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ARTICLE



The effects of modifying contact, duration, and teaching strategies in awareness interventions on attitudes towards inclusion in physical education

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ABSTRACT

This quasi-experimental study analyses the effects of an awareness intervention programme with five different branches designed to improve the attitudes of physical education (PE) students towards the inclusion of classmates with disabilities. The contact (yes/no) and its frequency (×1 vs. ×3) with para-athletes, the duration of the programme (1 vs. 6/7 sessions), and the provision of teaching strategies and materials (yes/no) were manipulated. The study involved 603 students aged 14–19 from five public educational centres in southern Spain. Attitudes were assessed pre- and post-intervention with the Spanish version of the Children's Attitude towards Integrated Physical Education (general and specific subscales) and the Scale of Attitudes towards Students with Disabilities in PE. The three groups having contact with para-athletes during the interventions improved in the three attitude variables ($p < 0.05$; $-0.20 < d < -0.24$). Pairwise comparisons of the improvement ratios also revealed several positive effects of the intervention duration and provision of teaching strategies ($p < 0.05$; $-0.07 < d < 0.18$). These findings could assist PE teachers in educating students to improve their knowledge and attitudes towards people with disabilities, having different strategies and resources to conduct awareness interventions based on para-sports in their regular PE classes.

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Introduction

Ensuring equal opportunities at all levels of an inclusive education system and lifelong learning represents the achievement of educational rights for persons with disabilities (United Nations 2009). The inclusive education concept is defined as 'an ongoing process aimed at offering quality education for all, while respecting diversity and the different needs and abilities, characteristics and learning expectations of the students and communities' (UNESCO 2008, 18). Inclusive education promotes friendships among students with and without disabilities as well as improving adolescents' socio-moral competencies (Grütter, Gasser, and Malti 2017). Within the Spanish educational system, students with special education needs (i.e., hearing, visual, physical, or neurodevelopmental disorders),

represent 2.3% of the students included in general education schools (MEFP 2019), increasing to 2.7% in the region where this study was conducted.

From a social learning point of view, attitudes can be understood as the result of the interaction between personal-, environmental-, task- or activity-specific factors; each contribute to behavioural intentions and ultimately to the resulting behaviour (Ajzen 1991). Attitudes towards students with disabilities are considered a key factor for inclusion (De Boer et al. 2014). Interventions aimed at increasing children's disability awareness within mainstream classrooms can help improve knowledge, attitudes, and acceptance of people with disabilities (Columa et al. 2009; McKay, Block, and Park 2015). There have been a wide variety of formats of disability awareness interventions, including providing information about disabilities, videos, drama, theatre and puppet shows, discussions, stories, simulations, structured interactions, and classroom activities, amongst others (Lindsay and Edwards 2013). Because PE classes present an opportunity for improving student attitudes towards and knowledge of individuals with disabilities, sports-based inclusive awareness programmes in PE should be promoted to foster better relationships (Campos, Ferreira, and Block 2014).

Lindsay and Edwards (2013) conducted a systematic review to develop recommendations for designing programmes aimed at changing attitudes towards disabilities, knowledge of disability, and acceptance of peers with disabilities. These authors classified the type of interventions based on: (1) social contact, where children are exposed to a person with a disability; (2) simulation-based interventions, where students experience how it would be to have a disability; (3) curriculum-based interventions; (4) multi-media curriculum using videos to explain para-sports; and (5) multi-component interventions, combining the abovementioned strategies. This study combines four of these strategies to improve attitudes towards people with disabilities in PE settings:

- (1) *Contact with People with Disabilities*. According to Allport's Contact Theory (1954), under the right conditions (i.e., equal status, cooperation, common goals, and support from authority), contact with people different from oneself will lead to an attitude change. Allport theorised that as people encounter others different from themselves, their prejudiced ideas would diminish as they come to understand the other person (McKay 2018). Several studies conclude that sharing PE sessions with a student/person with a disability creates positive attitudes towards inclusion of students with disabilities (Liu, Kudláček, and Ješina 2010; McKay, Block, and Park 2015). Both direct (i.e., interacting personally with an 'in-group' peer with a disability) and indirect (i.e., knowing an 'in-group' member who has some relationships with an 'out-group' member with a disability; imagining a positive interaction with a person with a disability; or being exposed to out-group members through their portrayal/testimony or interview in media such as video) contact is effective at improving children's attitudes towards individuals with disabilities (Armstrong et al. 2017). A well-structured interaction would help students with disability experience successful inclusion at school, such as being perceived as members of the class, interacting with peers, and feeling part of the group (Reina et al. 2019). Pettigrew and Tropp (2006) stated that when participants experience carefully structured contact situations where Allport's four conditions are met, the positive benefits of intergroup contact are enhanced.

- (2) *Simulation as an Awareness Strategy for Inclusion.* Disability simulation activities are often designed and implemented by outsiders (e.g., physical educators without impairments) to reflect the experiences of insiders (e.g., PE students with impairments) (e.g., Leo and Goodwin 2016). This teaching strategy has received some criticism because the insider perspective is omitted from the design, or it assumes that individuals without impairments will acquire meaningful insights into the lives of insiders by participating in temporally short and contrived activities (Leo and Goodwin 2014). However, there are some PE studies where simulations contributed to improving students' attitudes towards inclusion (Reina et al. 2011; Campos, Ferreira, and Block 2014; McKay, Block, and Park 2015; Pérez-Torralba et al. 2019).
- (3) *Duration of Curriculum-based Interventions.* According to Lindsay and Edwards (2013), there is no clear recommendation for best practices using a curriculum-based intervention to influence attitudes towards children with disabilities. When designing awareness programmes to improve the inclusion process, the duration of the intervention represents a variable to consider (Brown et al. 2011). For example, the Paralympic School Day (PSD), developed by the International Paralympic Committee (IPC, 2006), is a programme to raise awareness and understanding in schools about persons with disability while promoting a platform for attitude change (McKay 2013). Participants interact with and purposefully learn from para-athletes, varying their perceptions from otherness (e.g., physical limitations or inferiority) to similarities between the athletes and themselves (McKay, Haegele, and Block 2018). In PE contexts, few studies have implemented the PSD as a single-day activity to influence children's attitudes through a range of Paralympic activities (Liu, Kudláček, and Ješina 2010; Panagiotou et al. 2008; Xafopoulos, Kudláček, and Evaggelinou 2009). Other studies have implemented interventions lasting from 2-session/1-week (Campos, Ferreira, and Block 2014; Obrusníková, Válková, and Block 2003) to 6-session/3-weeks (Reina et al. 2011; Pérez-Torralba et al. 2019). To the best of the authors' knowledge, only the study by Reina et al. (2011) analysed how the duration of the programme (including contact) might lead to an improvement in attitude. Though some studies have proposed periods from a two-hour intervention (e.g., Krahé and Altwasser 2006) to a twenty-session programme (Slininger, Sherrill, and Jankowski 2000), there does not seem to be a consensus as to how long the programme/contact has to be for an effective attitude change intervention.
- (4) *Teaching Resources to Deliver Awareness Interventions.* Multi-media interventions (i.e., presentations, movies, and/or class activities) are effective in improving attitudes towards peers with disabilities (Lindsay and Edwards 2013). Besides, Kurniawati et al. (2017) found that teaching strategies (e.g., peer support or cooperative learning) of regular schoolteachers play a key role in realising inclusive education. Hutzler et al. (2019) also identified some factors that practitioners should be aware because of its potential influence in the inclusion process, including their professional and academic training towards inclusion, or school environmental factors such as a process rather than performance orientation.

This study aims to discern an optimal combination of factors to build an effective awareness programme to improve attitudes towards inclusion in PE students. Curriculum-

based activities using simulation in the PE students' natural settings were used, and the following variables were manipulated: (a) the contact (and its frequency) with para-athletes during a para-sport based educational intervention; (b) the duration of the programme; and (c) the provision of teaching strategies and materials for the students. Combining these variables, five branches of the awareness programme were designed and implemented in five different educational centres. Consequently, it was hypothesised that (1) contact during the awareness interventions would improve their attitudes towards peers with disabilities in PE more than those without contact; (2) longer interventions in terms of both duration and frequency would improve attitudes to a greater extent; and (3) using teaching strategies and materials for the students would positively affect the attitudes towards inclusion.

Method

Participants and settings

A convenience sample of 603 PE students from five educational centres took part in this study (see Table 1). All the centres were public and located in suburban areas in the southeast region of Spain. They were selected on the basis of (a) permission received by the education board; (b) proximity to the research group and para-athletes; and (c) the commitment of the PE teachers to deliver the whole intervention in their natural school setting. Depending on their assigned group, students received between two to seven lessons in their compulsory PE classes (twice a week), with a duration of 55 min per session. When the study was conducted, no students with disabilities were enrolled in any of the 21 PE classrooms where the programme was delivered. The programme alternatives were implemented in cooperation with three female and two male teachers, aged 30–49 years (41.80 ± 8.70 yrs.) and with a PE teaching experience of 8–23 years (16.80 ± 7.19 yrs.).

Study design

This quasi-experimental study used a pre-post design, with five natural groups. The awareness intervention programme consisted of five alternatives based on the following factors: (1) contact with para-athletes during the intervention; (2) the duration of the awareness programme; and (3) using teaching strategies such as videos and infographic materials (see Figure 1). Three Paralympic sports were used in the design of the intervention options: boccia, five-a-side football (for blind and visually impaired athletes), and

Table 1. Descriptive data for the five natural groups in this study.

Intervention Groups	N Students/Educational groups	Boys		Girls	
		N	Age	N	Age
Group 1 (CAS+ISC)	125/4	66	15.76 \pm 1.12	59	15.83 \pm 1.04
Group 2 (CAS+PDS)	122/4	71	15.48 \pm 1.00	51	15.27 \pm 1.11
Group 3 (PDS)	113/4	62	16.58 \pm 0.84	51	16.35 \pm 1.11
Group 4 (CAS)	103/4	48	15.92 \pm 0.90	55	16.00 \pm 1.24
Group 5 (ACG)	140/5	68	16.06 \pm 0.88	72	16.24 \pm 1.03

CAS: Curriculum Awareness Sessions, ISC: Inside-Session Contact, PDS: Paralympic Day Session, ACG: Active Control Group

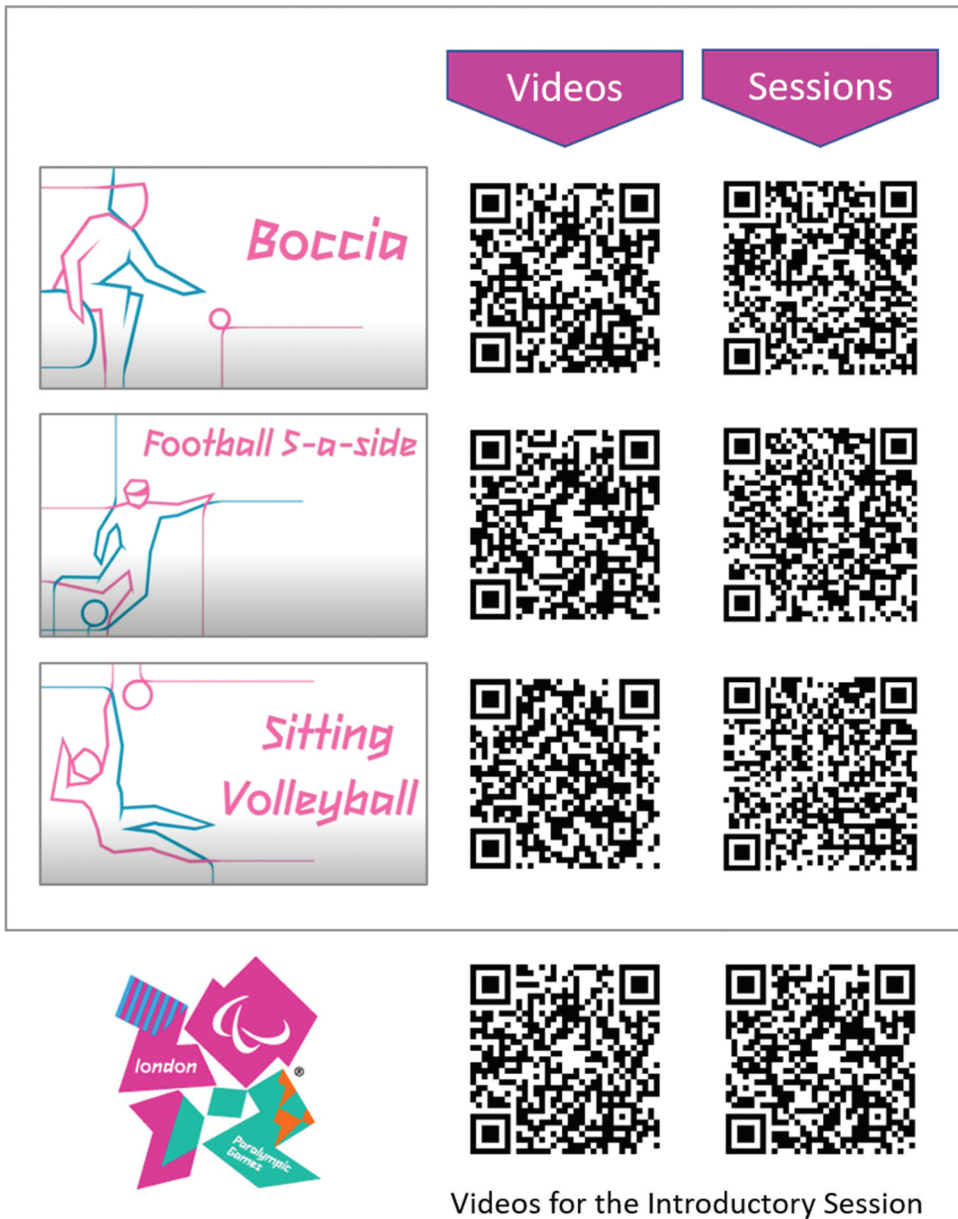


Figure 1. Multimedia and teaching tasks used during the interventions.

sitting volleyball. To find the optimal combination of factors, the authors designed five specific interventions (i.e., levels of the independent variable, and one per educational centre; see Table 2): (1) Curriculum Awareness Intervention (CAS) + Inside-Session Contact (ISC); (2) CAS + Paralympic Day Session (PDS); (3) PDS; (4) CAS; (5) Active Control Group (ACG). The specific interventions were randomly allocated to the five physical educators.

Table 2. Description of the awareness and information techniques used.

Group	Sessions	Weeks	Contact with para-athlete	Materials for students	Intervention structure
CAS+ISC	7	4	Yes (x3)	Yes	<ul style="list-style-type: none"> ● Session 1: pre-test + videos. ● Two-sessions per para-sport (2-to-7) ● Contact with para-athletes in sessions 3, 5, and 7.
CAS+PDS	8	4	Yes (x1)	Yes	<ul style="list-style-type: none"> ● Session 1: pre-test + videos. ● Two-sessions per para-sport (2-to-7) ● Session 8: Paralympic Day with three playing areas (one per para-sport) and having contact with the para-athlete for 15 min each.
PDS	2	1	Yes (x1)	Yes	<ul style="list-style-type: none"> ● Session 1: pre-test + videos. ● Session 2: Paralympic Day with three playing areas (one per para-sport) and having contact with the para-athlete for 15 min each.
CAS	7	4	No	Yes	<ul style="list-style-type: none"> ● Session 1: pre-test + videos. ● Two-sessions per para-sport (2-to-7)
ACG	6	3	No	No	<ul style="list-style-type: none"> ● Two-sessions per para-sport (1-to-6)

CAS: Curriculum Awareness Sessions, ISC: Inside-Session Contact, PDS: Paralympic Day Session, ACG: Active Control Group

Procedures

Before the beginning of the study, ethical approval from the principal investigator's home university was granted. Afterwards, the researchers contacted the five PE teachers to obtain their consent to participate in the study and explain the specific intervention they would implement during their regular PE classes. The schools and the institutions granted the necessary permissions, and informed consent letters were sent/given to students and their parents for approval.

Four of the five PE teachers were trained together across three sessions before the programme implementation. First, teachers watched two videos about the highlights and legacy of the London Paralympic Games. Then they were asked several questions to discuss what they thought after watching the videos (e.g., *'Do you think the athletes of the video had a good PE experience when they were at school?'*). After intervention assignments, the teachers could share their thoughts about which one they could develop at their educational centres. After a self-reflection, the second session consisted of explaining to them every detail about each intervention (see [Table 2](#)) and double-checking that they were able to implement it (e.g., schedule, facilities and equipment availability, students' profile, participating para-athletes). When all this information was clear, the four teachers received guidance specifically designed for every type of intervention the investigators had previously prepared. Sessions also detailed the motivational strategies to be used during interventions to promote a task-involving climate (Ames 1992), that is, TARGET: (a) Tasks and activities (e.g., cooperative games); (b) Authority (i.e., letting students make their own decisions); (c) Recognition, punishment, and rewards (i.e., equal participation and feedback); (d) Group (i.e., flexible and heterogeneous grouping); (e) Evaluation (i.e., considering personal progress); and (f) Time (i.e., giving opportunities and time to progress). During the third session, they shared their reflections about the designs (e.g., specific equipment and logistics required to deliver the programme), and the teachers helped to define details about the awareness lessons (e.g., weekly schedule to ensure the contact with the para-athletes). The fifth teacher led the ACG and as such did not participate in the training sessions. Instead, this PE teacher received only the six-sessions awareness programme to implement with the students (i.e., no videos or infographics, nor contact with para-athletes), but was supported by the research staff during its implementation.

The questionnaires were given to the participating students before (pre-test) and after (post-test) the corresponding intervention, a period lasting from a minimum of two to a maximum of four weeks (see [Table 2](#)). The students' anonymity was guaranteed by a codifying system designed by the authors in collaboration with the PE teachers. Before starting each intervention, each PE teacher (except the one for the ACG) applied the introductory session. This first session included the pre-test, two videos about the Paralympic Games (i.e., *'Sport Doesn't Care Who You Are'* and highlights of a Paralympic Games), several questions related to each video (e.g., *'What disabilities do you think the athletes that appear on the video have?'*) to work within the awareness process, an infographic flyer for each student with the essential information of each of the three Paralympic sports used for the interventions, and three explanatory videos about each para-sport (boccia, sitting volleyball, and football five-a-side). All the information and documents related to the study implementation can be located at [Figure 1](#) (access to each supplementary material requires a QR Code Scanner).

Measurements

Two questionnaires with inverse items were used to assess the attitudes of PE students towards the inclusion of peers with disabilities. First, the Children's Attitude towards Integrated Physical Education–Revised (CAIPE-R; Block 1995), translated and validated to the Spanish (CAIPER-S) context by Ocete et al. (2017). The CAIPER-S includes a description of a student with a visual impairment and a vignette representing her/his participation in PE (i.e., a blind person requiring a stick for orienteering her/himself in the space), followed by six statements about her/his inclusion in the PE classroom (e.g., *'It would be nice to have María/Carlos in physical education class'*) and four statements regarding possible adaptations in team sports (i.e., football) that would promote the inclusion of this student (e.g., *'María's/Carlos's goals may score two points'*). Participants express their level of agreement or disagreement with each statement on a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) where higher scores on the scale suggest a favourable attitude. Ocete et al. (2017) obtained Cronbach's reliability scores of 0.74 and 0.78 for the general and specific subscales of the CAIPER-S, respectively.

Second, the Scale of Attitudes towards Students with Disabilities in Physical Education (EAADEF; Iñiguez-Santiago et al. 2017) is a short scale that is invariant to several socio-demographic variables, such as gender, previous participation in inclusive activities, have a family member with a disability and having had previous contact with a classmate with a disability. The questionnaire begins with the statement *'In the subsequent scenarios, a person with a disability ...'*, followed by four statements about the behavioural (i.e., actions) component of the attitude (e.g., *'I prefer not involving a person with a disability in my team'*). The participants answered on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) where higher scores suggest a less favourable attitude towards inclusion of peers with disabilities in PE. Cronbach's reliability score for this scale was set at 0.77.

Data analysis

The ratio of valid pre-post questionnaires was 94.7%. Those with blank responses in any item/survey or which did not include pre- or post-measurements were excluded from the data analysis. Since the five interventions were conducted with natural groups, significant between-group differences were observed in the pre-intervention scores ($p < 0.05$) for the three variables of the attitudes (i.e., CAIPER-S general and specific subscales, and EAADEF). Thus, the effect of the intervention was assessed for each of the five groups by ANOVA for repeated-measures data. Another repeated-measures ANOVA was conducted that included the pre- and post-intervention measurements as a within-groups factor and each specific intervention as a between-groups factor. Tukey's post-hoc analysis was used for multiple comparisons between intervention groups. Cronbach's alphas were also calculated for the three measurements of attitudes, both in the pre-test and the post-test measurements. In addition, Cohen's effect sizes (d) were calculated and interpreted as follows: ≥ 0.8 (large); < 0.8 and ≥ 0.5 (moderate); < 0.5 and ≥ 0.2 (small); < 0.2 (trivial) (Cohen 1988). All analyses were performed using SPSS version 24 (SPSS, Inc., Chicago, IL, USA).

Results

All the attitudes' variables revealed acceptable reliability scores, both in the pre- and post-intervention measurements, ranging from 0.67 to 0.85 (Table 3). Table 3 also shows the within-group differences from the repeated-measures ANOVA. The three groups having contact with para-athletes during the interventions (i.e., CAS+ISC, CAS+PDS, and PDS) improved their attitudes according to the scores of the three attitude variables ($p < 0.05$; $d = \text{small}$). Regarding the group using supporting materials for the PE students (i.e., CAS), attitude improved only for the CAIPER-S general subscale ($p = 0.049$; $d = \text{trivial}$). Lastly, for the ACG, a significant change in the attitudes towards inclusion was also observed for the CAIPER-S general subscale ($p = 0.037$; $d = \text{trivial}$) but changing to a lower attitudinal score.

The repeated-measures ANOVA revealed significant interactions between factors for the CAIPER-S general subscale [$F(4,598) = 4.61$; $p < 0.01$] and the EAADEF [$F(4,598) = 2.65$; $p = 0.03$], but not for the specific subscale of the CAIPER-S ($p = 0.64$). Table 4 synthesises the Tukey's pairwise comparisons to analyse the differential effects of the variables used to design the interventions: contact with a para-athlete during the intervention (yes vs. no), the frequency of that contact ($\times 1$ vs. $\times 3$ sessions), the duration of the intervention (1 vs. 6/7 sessions), and the provision of supplementary materials for the PE students (yes vs. no). Regarding contact, comparisons 3, 4 and 6 revealed differences ($p < 0.01$; $d < 0.29$) in favour of those groups where the contact took place (i.e., CAS+ISC or CAS+PDS vs. CAS or ACG). However, these differences were only obtained for the EAADEF scores and the CAIPER-S general subscale in comparison 3 (CAS+ISC vs. CAS) ($p < 0.01$; $d = -0.20$). About the frequency of the contact, having a similar duration of the intervention, comparison 1 (CAS+ISC vs. CAS+PDS) did not reveal significant differences for all the attitude variables. Comparisons 2 and 5 also revealed those groups that included contact and longer interventions (i.e., CAS+ISC or CAS+PDS) improved their attitudes to a greater extent than the group with a single PDS ($d < -0.19$). However, these differences were obtained for the EAADEF scores and the CAIPER-S general subscale (comparison 2, $p < 0.01$; comparison 5, $p = 0.08$). Lastly, comparison 7 evaluated the differential effects of using supplementary materials for the students and the training received by the PE teachers before the programme delivering. This comparison revealed that the ACG displayed worse attitudes after the programme (CAIPER-S general subscale, $p < 0.01$, $d = 0.18$; EAADEF, $p = 0.07$, $d = 0.17$).

Discussion

The proper combination of several components represents a key factor when looking for the success of awareness interventions (Lindsay and Edwards 2013). This study aimed to determine the most impactful way to promote the idea of inclusion (of students with disabilities) amongst 3rd–4th compulsory and 1st–2nd upper secondary PE students to positively impact their attitudes. Hence, the discussion is structured in accordance with the combination of factors that were used to deliver the five levels of the awareness intervention and to elicit the most significant change in attitude: that is, contact with para-athletes (yes/no), the frequency of contact (1x vs. 3x), the duration of the intervention (1–7 sessions), and the usage of complementary teaching materials (yes/no). This is followed by a general discussion on their effects on the students' attitudes and the study limitations.

Table 3. Within-group differences in the attitudes towards the inclusion of peers with a disability in physical education classes after the intervention.

Variable	Cronbach's α		Group	Pre-Test		Post-Test		F(df)	p	Cohen's d
	Pre-Test	Post-Test		M \pm SD	M \pm SD					
CAIPER-S General	0.80	0.85	CAS+ISC	2.92	0.59	3.04	0.62	-2.09 (124)	0.039*	-0.20
			CAS+PDS	3.10	0.59	3.22	0.61	-2.49 (121)	0.014*	-0.20
			PDS	3.28	0.57	3.42	0.51	-3.30 (112)	0.001*	-0.24
CAIPER-S Specific			CAS	3.32	0.48	3.31	0.57	0.20 (102)	0.844	0.02
			ACG	3.11	0.48	3.02	0.56	2.11 (139)	0.037*	0.19
	0.67	0.73	CAS+ISC	1.63	0.79	1.79	0.84	-2.10 (124)	0.038*	-0.21
			CAS+PDS	1.76	0.97	1.99	1.03	-2.75 (121)	0.007*	-0.24
			PDS	1.59	0.82	1.78	0.93	-2.20 (112)	0.030*	-0.23
EAADEF			CAS	1.68	0.89	1.88	1.00	-1.99 (102)	0.049*	-0.12
			ACG	1.79	0.93	1.86	0.92	-0.98 (139)	0.330	-0.07
	0.76	0.79	CAS+ISC	2.09	0.82	1.91	0.74	2.58 (124)	0.011*	0.22
			CAS+PDS	2.09	0.93	1.89	0.79	2.85 (121)	0.006*	0.22
			PDS	1.67	0.75	1.52	0.67	2.09 (112)	0.039*	0.20
			CAS	1.57	0.69	1.48	0.57	1.30 (102)	0.198	0.13
		ACG	1.74	0.63	1.75	0.67	-0.11 (139)	0.912	-0.02	

M: mean, SD: standard deviation, df: degrees of freedom, CAS: Curriculum Awareness Sessions, ISD: Inside-Session Contact, PDS: Paralympic Day Session, ACG: Active Control Group, * $p < 0.05$

Table 4. Tukey's post hoc comparisons between interventions.

	Pair Comparisons	Contact	Duration	Materials	CAIPER-S		EAADEF
					General	Specific	
1	CAS+ISC vs CAS+PDS	③ vs ①	□	□	No	No	No
2	CAS+ISC vs PDS	③ vs ①	⑥ vs ①	□	Yes**	No	Yes**
3	CAS+ISC vs CAS	③ vs	□	□	Yes**	No	Yes**
4	CAS+ISC vs ACG	③ vs	□	■	No	No	Yes**
5	CAS+PDS vs PDS	□	⑥ vs ①	□	No*	No	Yes**
6	CAS+PDS vs CAS	① vs	□	□	No	No	Yes**
7	CAS vs ACG	□	□	■	Yes**	No	No*

CAS: Curriculum Awareness Sessions, ISD: Inside-Session Contact, PDS: Paralympic Day Session, ACG: Active Control Group, □ = not different; ■/□ = different; ** $p < 0.01$; * $p < 0.10$

First, the contact with a para-athlete during the intervention is presented as a key element in improving attitudes towards people with disabilities; that is, the CAS+ISC, CAS+PDS, and PDS groups showed significantly better attitudes after each programme implementation than before. According to Allport (1954), the level of personal connection is significant to attitude change. McKay (2018) 'unpacked' the components of Allport's Contact Theory, namely equal status, cooperation, personal interactions, and support from authority. The three specific interventions noted previously included: (a) equal status since the PE students practised the three Paralympic sports from the 'perspective' of the para-athletes (i.e., seated for practising sitting volleyball, limiting the functioning of their arms to play boccia from a sitting position, or using visual-loss goggles when practising five-a-side football); (b) cooperation, because the intervention session was designed to promote a positive/task-involving climate in the PE class; and (c) personal interactions since the PE students played together with people with disabilities in their natural education setting. As mentioned by McKay (2018), working to align with these components of contact can enhance positive experiences, facilitating an inclusive culture and creating a platform for attitude change. Hence, contact between groups under optimal conditions could effectively reduce intergroup prejudices (i.e., attitudes) (Allport 1954; Pettigrew and Tropp 2006).

These outcomes also corroborate the findings by Armstrong et al. (2017), who concluded that the most effective type of contact appears to be extended contact (i.e., knowing a fellow 'in-group' member who has a close relationship with an 'out-group member') and direct contact (i.e., face-to-face interactions with individuals with disabilities) while programmes without contact would not improve one's attitude towards people with disabilities after the interventions (De Boer et al. 2014). Based on this, our first hypothesis would be accepted because those groups with contact during the awareness interventions have improved their attitudes towards peers with disabilities in PE compared to those without contact. In contrast, with regards to the frequency of the contact (i.e., CAS+ISC vs. CAS+PDS), similar improvements in all three outcome variables of attitudes towards inclusion in PE were found, so there was no significant difference for this between-groups comparison.

Second, the duration of the intervention also rises as a potential factor influencing the effect on the attitudes towards inclusion in PE. When comparing those groups with contact and long duration (i.e., CAS+ISC and CAS+PDS) vs. the group with contact but a short duration of the programme (i.e., PDS), we found significant differences for the EAADEF outcome and some higher improvements for those groups exposed to the six-

session intervention. Since all three groups improved their attitudes after the programme, this result is consistent with the study by Reina et al. (2011), who demonstrated that a 6-day programme was more effective than a 1-day intervention. Although other shorter programmes have also been effective (e.g., 3-day programme; Liu, Kudláček, and Ješina 2010), a 1-day intervention, including contact, would be enough to improve attitudes towards inclusion in PE (Tavares 2011). Compared with other 1-day interventions, which require more time for programme delivery (e.g., Paralympic School Day, 40 min per para-sport; McKay, Block, and Park 2015), the shortest intervention in the current study was constrained to the available time for the compulsory PE classes, that is, less time was available per Paralympic sport (i.e., approximately 15 min). Therefore, the second hypothesis of our study is partly accepted.

Third, two groups received the six-session programme (i.e., CAS vs. ACG) with the only differences being between the provision of teaching materials to the PE students and the pre-intervention training to promote a positive motivational climate. While the CAS group showed a trivial but significant improvement in their attitude scores (i.e., CAIPER-S specific subscale), the ACG deteriorated in the CAIPER-S general scale, revealing between-group differences for this variable. Comparing the design of the five specific interventions, only one lesson (i.e., the introductory session) differentiates the ACG from the other four alternatives. The authors' intended to understand whether the knowledge conveyed in the introductory session would influence the experience in the subsequent sessions, and thereby the success of the intervention. The way PE teachers implemented their classes might be positively related to their attitudes towards including students with disabilities in their PE classes (De Boer, Pijl, and Minnaert 2011). Accordingly, the ACG was the only group in the present study that exhibited a deterioration in some of the attitudes' outcomes after the programme. A recent study by Pérez-Torralba et al. (2019) that implemented an awareness programme using para-sports (i.e., boccia and goalball) for athletes with high support needs suggested that multimedia material and written and oral information influenced the improvement in attitudes. It is plausible to think that the provision of information of (probably) novel content for the PE students (i.e., Paralympic sports) would help their understanding of this educational content and the demands of people with disabilities, thus strengthening the link between knowledge and attitudes towards/acceptance of people with disabilities (Lindsay and Edwards 2013).

Teaching strategies and the learning conditions found within the PE setting have been identified as other key elements to implement in awareness programmes to improve attitudes towards the inclusion of people with disabilities by their peers without disabilities (Wilhelmsen and Sørensen 2017). Conversely, Armstrong et al.'s (2017) surmised that para-social contact using resources, such as videos, might be insufficient to improve children's attitudes towards disabilities. De Boer et al. (2014) stated that talking with the students about disabilities represents a first step in shaping their attitudes because this encourages them to think about disabilities. Therefore, only when students with and without disabilities learn to understand and appreciate each other can they work and progress together towards a better understanding (Schwab 2017). Although our third hypothesis would be partly accepted, the trivial improvements in the CAS group recommend taking this result with caution.

Finally, it is pertinent to consider the overall outcome of the effects of the different intervention alternatives on the three variables of attitudes towards inclusion. The

EAADEF is the variable that reported more significant differences in the pairwise comparisons (i.e., 6/7), compared with the general (4/7) and the specific (0/7) subscales of the CAIPER-S. Because different strategies were employed in the present study, it is plausible to think that a general measurement of the attitudes of students towards inclusion in PE would work better than a specific measurement. Overall, the five groups reported higher attitude scores in the general subscale. This mirrored the findings of Hutzler and Levi (2008), who used a sample of 120 high-school students (who were therefore of a similar age to those in the present study). Other studies using the original or an adapted version of the CAIPE-R (Block 1994) found differences for the general subscale but not the specific subscales (Liu, Kudláček, and Ješina 2010; Panagiotou et al. 2008; Xafopoulos, Kudláček, and Evaggelinou 2009). One explanation for these results could be the role of the vignette at the beginning of the questionnaire, including different sports such as baseball (Block 1994) or basketball (Hutzler and Levi 2008; Ocete et al. 2017; Panagiotou et al. 2008), but these interventions included activities such as sledge hockey, wheelchair mobility (non-sport specific), or boccia. If the PE students must think about a situation of inclusion throughout the vignette, it might be difficult to improve attitudes about specific statements without real experience in those situations. In our study, the three Paralympic sports were for people with visual impairments (five-a-side football), severe physical impairments (boccia), and lower limbs impairments (sitting volleyball), while the vignette only included one scenario. For this reason, it is plausible to think that the improvements in the attitudes were best measured by the EAADEF.

Several study limitations should be mentioned. First, the PE students belonged to natural groups, and their initial level of attitude was not possible to control, so their attitude score baseline varied. For this reason, individual ANOVAs for repeated measurements were conducted, using Tukey's post-hoc analysis to compare the ratios of improvement between groups. Second, the programme alternatives were implemented in different education centres by different PE teachers, which led to some variability in delivery. Therefore, the different interventions should be tested in other education centres for better external validity. Third, the CAIPER-S survey includes a vignette of a person with a visual impairment, which would bias the responses because the awareness programme also included para-sports (i.e., boccia and sitting volleyball) for people with physical impairments. Fourth, including a sixth group as a true or passive control group (i.e., no intervention) would provide a better understanding of the intervention effects, and this should be considered in further research. The authors did attempt to control contact, duration, and teaching strategies across the five groups during the preparatory training of the physical educators before programme delivery. Fifth, although the specific interventions were delivered in different educational centres, involving the physical educators in an interactive pre-intervention training would have impacted their teaching styles. Sixth, and finally, a follow-up test should be considered in future studies to check if the changes are maintained over time, and to discern further between attitudes and intentions towards inclusion.

Conclusions and future research

This study contributes to the literature by analysing the differential effects of the contact with para-athletes, the contact frequency, the duration of the intervention, and the use of

teaching strategies on the PE students' attitudes towards students with disabilities. All the intervention alternatives were conducted in the natural settings where PE takes place, providing ecological validity to this study. Contact with people with disabilities (i.e., para-athletes) seems to be the key factor when designing a successful programme to improve PE students' attitudes towards individuals with disabilities. However, contact variables such as the time of exposure, the quality of that contact, and personal interactions with the person with a disability require further research. Further work could also focus on analysing the impact of novelty on those students who had never experienced any type of contact (direct or indirect) with people with disabilities.

There is no singular solution to inclusion within PE classes, but rather it is a combination of actions (e.g., becoming reflexive) that supports this process. A multi-layered approach could make a difference in how all the students in class experience inclusion, including those students positioned as 'disabled' (Petrie, Devcich, and Fitzgerald 2018). Having in mind the work of McKay, Park, and Block (2017), future research should apply a fidelity criteria instrument to measure the contact theory, seeking to control and explain how the interventions, including contact, satisfied the four components of the Contact Theory.

Disclosure statement

No potential conflict of interest was reported by the authors.

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