carlesventura@gencat.cat)

## Section:

Physical activity and health

## Original language:

Catalan

## Received:

July 8, 2021

## Accepted:

November 25, 2021

## Published:

April 1, 2022

## Cover:

2022 UN International  
Year of Sustainable  
Mountain Development.  
Tirol (Austria)  
@Adobe Stock

## Introduction

The scientific and systematic study of bullying began in the 1970s and it is now considered a social problem that affects the whole world, with significant negative effects on mental health (UNESCO, 2018). The key aspects that characterise the phenomenon are threefold: the intention to harm a victim, the imbalance of power in favour of the aggressor and the repetition of these behaviours over time (Olweus, 1994). In terms of typology, we find so-called traditional bullying, which includes verbal bullying (name-calling, insults...), physical bullying (hitting, kicking, damaging personal objects...) and social bullying (excluding, ignoring...) (Menesini & Salmivalli, 2017). These typologies can be of a direct nature (face-to-face between victim and perpetrator) or of an indirect nature (no physical interaction between victim and perpetrator) (Olweus, 2006). In addition to these typologies, cyberbullying has emerged notably in recent years due to the increasing use of online information and communication technologies (Smith, 2019). Beyond the school environment, bullying can take place in any context where children and adolescents are together and interact, including spaces for sport (Shannon, 2013) and physical activity in general (Castañeda-Vázquez et al., 2020). Although it is understood that the practice of physical-sports activities has beneficial effects on the physical, psychological and social development of children and young people, bullying can turn it into a negative experience among athletes (Mattey et al., 2014). It has been observed that the occurrence of bullying in sport is lower than that observed in the school context, with incidence rates ranging from 10% to 48% (Mishna et al., 2019). These are some of the main risk factors for bullying in sport: having a disability, being obese, belonging to an ethnic minority, sexual orientation or lower motor skills (Nery et al., 2020). In terms of the consequences of bullying in sport, negative emotional effects have been observed among victims (Kentel & McHugh, 2015). It can also lead to a decrease in sporting and academic performance and premature withdrawal from sport (Nery et al., 2020).

Starting from the ecological theoretical framework proposed by Bronfenbrenner (1979), adapted to the phenomenon of bullying in the sporting context by Nery et al. (2020), the role of the coach is key in addressing the phenomenon. They can condition the behaviour of the players, as well as their moral development, acting as a reference or role model for them (Nery et al., 2020). In this sense, Vveinhardt et al., (2017) observed that a sample of basketball players who were victims of bullying, communicated their situation to coaches rather than to their own family. However, equally, it is possible that the coach may normalise certain negative behaviours, such as behaviours related to bullying, as inherent to sport culture

(Kowalski, 2017). For this reason, it is considered important that coaches receive training that goes beyond technical and tactical knowledge of the sport and that emphasis is placed on the physical, psychological and social development of the children and adolescents under their responsibility (Shannon, 2013). Specifically, in relation to training related to bullying, it is the coaches themselves who state that they have insufficient competences on the subject (Flores et al., 2020). Moreover, the problem is exacerbated when, in formative sport, these coaches are volunteers who lack solid pedagogical training (Kowalski, 2017).

It is important for the coach to act preventively when bullying situations arise, as well as to promote a positive and inclusive climate within the group of athletes (Nery et al., 2020). Similarly, it is necessary to promote a cooperative orientation towards the activities that are proposed in training (Shannon, 2013) and to participate in improving communication between all sporting agents (Nery et al., 2020). In the school setting, the way teachers define the phenomenon of bullying and the different forms it can take has been identified as a key element in its prevention and one that influences the way it is dealt with (DeOrnellas & Spurgin, 2017). Given the lack of research in this line in the field of sport, the objectives of this research were, on the one hand, to assess the knowledge of formative sport coaches on bullying in terms of its conceptualisation (definition and typologies) and, on the other hand, to analyse the preventive strategies they knew.

## Methodology

### Participants

The sample consisted of 161 coaches ( $n = 122$  - 75.8% men - and  $n = 39$  - 24.2% women) from 24 different sporting areas, first year students of Physical Activity and Sport Sciences Degrees (CCAFD) at the National Institute of Physical Education of Catalonia (INEFC), Barcelona centre (University of Barcelona). These were the inclusion criteria for selecting participants: (1) they needed to be active coaches of athletes in their formative years (6-16 years old), (2) they needed at least one season of coaching experience and (3) they needed positive informed consent. The age range of the sample was between 17 and 41 years ( $M = 20.3$  years,  $SD = 3.15$ ), with an average coaching experience of 2.7 seasons ( $SD = 1.72$ ), 55.3% had an official coaching qualification from the corresponding federation.

The Clinical Research Ethics Committee of the Catalan Sports Administration approved the study (009/CEICGC/2021).

## Instruments

A questionnaire that had been *ad hoc* divided into two sections was used. The first collected socio-demographic data of the participant (age, gender, qualification, experience and type of sport of coached) and the second presented the following open questions, which aimed to collect information in three areas from the objects of study: "How would you define bullying", "What types of bullying exist" and "What strategies do you use to prevent bullying in sport? An open-ended data collection methodology was used, in line with previous studies in the school setting (Naylor et al., 2006).

## Procedure

Prior to completing the questionnaire, participants were informed of the purpose of the study, the voluntary nature of the study, anonymity and confidentiality in the analysis of the data. Participants completed the questionnaire individually using the SurveyMonkey® platform at INEFC Barcelona, with the research team present.

## Data analysis

A content analysis for the three question areas was carried out following the phases established by Bradin (1986). For the first area, an analytical-deductive approach was used (Martínez, 2004), coding responses according to the identification of the key concepts of the definition of bullying: a) *repetition*, b) *intent to harm* and c) *power imbalance* (Olweus, 1994). Category d) *consequences on the victim* was added due to the observation of the presence of actions linked to that category. Finally, a text search frequency query (Bryman, 2008) was conducted and four new categories were created: e) *harassment*, f) *discrimination*, g) *mistreatment* and h) *abuse*. The second area encompassed the study of the typologies of bullying, which were organised into a) *physical bullying*, b) *verbal bullying* c) *social bullying* and d) *cyberbullying* (Menesini & Salmivalli, 2017; Smith, 2019). After consulting the text search frequency (Bryman, 2008), category (e) *psychological bullying* was included, as well as the typification criteria according to f) *reasons for bullying* and according to g) *place where bullying occurs*. The third area concerned preventive strategies for the phenomenon of bullying. It was carried out using an inductive approach, which facilitates the analysis of the categories that appeared during the study, without prior assumptions (Martínez, 2004). Responses were coded according to: a) *promoting a positive climate*, b) *communication*, c) *observation*, d) *awareness-raising*, e) *emotional education*, f) *regulation* and g) *conflict intervention*.

The Atlas.ti programme version 9® was used for coding. Responses from or to the same participant could fall into several categories described in each of the areas. The allocation of participants' responses to the different categories for further analysis was carried out with the participation of two expert researchers. The Kappa index was used to evaluate the inter-rater reliability, which, according to Landis & Koch (1977), yielded excellent agreement values (.845 for definitions, .932 for typologies and .854 for prevention strategies). For the quantitative analysis of the data, SPSS version 21® was used. The frequencies (%) of the responses in each of the categories were calculated, as well as the Chi-square test for the analysis of contingencies between the corresponding categories with respect to gender and the sports qualifications of the coaches, taking as a reference a significance level of  $p < .05$ .

## Results

### Definition of the phenomenon of bullying

60.9% of the participants did not name any of the three key concepts (*repetition*, *intent to harm* and *power imbalance*), 35.4% referred to one of the key concepts, 3.7% to two concepts and none of the participants named all of the key concepts. According to the number of key concepts named, no statistically significant differences were observed in any category, neither in relation to the gender of the participants nor to the degree they held. The most frequently named key concept was *intent to harm* with 16.8%, and with statistically significant differences in relation to gender (20.5% male versus 5.1% female;  $\chi^2(1.161) = 5$ ;  $p = .025$ ). In this case, explicit reference was made to the aggressor's aim with his/her actions ("aim to", "intention to", "intentionally"). 13% of the coaches referred to the key concept of *repetition*, referring to "continuous behaviour" or doing something "constantly". In addition, 13% of the coaches mentioned the key concept *power imbalance*, referring to the consequence of the behaviour ("making someone feel inferior", "making someone feel inferior to the group"), to the motive of the aggressor ("showing superiority") and others referred to this power imbalance as a characteristic of the person being victimised, probably due to a previous hierarchisation of the peer group ("weaker individual"). 11.2% of the respondents alluded to the consequences suffered by the person being victimised in their definition. These consequences are linked to effects on the person in general ("negatively affecting one's way of being or living"), negative feelings ("loneliness", "vulnerability",

"sadness"), mental disorders ("depression") and other serious general consequences. However, in no case was reference made to the consequences that other actors involved might experience, naming only the effects on the person who is the victim of bullying. 26.7% of

coaches used the same concept of bullying to describe it. Bullying was also referred to as a form of *discrimination* (15.8%), *mistreatment* (11.8%) and *abuse* (8.1%). Table 1 provides concrete examples of definitions for each of the categories.

**Table 1**

*Categories of the definition of bullying and coaches' responses justifying them.*

| Categories                  | Responses from participants  |
|-----------------------------|--|
| Repetition                  | "To belittle another person on a continuous basis" (basketball coach)  |
|                             | "When a person is constantly subjected to criticism, mockery, derogatory comments from peers" (football coach)   |
|                             | "Bullying is the constant harassment of a person for no reason" (swimming coach)   |
| Intent to harm              | "For me, bullying is when a child or group of children aim to tease or make fun of a peer" (padel coach)   |
|                             | "The intention to cause a negative effect on a person or groups of people, thus making them feel bad or unhappy with themselves or with life" (athletics coach)  |
|                             | "A way of intentionally harassing and hurting people" (multi-sport activity coach)   |
| Imbalance of power          | "It is the act of humiliating a person and making them feel inferior" (basketball coach)   |
|                             | "Bullying for me is acts of exclusion by one child or several children to another child making him/her feel inferior to the group" (basketball coach)  |
|                             | "Showing superiority over another person as a motive for personal satisfaction" (multisport activities coach)  |
| Consequences for the victim | "Is a situation of rejection of a specific person that negatively affects their way of being or living, be it through verbal harassment, physical harassment, etc." (football coach)   |
|                             | "A set of actions, usually directed from a group to a single person, that provoke feelings of loneliness, contempt, vulnerability, sadness, and even depression in the latter. The biggest effect it has on the person who suffers from it is lack of self-esteem, due to the influence of offensive behaviour and words from peers" (multisport activities trainer) |
|                             | "Abuse by a person or group towards a person or group that creates a state of discomfort for the victim and can affect them psychologically with serious consequences" (swimming coach)  |
| Harassment                  | "Bullying is physical or psychological harassment that is carried out on a continuous basis towards an individual" (athletics coach)   |
|                             | "Harassment of a person by one or more persons, both physically and psychologically" (artistic gymnastics coach)   |
|                             | "It is harassment by a person or a group of people towards another individual" (basketball coach)  |
| Discrimination              | "Discrimination by a group or a person against another person because of some weakness that makes him or her vulnerable" (rugby coach)   |
|                             | "Bullying is the discrimination by one or more persons against another person or persons, either physically or verbally, causing negative effects on the person who suffers it" (football coach)   |
|                             | "Discrimination and marginalisation of another individual by a person or group of people" (roller hockey coach)  |
| Mistreatment                | "Physical or psychological abuse, by any person or group of persons, of another person, in any situation. It includes making jokes in bad taste, disrespect, discomfort, insults, etc." (football coach)   |
|                             | "Abuse, both psychological and physical, to another person" (basketball coach)   |
|                             | "Psychological and physical abuse, by an individual or a group, of a 'weaker' individual" (basketball coach)   |
| Abuse                       | "Abuse by a person or group towards a person or group that creates a state of discomfort for the victim and can affect them psychologically with serious consequences" (swimming coach)  |
|                             | "Abuse, by one person or group, of another who is believed to be inferior" (acrobatics coach)  |
|                             | "Physical or psychological abuse" (indoor football coach)  |

## Typologies of bullying

25.5% of the sample did not mention any of the four bullying typologies of reference (*physical, verbal, social and cyberbullying*). 56.5% of the sample mentioned physical bullying, 32.9% cyberbullying, 23% verbal bullying and 13.7% social bullying. In relation to gender, statistically significant differences were only obtained in the typology of social bullying, with a higher frequency of responses among female coaches (25.6% vs. 9.8% ;  $\chi^2_{(1,161)} = 6.26; p = .012$ ). Regarding the number of typologies referred to, 39.8% mentioned only one typology, 19.9% two, 13% three and 1.9% mentioned all four. In relation to other typologies of bullying, it should be noted that 44.1% of the coaches referred to "psychological" bullying, 15.3% mentioned typology according to the place where these behaviours took place ("school", "work", "sport") and 11.8% according to the reasons for bullying ("physical appearance", "gender", "religious background").

## Prevention strategies

83.8% of the coaches offered prevention strategies that were coded according to the categories outlined above: a) *promoting a positive climate*, b) *communication*, c) *observation*, d) *awareness-raising*, e) *emotional education*, f) *regulation* and g) *conflict intervention*. There were no statistically significant differences in terms of prevention strategies offered in relation to gender or the possession of a sports qualification. 61.5% of the total responses fell into a single category, 21.7% into two categories and 0.6% of the responses referred to three preventive categories. 16.2% of the responses did not fall into any of the categories, either because they left the question unanswered (11.2%), they explicitly specified that they did not know what to answer (1.9%), they referred to intervention rather than prevention strategies (1.9%) or they gave an answer that could not be included in any of the categories (1.2%). The results obtained for the categories analysed are presented below, and specific examples for each category are given in table 2.

### Promoting a positive climate

60.9% of the coaches commented on the importance of creating and promoting a positive climate among athletes. This work was established on the basis of organisational criteria for sporting activities and the inclusion of cooperative dynamics in the tasks proposed. Some highlighted the importance of dynamic group activities that go beyond the timetable, training and competitions. However, the development of competences was essential in achieving such a positive climate.

### Communication

Communication was mentioned by 14.3% of the respondents. For the coaches, it was important to organise personal meetings

with the athletes in order to understand the individual situation of each athlete, reinforcing coach/athlete trust. Communication with the athlete's environment, for example the family, was also mentioned.

### Observation

Observation of athletes' behaviours, as well as of the relationship dynamics that can be established between athletes, was considered a bullying prevention strategy by 7.5% of coaches. It was important to keep this in mind from the beginning of the season and during training in order to detect any signs that one of the athletes might feel uncomfortable in the group, or to detect potential aggressors. Being alert to any anomalous behaviour in the relationship dynamics between players was also stressed. Finally, for coaches, the changing room was one of the spaces that required special attention, as it was a space where they had less control.

### Awareness-raising

Awareness of the problem was mentioned by 5.6% of the coaches. Its aim was to increase athletes' knowledge about the issue of bullying and to raise their awareness of its importance. To this end, activities such as the organisation of talks with professionals on the subject or reflections using audiovisual resources were proposed.

### Emotional education

5.6% mentioned the relevance of preventive action based on the development of activities explicitly linked to emotional education. These activities were aimed at working on empathy, making athletes reflect on the occurrence of violent actions against each other. The importance of pedagogically managing competitive activities during training and reinforcing self-confidence among the players was also expressed.

### Regulations

5% of the coaches referred to establishing a policy as a preventive strategy. This regulation referred to the rules that regulated the internal dynamics among the group of athletes, in some cases involving the players themselves in its elaboration in order to reinforce acceptance and compliance with it. Other coaches did not explicitly refer to the drafting of written rules, agreed or not, but simply mentioned warning athletes of the consequences (punishments or penalties) if violent behaviour was witnessed.

### Conflict intervention

Finally, 3.1% of the coaches referred to the importance of taking action in the presence of conflicts, avoiding possible future bullying situations.

**Table 2***Categories of prevention strategies and coaches' responses justifying them.*

| Categories                   | Responses from participants   |
|------------------------------|---|
| Promoting a positive climate | <p>"Try to create as pleasant an atmosphere as possible for the relationship between colleagues" (football coach)</p> <p>"[...] always make teams and pairs so that everyone can get to know each other throughout the season" (acrobatics coach)</p> <p>"Extra-sports events for group members to interact as friends outside of training" (skating coach)</p> <p>"[...] to do trips, like camps" (football coach)</p> <p>"I make a lot of use of cooperative challenges and group dynamics where everyone's participation is required" (basketball coach)</p> <p>"Encourage respect, education, tolerance and helping others [...]". (football coach)</p> <p>"Ensuring that all the boys and girls in the team are included". (athletics coach)</p> |
| Communication                | <p>"Talk to the children individually to see what emotional situation they are in". (volleyball coach)</p> <p>"[...] I try to talk to each of my players once a day so that they can explain to me how they feel in the team [...]". (multisport activities coach)</p> <p>"[...] stay in contact with parents to find out, as soon as possible, about possible problems at home or at school that could lead to such behaviour". (football coach)</p>   |
| Observation                  | <p>"From the beginning, be attentive to any kind of situation and behaviour of the children [...]". (multisport activities coach)</p> <p>"Keep an eye on those who appear to be the aggressors". (football coach)</p> <p>"I pay a lot of attention to the way they behave towards each other [...]". (basketball coach)</p> <p>"I think it is important to observe at all times, both on and off the pitch [...] changing rooms are dangerous areas where there is not as much surveillance". (football coach)</p>  |
| Awareness-raising            | <p>"Give talks so that they can see what bullying actually is [...]". (football coach)</p> <p>"Awareness-raising talks [...]". (swimming coach)</p> <p>"Put on videos on these topics [...]". (football coach)</p>  |
| Emotional education          | <p>"Propose activities that allow them to get to know each other emotionally. Empathy and cooperation games to promote and develop emotional intelligence" (acrobatics trainer)</p> <p>"Empathy exercises to make them feel what their teammates feel in certain situations". (football coach)</p> <p>"[...] I ask them why they did it and how it might make the person they made the gesture or comment to feel". (skating coach)</p> <p>"Carry out activities that do not allow the continuous failure or triumph of any player". (Indoor football coach)</p>  |
| Regulations                  | <p>"I currently have an internal regulation; the players have accepted it and have made proposals.... It says that in case of any disrespect towards a teammate, the aggressor will be expelled [...]". (football coach)</p> <p>"Warn them that there will be a punishment if any bullying situation is provoked, as it is not right to do so". (tennis coach)</p>  |
| Conflict intervention        | <p>"I intervene if I see any verbal or physical fights and resolve them before they escalate". (martial arts trainer)</p> <p>"I call out any person who makes a disrespectful gesture towards another person, on or off the rink". (skating coach)</p>  |

## Discussion

The aim of this study was to evaluate coaches of formative sports' conceptualisation of the phenomenon of bullying, taking into account the basic elements of its definition as well as its taxonomic categorisation. The aim was also to find out what strategies they used to prevent bullying situations in the sporting context.

Generally, little agreement was shown in the definition of bullying among coaches, irrespective of whether or not they had a degree, as they based it on concepts related to violence, but without explicitly specifying the basic elements of the definition of bullying according to the literature (Olweus, 1994). Poor knowledge about the key elements of the definition was also observed by Baar & Wubbels (2013) in Dutch coaches. This fact may contribute to their negative management of bullying situations, as observed among teachers in the school context (Valdés et al., 2014). The only gender-related difference that was observed in the definition was the key concept of *intent to harm*, which appears more frequently among male coaches than among female coaches. In further studies, it would be interesting to investigate why these differences exist, perhaps by looking at elements of the moral atmosphere linked to the sporting environment. Some of the coaches included in the definition the consequences for health and well-being (sadness, loneliness, depression) that the victim may experience when in bullying situations, in line also with Baar & Wubbels (2013). However, none of the coaches made reference to the consequences that may develop for other actors, despite the fact that such acts have consequences for all involved (Menesini & Salmivalli, 2017).

In terms of bullying typologies, coaches clearly identified physical bullying, although it is not the most frequent bullying typology in the sporting environment (Mishna et al., 2019; Nery et al., 2020). However, cyberbullying, which currently has little presence in sport (Nery et al., 2020), was mentioned quite frequently by coaches as a typology of bullying. This may be due to the current growth of this new type of violence and concern about the problem (Smith, 2019). Regarding verbal bullying, its identification can be explained by the fact that coaches do not identify derogatory comments, insults, name-calling, etc. between players as bullying behaviours, as they become normalised within the traditional sport culture (Flores et al., 2020). As regards social bullying, it is worth noting that it was female coaches who mentioned this typology more than male coaches. This is related to the fact that more bullying behaviour occurs among girls, which causes them to be more sensitive towards coaches (Menesini & Salmivalli, 2017). Moreover, as indicated by Slattery et al. (2019), the conceptualisation of bullying can be directly conditioned by situations that have been experienced, either directly

or from observation. Psychological bullying, although not considered a typology of bullying, as all bullying behaviours have an implicit psychological component (Hernández & Saravia, 2016), was the second most mentioned typology by coaches. The coaches' conceptualisation of this typology needs to be analysed in more depth in order to understand the set of behaviours that are included in it.

Regarding preventive strategies for the development of bullying behaviours, part of the sample, regardless of whether they had a degree or not, did not offer any. This could be related to the lack of training on the phenomenon that coaches face (Flores et al., 2020). In addition to the technical or tactical dimensions of the respective sport, coach training courses should take into account the holistic development of young athletes (Kowalski, 2017).

Promoting a positive climate among the athletes was the most indicated strategy by the coaches, in line with Shannon's (2013) proposal. School is also a place where the promotion of a positive climate has been found to reduce the prevalence of bullying situations (DeOrnellas & Spurgin, 2017; UNESCO, 2018). It is important to promote this positive climate not only by proposing specific tasks in training, such as the development of cooperative games, but also by proposing extra-sports activities (camps, excursions, etc.), based on pedagogical models that promote the development of civic values and the prevention of violence (Mattey et al., 2014; Sánchez-Alcaraz et al., 2020). The way in which the grouping of athletes in different activities is established, as a preventive strategy, was also mentioned, understanding that, as in the school environment, the methodology used by the teacher to group athletes can become a catalyst for victimisation and exclusion (Healy, 2014). Coaches also mentioned communication, in line with the results obtained by Baar & Wubbels (2013), as a strategy to be taken into account, highlighting the two-way and positive relationship to be established between coaches and players (Nery et al., 2020). This communication aims to build trust with athletes, as a basic element for understanding the dynamics that a player may be experiencing inside or outside the sporting context (Nery et al., 2020), an aspect that has also been taken into account in the school context (DeOrnellas & Spurgin, 2017). It is also important to articulate good communication with families, due to their direct influence on the behaviour of children and adolescents, as they are a very important agent and of vital participation in programmes to address the phenomenon (Mattey et al., 2014; UNESCO, 2018). In relation to this, work on emotional education was considered by the coaches an appropriate strategy, as has been observed in the educational context with positive results (Méndez et al., 2019). Regarding observation and being alert to behaviours or relationship dynamics between players, the behaviours (signs and symptoms) that need to be observed were not

explicitly detailed, perhaps due to the few competences that stand out when it comes to identifying bullying situations (Kowalski, 2017). However, this observation should not only focus on players who may become victims, but also among potential aggressors, as well as on the general dynamics between athletes within the group. Nonetheless, the changing room was highlighted as the space where bullying situations were most present, as demonstrated in recent research (Flores et al., 2020; Kowalski, 2017; Nery et al., 2020). There was little reference to awareness-raising as a fundamental prevention strategy, although it is one of the basic pillars of any anti-bullying programme (Nery et al., 2020). There were also few references made by coaches to the development of regulations or coexistence codes in sports clubs as a preventive strategy, reaffirming the study by Stefaniuk & Bridel (2018), conducted in Canada to evaluate the presence of anti-bullying policies in various sports organisations, which found an absence of coexistence codes that provide explicit guidelines to prevent bullying. Therefore, it is necessary that the public administrations responsible for sports, as well as sports federations and clubs, promote regulations and codes of coexistence that include, among others, the issue of bullying. On the other hand, the use of punishment as a coercive measure to avoid possible bullying situations in the future was also mentioned, although, as has been demonstrated in the school environment, its effectiveness is low (DeOrnellas & Spurgin, 2017). Finally, some coaches linked the role of competition as a possible catalyst for bullying behaviour in formative sport and proposed strategies to reduce its value, in line with recommendations in the literature (Shannon, 2013).

Finally, it should be stressed that, although coaches play a very important role in prevention, it is important to address the issue across the board. From an ecological point of view, it is necessary to involve all the agents linked to the sports community: athletes, families, sports management, etc. (Nery et al., 2020).

As a possible limitation of the study, it should be noted that the coaches were students of Physical Activity and Sport Sciences Degrees. In the future, it would be interesting to analyse the knowledge and strategies offered by coaches who are not part of this group, as the level of education could become a variable to be taken into account. It would also be necessary to know whether the different preventive strategies they propose are actually applied in training and to assess their effectiveness.

## Conclusions

This study highlights the lack of knowledge on the part of formative sport coaches about the phenomenon of bullying in terms of the key elements in its definition (repetition, intention

to harm and power imbalance). In relation to the typologies of bullying, there is a clear identification of the category of physical bullying and cyberbullying, and verbal and social bullying are not identified very often. A typology that is often mentioned is psychological bullying, although it is not considered part of the taxonomies proposed by the literature. As far as prevention strategies are concerned, promoting a good climate in the group or team of athletes is frequently mentioned, although there are few proposals that go beyond this. In general, it is considered necessary to articulate training programmes among coaches where the conceptualisation of bullying and the dynamisation of preventive strategies to be carried out are addressed, either directly with the group of athletes or by proposing actions in their club or sport entity.

## Acknowledgements

Our thanks to all the coaches who participated in the study and to INEFC Barcelona.

## References

- Baar, P., & Wubbels, T. (2013). Peer Aggression and Victimization: Dutch Sports Coaches' Views and Practices. *Sport Psychologist*, 27(4), 380–389. <https://doi.org/10.1123/tsp.27.4.380>
- Bradin, L. (1986). *Análisis de Contenido*. Akal.
- Bronfenbrenner, V. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Bryman, A. (2008). *Social research methods* (3<sup>rd</sup> ed.). Oxford University Press.
- Castañeda-Vázquez, C., Moreno-Arrebola, R., González-Valero, G., Vicianá-Garófano, V., & Zurita-Ortega, F. (2020). Posibles relaciones entre el bullying y la actividad física: una revisión sistemática. *Journal of Sport & Health Research*, 12(1), 94–111. <http://hdl.handle.net/10481/58901>
- DeOrnellas, K., & Spurgin, A. (2017). Teachers' Perspectives on Bullying. In L. H. Rosen, K. DeOrnellas, & S. R. Scott (Eds.), *Bullying in School. Perspectives from School, Staff, Students, and Parents* (pp. 49–68). Palgrave Macmillan. [https://doi.org/10.1057/978-1-137-59298-9\\_3](https://doi.org/10.1057/978-1-137-59298-9_3)
- Flores, G., Prat, M., Ventura, C., & Ríos, X. (2020). 'I was always made fun of for being fat': first-hand accounts of bullying in children's football. *Physical Education and Sport Pedagogy*, 26(6), 1–13. <https://doi.org/10.1080/17408989.2020.1826918>
- Healy, S. (2014). Preventing Bullying in Inclusive Physical Education: Practical Strategies for Teachers. *Palaestra*, 28(2), 42–47.
- Hernández, R. M., & Saravia, M. Y. (2016). Generalidades del acoso escolar: Una revisión de conceptos. *Revista de Investigación Apuntes Psicológicos*, 1(1), 30–40. <http://repositorio.usil.edu.pe/handle/123456789/1682>
- Kentel, J. L., & McHugh, T. L. F. (2015). "Mean mugging": An exploration of Young Aboriginal Women's Experiences of Bullying in Team Sports. *Journal of Sport and Exercise Psychology*, 37(4), 367–378. <https://doi.org/10.1123/jsep.2014-0291>
- Kowalski, C. (2017). Coaches' Perspectives on Bullying. In L. H. Rosen, K. DeOrnellas, & S. R. Scott (Eds.), *Bullying in School* (pp. 135–158). Palgrave Macmillan. [https://doi.org/10.1057/978-1-137-59298-9\\_7](https://doi.org/10.1057/978-1-137-59298-9_7)
- Landis, J. R., & Koch, G. G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), 159–174. <https://doi.org/10.2307/2529310>
- Martínez, C. (2004). *Técnicas e instrumentos de recogida y análisis de datos*. Universidad Nacional de Educación a Distancia.
- Mattey, E., McCloughan, L. J., & Hanrahan, S. J. (2014). Anti-Vilification Programs in Adolescent Sport. *Journal of Sport Psychology in Action*, 5(3), 135–146. <https://doi.org/10.1080/21520704.2014.925528>

- Méndez, I., Jorquera, A. B., Ruiz-Esteban, C., Martínez-Ramón, J. P., & Fernández-Sogorb, A. (2019). Emotional intelligence, Bullying, and Cyberbullying in Adolescents. *International Journal of Environmental Research and Public Health*, 16(23). <https://doi.org/10.3390/ijerph16234837>
- Menesini, E., & Salmivalli, C. (2017). Bullying in schools: the state of knowledge and effective interventions. *Psychology, Health and Medicine*, 22, 240–253. <https://doi.org/10.1080/13548506.2017.1279740>
- Mishna, F., Kerr, G., McInroy, L. B., & MacPherson, E. (2019). Student athletes' experiences of bullying in intercollegiate sport. *Journal for the Study of Sports and Athletes in Education*, 13(1). <https://doi.org/10.1080/19357397.2019.1581512>
- Naylor, P., Cowie, H., Cossin, F., De Bettencourt, R., & Lemme, F. (2006). Teachers' and pupils' definitions of bullying. *British Journal of Educational Psychology*, 76(3), 553–576. <https://doi.org/10.1348/000709905X52229>
- Nery, M., Neto, C., Rosado, A., & Smith, P. K. (2020). *Bullying in Youth Sports Training*. Routledge. Taylor Francis Group.
- Olweus, D. (1994). Bullying at School: Basic Facts and Effects of a School Based Intervention Program. *The Journal of Child Psychology and Psychiatry*, 35(7), 1171–1190. <https://doi.org/10.1111/j.1469-7610.1994.tb01229.x>
- Olweus, D. (2006). *Conductas de acoso y amenaza entre escolares* (3a ed.). Morata.
- Sánchez-Alcaraz, B. J., Ocaña-Salas, B., Gómez-Mármol, A., & Valero-Valenzuela, A. (2020). Relationship between School Violence, Sportpersonship and Personal and Social Responsibility in Students. *Apunts Educació Física Esports*, 139, 65–72. [https://doi.org/10.5672/apunts.2014-0983.ES.\(2020/1\).139.09](https://doi.org/10.5672/apunts.2014-0983.ES.(2020/1).139.09)
- Shannon, C. S. (2013). Bullying in recreation and sport settings: Exploring risk factors, prevention efforts, and intervention strategies. *Journal of Park & Recreation Administration*, 31(1), 15–33.
- Slattery, L. C., George, H. P., & Kern, L. (2019). Defining the word bullying: Inconsistencies and lack of clarity among current definitions. *Preventing School Failure: Alternative Education for Children and Youth*, 63(3), 227–235. <https://doi.org/10.1080/1045988X.2019.1579164>
- Smith, P. K. (2019). Research on Cyberbullying: Strengths and Limitations. In *Narratives in Research and Interventions on Cyberbullying among Young People* (pp. 9–27). Springer International Publishing. [https://doi.org/10.1007/978-3-030-04960-7\\_2](https://doi.org/10.1007/978-3-030-04960-7_2)
- Stefaniuk, L., & Bridel, W. (2018). Anti-Bullying Policies in Canadian Sport: An Absent Presence. *The Journal of Park and Recreation Administration*, 36(2), 160–176. <https://doi.org/10.18666/jpra-2018-v36-i2-8439>
- UNESCO. (2018). School violence and bullying: Global status and trends, drivers and consequences. *UNESCO, Education Sector*.
- Valdés, Á. A., Estévez, E. H., & Manig, A. (2014). Creencias de docentes acerca del bullying. *Perfiles Educativos*, 36(145), 51–64. [https://perfileseducativos.unam.mx/issue\\_pe/index.php/perfiles/article/view/45973](https://perfileseducativos.unam.mx/issue_pe/index.php/perfiles/article/view/45973)
- Vveinhardt, J., Komskiene, D., & Romero, Z. (2017). Bullying and harassment prevention in youth basketball teams. *Transformations in Business and Economics*, 16(1), 232–251.

**Conflict of interest:** No conflict of interest has been reported by the authors.



© Copyright Generalitat de Catalunya (INEFC). This article is available at the URL <https://www.revista-apunts.com/en/>. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line. If the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>