



## Metric invariance and psychometric properties of assessment of attitudes toward inclusion of students with disabilities (AISDPE) in Physical Education

*Propiedades psicométricas e invarianza métrica de evaluación de actitud hacia la inclusión de estudiantes con discapacidad (AISDPE) en Educación Física*

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### Abstract

**Introduction:** Despite progress in inclusion, prejudices related to people with disabilities continue to emerge. Attitudes towards disability affect the perception and behaviour of other students, ensuring full inclusion that enhances the experience of students with functional diversity.

**Objective:** The aim of this study is to analyse the psychometric properties, as well as the metric invariance and convergent validity of the "The Attitudes towards Inclusion of Students with Disabilities in Physical Education" (AISDPE) in secondary school students from a region of southeastern Spain.

**Methodology:** exploratory and confirmatory analyses, as well as multigroup analyses and test-retest techniques, were carried out on a sample of 992 students.

**Results:** showed a seventeen-item bifactor structure with excellent goodness-of-fit and reliability indices. In addition, measurement invariance was confirmed for all demographic variables included in the analysis. Finally, convergent validity found significant associations with another unifactorial tool employed to assess attitudes toward disability in Physical Education classes.

**Conclusion:** this research has found excellent properties in an inexpensive and quick-to-use tool that allows exploring the attitudes toward disability of secondary students, allowing the adaptation of possible interventions and programs to be developed in the classroom.

### Keywords

Assessment; attitudes toward disability; high school; inclusive education; physical education.

### Resumen

**Introducción:** A pesar de los avances en materia de inclusión, siguen surgiendo prejuicios relacionados con las personas con discapacidad. En temas de inclusión, las actitudes que tienen tanto otros alumnos como los docentes afectan a la experiencia educativa de aquellos estudiantes con diversidad funcional, por lo que es importante que estas actitudes estén enfocadas desde una perspectiva positiva e inclusiva.

**Objetivo:** analizar las propiedades psicométricas, así como la invarianza métrica y la validez convergente del cuestionario «Actitudes hacia la Inclusión de Estudiantes con Discapacidad en Educación Física» (AISDPE) en estudiantes de secundaria en la región de Extremadura (España). **Metodología:** se realizaron análisis exploratorios y confirmatorios, así como análisis multigrupo y técnicas test-retest sobre una muestra de 992 estudiantes.

**Resultados:** se encontró una estructura bifactorial de diecisiete ítems con índices de bondad de ajuste y fiabilidad excelentes. Además, se confirmó la invarianza de medida para todas las variables demográficas incluidas en el análisis. Por último, se encontraron asociaciones convergentes significativas con otro instrumento unifactorial, empleado para evaluar las actitudes hacia la discapacidad en las clases de educación física.

**Conclusión:** las propiedades analizadas esta herramienta de características asequibles y accesibles para toda la población, con facilidad de uso que permite explorar las actitudes hacia la discapacidad de los estudiantes de secundaria, permitiendo la adaptación de posibles intervenciones y programas desarrollados en el aula.

### Palabras clave

Actitudes hacia la discapacidad; educación inclusiva; educación física; evaluación; instituto.

## Introduction

In 1994, the United Nations Educational Council (UNESCO) set the groundwork for education for all by guaranteeing the complete participation of students with special educational needs in the educational system (Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura, 1995). The human rights of people with disabilities made progress at the beginning of the twenty-first century, and numerous international organizations have echoed social injustices that continue to exist in society as a result of disabilities, stressing the significance of promoting laws that support attitudes of acceptance, respect, and equality for people with disabilities (Felipe-Rello et al., 2019). According to Carter et al. (2024), the development of educational practices to support the inclusion of students with disabilities in the classroom enables their acceptance by peers without disabilities, thereby establishing partnerships. To achieve complete acceptance and inclusion, it is vital to plan and implement consistent tangible measures (Giangreco et al., 2020). As stated by Lindsay and Edwards (2013), educational initiatives aimed at encouraging a shift in the perception and acceptance of students with disabilities can dispel stereotypes and highlight the obstacles to their inclusion. Examples of such initiatives include simulations, curricular interventions, and contact with disabled individuals. Multiple factors influence the inclusion of students with disabilities in educational institutions. Different authors explain that adaptation to the characteristics of each student is fundamental, in addition to the previous experiences of each student or teacher, including knowledge related to the subject of inclusion and contact with students in this group (Alhumaid et al., 2022; Alshahrani, 2022).

Thus, numerous educational contexts and circumstances have been used to study how children without disabilities feel, including those with disabilities (McKay et al., 2021). Based on the early literature's unidimensional aspect, attitude is the disposition or state of preparedness for action and the basis for behavior (Allport et al., 1954). Theorists have explained that attitude has cognitive, affective, and behavioral components, broadening the multidimensional definition of attitude (Rosenberg et al., 1960). Although attitudes are defined differently by different researchers, they all agree that attitudes play a significant role in human behavior because they help people communicate their values, simplify information, and direct behavior toward goals (Katz, 1960). According to different reviews (Armstrong et al., 2017a; Freer, 2021), attitude is one of the keys to altering how people behave toward those who are different, and these better behaviors are necessary for adaptive physical education (PE), inclusive PE, and integration. However, attitudes are one of the most powerful barriers to the acceptance of people with disabilities; therefore, removing them is more important than putting legal restrictions in place for inclusion to succeed (Dukes y Berlingo, 2020; Sánchez-Díaz y Morgado, 2022). Following this line, the scientific community agrees that attitudes change constantly, and interventions aimed at modifying and forming young people's attitudes are most effective during the school years, including childhood and adolescence (Cameron et al., 2011; Di Maggio et al., 2022; Jeon, 2018; Lindsay y Edwards, 2013).

However, according to the Spanish Ministry of Education and Vocational Training (Ministerio de Educación y Formación Profesional, 2022), the total number of students with specific educational assistance needs who received educational attention other than the standard one for the 2020–2021 academic year was 748,054, or 9.3% of all students. In the same report (Ministerio de Educación y Formación Profesional, 2022), 76.1% of extremist students with special educational needs were enrolled in regular schools. Therefore, to achieve full inclusion, it is necessary to have more material and personal resources, as well as the necessary structures adapted for these students in regular classrooms (Nieto Carmona y Moriña Díez, 2021; Trujillo González et al., 2023). In light of these findings, it makes sense to consider the need for student-focused educational and awareness programs so that students are ready to welcome and accommodate disabled children in their classrooms (Felipe-Rello et al., 2019). Likewise, PE is considered an educational area that is more prone to the development of values and attitudes as curricular content, ahead of any other school subject (Campos et al., 2014; Velázquez Buendía y Maldonado Rico, 2004), because it has emerged as a privileged tool for the transmission of values and attitudes, normalization, equality, and social inclusion (Canales Nuñez et al., 2018). However, it is also true that depending on the quality and preparation of the contact maintained, taking PE with classmates who have impairments can also result in a drop in socially desirable attitudes (Abellán et al., 2018b).

However, there is not yet a sufficiently proven Spanish-language tool for gauging pupils' views towards peers with disabilities (Polo Sánchez y López Justicia, 2014); moreover, there is not yet a sufficiently



proven Spanish-language tool for gauging pupils' views toward peers with disabilities (Reina Vaillo et al., 2016). In this sense, it can be mentioned that in some studies, such as the Chedoke-McMaster Attitudes Toward Children with Handicaps Scale (CATCH) (Rosenbaum et al., 1986), no relationship between attitude toward disability in PE and variables such as sex or previous contact with a person with a disability was demonstrated. In others, such as the Children Attitude Integrated Physical Education-Revised (CAIPE-R) (Block, 1995), in its Spanish version (Ocete Calvo et al., 2017), three items had to be eliminated from the 13 that composed it because of its low reliability and consistency indices. Also, in the Attitude Scale for Students with Disabilities in Physical Education (EAADEF) (Iñiguez Santiago et al., 2017), the cognitive component showed a value below the recommended values for reliability indicators. However, in general, Reina et al.'s Attitudes towards the Inclusion of Students with Disabilities in Physical Education (AISDPE) scale (Reina Vaillo et al., 2016) is the best tool for evaluating attitudes toward disability because it has been shown to be a two-dimensional model of these attitudes through the use of exploratory and confirmatory factor analysis. As Moreno-Murcia, et al. (2013) point out, "validation is a process that is not exclusive to a single study" and, for all these reasons, the aim of the present study is to explore the psychometric properties of the AISDPE, as well as to carry out an invariance analysis considering sex, demographic location of the school, educational stage, contact with disability and participation in physical activity (PA) with people with disability in which a sample of adolescents from a region of southeastern Spain reside. Considering previous literature, it is hypothesized that the internal structure will be bifactorial, composed of 17 items, and offer good goodness-of-fit indices.

## Method

### Participants

This study used a descriptive cross-sectional approach to collect as many responses as possible from participants. According to the most recent data available at the National Institute of Statistics ([www.ine.es](http://www.ine.es)), 43,043 minors between the ages of eight and 18 reside in the Community of Extremadura, Spain. Our study's sample size of 992 participants was greater than the 381 needed to guarantee a 95% confidence level and a  $\pm 5\%$  margin of error. A sample of Compulsory Secondary Education (E.S.O.) and baccalaureate students was selected using non-probabilistic convenience sampling, following Salkind's approach (Salkind et al., 1999). The inclusion criteria for participation in the study were regular participation in PE classes and informed consent from parents.

The sample consisted of 992 students (Table 1), 48.4% boys and 51.6% girls. Likewise, the majority of students belonged to a rural context (52.6 %), compared to 47.4% of urban students. Likewise, 67.44% of the participants had contact with disabled people. However, 44.56% expressed that they participated in different physical activities than people with disabilities did. The Cáceres Provincial Council definition (<https://www.dip-caceres.es/>) was used to classify living environments in this study. Communities with 20,000 or fewer residents were classified as rural, and those with a population of 20,000 or more were classified as urban.

This study was conducted in accordance with the relevant ethical regulations and was approved by the Bioethics and Safety Committee of the University of Extremadura under the reference code 186/2021.

Table 1. Sample characterization (N = 992).

Variable	Categories	N	%
Sex	Boys	480	48.4
	Girls	512	51.6
Educational stage	E.S.O.	880	88.7
	Baccalaureate	112	11.3
Demographic location	Urban	470	47.4
	Rural	522	52.6

N: number; %: percentage; E.S.O.: Compulsory Secondary Education.



## Procedure

The procedure followed was as follows. First, a list of public high schools in the region of Extremadura was consulted (available at: [http://estadisticaeducativa.educarex.es/?centros/enseanzas/ycurso=17yensenanza\\_centro=101200001](http://estadisticaeducativa.educarex.es/?centros/enseanzas/ycurso=17yensenanza_centro=101200001), accessed December 2023). We sent them the description of the study, the variables analysed, a copy of each instrument applied, parental consent for students to participate in this research, and a letter of confirmation to be signed by the school principals. If the physical education teachers and the director agreed, a date was set for the research team to go to the center and apply the questionnaires. Subsequently, on the day of the application, the researcher collected the signed parental consents and provided a tablet to each student with the questionnaires included in Google Forms during the physical education class, with the teacher present. To ensure that the items were interpreted correctly, each item was read aloud and explained to avoid different interpretations. Those students who did not have the consent or did not want to participate carried out recreational-sports activities with the teacher during the time of questionnaire application. This digital medium was used to facilitate data collection and synthesis and to ensure the anonymity of each student. Data were collected between January and February 2024, for a duration of approximately five minutes.

## Instrument

Sociodemographic questionnaire: this questionnaire contained six questions about the social and demographic characteristics of the students, on sex, age, demographic location, educational stage, as well as two questions about previous experiences with people with disabilities: “do you have or have you had contact with any person with a disability (family, friends, classmates...?)” and “have you participated in any physical activity with people with disabilities?”.

The Attitudes towards Inclusion of Students with Disabilities in Physical Education (AISDPE): The Spanish version of the AISDPE scale (Reina Vaillo et al., 2016) was administered. This 17-item scale, which measures attitudes toward including students with disabilities in PE, has two components: behavioral intention or predisposition to action (items 2, 5, 7, 8, 9, 10, 11, 12, 16, and 17: e.g., “I prefer not to interact with people with disabilities”) and the cognitive perception (items 1, 3, 4, 6, 13, 14, and 15: e.g., “I think I would stand out if I participate with people with disabilities in any activity or sport”). This scale is also based on a 5-point Likert scale ranging from 1 (“completely disagree” and 5 “completely agree”). This scale was inverted so that the higher the score, the more people disagreed with the statements in the questionnaire, indicating a higher level of attitude toward inclusion. The  $\alpha$  coefficients for each of the AISDPE subscales were 0.82 for the cognitive component and 0.75 for the behavioral component.

Attitude Scale for Students with Disabilities in Physical Education (EAADEF): This scale proposed by Íñiguez Santiago et al. (2017) was used. The instrument is headed with the introductory phrase: “In physical education, with respect to people with disabilities...”. This scale includes four items related to the behavioral component of attitude (e.g., “I wouldn't propose as captain of my team a person with a disability”). Responses were collected on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the EAADEF revealed a less inclusive attitude towards the participation of students with disabilities in PE. The  $\alpha$  coefficient of the scale was 0.77.

## Data analysis

First, descriptive statistics of AISDPE scores were determined. Exploratory analyses were then conducted using the free statistical program FACTOR v.10.10.02 (Rovira I Virgili University: Tarragona, Spain) because the data were ordinal in type (5-point Likert scale) (Ferrando y Lorenzo-Seva, 2017). Then, using the Solomon method (Lorenzo-Seva, 2022), the whole sample was divided into two equal subsamples: one for confirmatory factor analysis (CFA) and the other for exploratory factor analysis (EFA). Bartlett and Kaiser-Meyer-Olkin (KMO) tests of sphericity were employed as indicators of sample adequacy (Beavers et al., 2013). The structure was cleared of items with cross loads over 0.40, communalities below 0.30, and loads below 0.60 (Hair, 2010).

Once the possible structure of the questionnaire was defined, CFA was conducted using AMOS v.26.0.0 program (IBM Corporation, Wexford, PA, USA). In addition, the following metrics were used to evaluate the goodness of fit of the model: chi-square per degree of freedom ratio (CMIN/DF) < 3 (Yaslioglu y Toplu Yaslioglu, 2020), root means square error of approximation (RMSEA) < 0.08 (Kenny et al., 2015), root mean square of residuals (RMSR) < 0.08 (Shi et al., 2020), comparative fit index (CFI) and normed



fit index (NNFI) < 0.90 (Bentler, 1990). Furthermore, Cronbach's alpha was used as a measure of scale reliability, Cronbach's Alpha was employed (Dunn et al., 2014).

Similarly, several multigroup CFAs were conducted to evaluate measurement invariance (MI) according to sex, educational stage, demographic location, contact with disability, and participation in PA. As a measurement parameter, a variation in CFI of less than 0.01 between the unconstrained and constrained model (configural invariance) was established to test MI (Cheung y Rensvold, 2002).

Subsequently, to assess convergent validity, the relationship of the scores obtained in the AISDPE with another validated tool to assess attitudes towards peers with disabilities in PE (EAADEF) was explored using Spearman's correlation.

## Results

### Descriptive statistics

The descriptive statistics for each component and the total score of the AISDPE questionnaire differentiated by sex and educational stage are shown in Table 2.

Table 2. Descriptive statistics of the AISDPE questionnaire according to sex and educational stage of the student body.

Item	Total		Boys		Girls		Rural		Urban	
	M	SD	M	SD	M	SD	M	SD	M	SD
Cognitive	3.50	0.75	3.19	0.77	3.78	0.62	3.53	0.75	3.47	0.76
Behavioral	4.07	0.64	3.84	0.71	4.28	0.48	4.12	0.63	4.02	0.64
Total	3.84	0.62	3.57	0.65	4.08	0.48	3.87	0.61	3.79	0.63

Note: M= Mean value; SD= Standard Deviation.

At a general level, students showed good scores in terms of attitudes towards disability in PE, with higher scores in the behavioural component than in the cognitive component. In terms of the variables explored, women and students from rural contexts showed higher scores for both the components and the results of the scale.

Table 3 shows the descriptive statistics of AISDPE according to educational stage, family contact, and participation in PA among people with disabilities.

Table 3. Descriptive statistics of the AISDPE questionnaire according to educational stage, family contact, and PA participation.

Item	Educational stage				Contact with disability				PA participation			
	E.S.O.		Baccalaureate		Yes		No		Yes		No	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Cognitive	3.50	0.76	3.46	0.71	3.53	0.73	3.42	0.80	3.52	0.75	3.48	0.76
Behavioral	4.01	0.65	4.12	0.51	4.10	0.64	3.98	0.64	4.13	0.64	4.02	0.64
Total	3.84	0.63	3.85	0.54	3.87	0.61	3.75	0.64	3.88	0.62	3.80	0.62

Note: M= Mean value; SD= Standard Deviation; E.S.O.: Compulsory Secondary Education.

Regarding the educational stage, baccalaureate students scored higher on both the behavioral component and the final score. Likewise, students who affirmatively expressed contact with people with disabilities and participated in PA had better results on all scores than their peers who responded negatively.

### EFA and CFA

The RULS technique with Promin ascertained that the questionnaire had a structure consisting of two factors in the first half of the sample because of the eigenvalue-based explained variance (Larsen y Warne, 2010) and the validity of expected a posteriori scores (EAP) (Ferrando Piera y Lorenzo Seva, 2016). Since the sample adequacy indices yielded positive results (Bartlett test = 6907.7; df = 136; p < .001; KMO test = .93), EFA was conducted.

Once the number of dimensions was established, the Direct Oblimin rotation method was chosen because non-parametric methods were required owing to the degree of kurtosis (kurtosis = 417.99; p < .001). The rotating loading matrix for 17 variables and two factors is shown in Table 4.

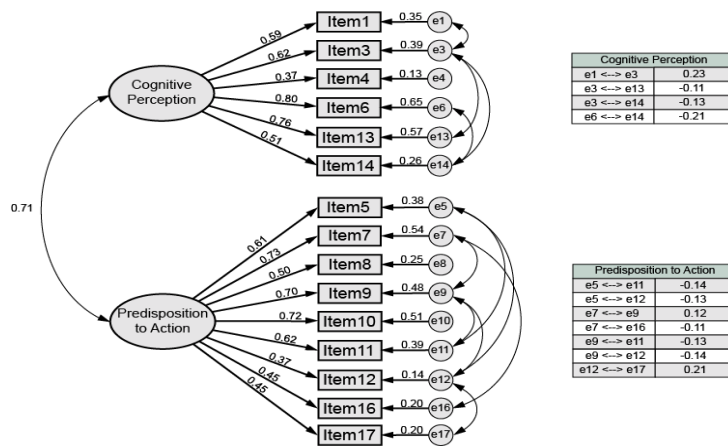


Table 4. Rotated loading matrix of the scale.

Items	Factor 1	Factor 2
I believe that people with disabilities have greater difficulty than other people in achieving the same personal and/or professional goals.	-0.14	0.86
People with disabilities cannot adapt to a competitive environment.	0.31	0.36
I will excel if I participate with people with disabilities in physical activities or sports.	0.06	0.68
People with blindness should always be assisted by a guide.	-0.03	0.62
Students with disabilities should not participate in regular P.E. classes because they may be detrimental to the progress of their classmates.	0.63	0.18
I would not like to be told by the teacher that I have to help a person with a disability.	0.18	0.68
I prefer not to interact with people with disabilities.	0.82	0.01
If I have a family member with a disability I will avoid talking about it with other people.	0.65	0.03
I would not sit in class near a classmate with a disability.	0.83	0.01
I would not choose a teammate with a disability for my team.	0.85	-0.03
I would not volunteer at a camp for people with disabilities where I would have to help them with showering, meals, etc.	0.72	-0.06
If I had a disability, my lifestyle would change completely.	0.18	0.63
People with disabilities are often less intelligent than other people.	0.16	0.63
In general, people with disabilities are less sociable.	0.63	0.17
Many people with disabilities cannot take care of themselves.	0.24	0.27
People with disabilities should practice specific and independent sports.	0.64	0.23
If I became a wheelchair user due to an accident, my life would be meaningless.	0.64	0.01

After the EFA was completed and the scale's structure was established, a CFA was conducted to evaluate the model's properties. After carrying out CFA, the goodness-of-fit indices showed poor values for some indicators (CMIN/DF = 4.98, CFI = 0.91, NFI = 0.89, RMSEA = 0.07, RMSR = 0.07). The next step was to correlate the errors of different items, as long as they were included in the same factor, following the modification indices, until acceptable values were reached in the model. After that, the CMIN/DF obtained a value of 2.91 ( $\chi^2=226.98$ ,  $df = 78$ ), while the CFI and NFI showed values of 0.96 and 0.94, respectively. For RMSEA and RMSR, the model exhibited scores of 0.05 and 0.06. The final structure of the model is illustrated in Fig. 1.

Figure 1. Factor structure.



### Measurement invariance

Table 5 shows the MI of the questionnaire as a function of sex and the demographic location of the school. Regarding sex, the assumption of configural invariance was met; however, neither metric nor scalar invariance was met. However, for demographic location, both configural and metric invariances were met.

Table 5. Measurement invariance for sex and demographic location.

Model	$\chi^2$	df	Sex					RMSR	$\Delta CFI$
			CMIN/DF	CFI	NFI	RMSEA			
Unconstrained	278.84	122	2.28	0.954	0.907	0.038	0.050		
Configural Invariance	325.42	133	2.45	0.945	0.891	0.040	0.063	<0.01	
Metric Invariance	422.24	136	3.11	0.899	0.859	0.049	0.131	>0.01	
Scalar Invariance	902.23	152	5.94	0.736	0.699	0.075	0.163	>0.01	
Model	$\chi^2$	df	Demographic Location					RMSR	$\Delta CFI$
			CMIN/DF	CFI	NFI	RMSEA			
Unconstrained	255.03	122	2.09	0.963	0.932	0.035	0.048		



Configural Invariance	277.14	133	2.08	0.960	0.926	0.035	0.056	<0.01
Metric Invariance	282.16	136	2.08	0.959	0.924	0.035	0.058	<0.01
Scalar Invariance	337.07	152	2.22	0.948	0.910	0.037	0.060	>0.01

Regarding MI as a function of educational stage, contact with people with disabilities, and participation in PA, the educational stage variable expressed configural invariance. However, it did not satisfy the metric and scalar invariance assumptions. Likewise, contact with a disability fulfilled the MI assumption, as configural and metric invariance were confirmed. Finally, PA participation fulfilled the MI assumption by expressing configural and metric invariance.

### **Internal consistency**

In the analysis of the instrument's internal consistency, the behavioral component had a Cronbach's alpha value of 0.79 and the cognitive component had a value of 0.77. In addition, the total internal consistency of the scale had an alpha value of 0.86. Finally, the convergent validity between the components constituting the AISDPE and EAADEF total scores was tested. The behavioral component showed a direct, considerable ( $\rho = 0.72$ ), and significant association ( $p < 0.001$ ). In contrast, the cognitive component showed a direct, moderate ( $\rho = 0.51$ ), and significant ( $p < 0.001$ ) relationship with the EAADEF score.

## **Discussion**

The main goal of this study was to assess AISDPE's psychometric properties in a sample of secondary school students from the Extremadura region of southeast Spain, and to validate the measurement's invariance by sex, demographic location, educational level, contact with disability, and PA participation. As other research has previously established, the results in this regard validated sufficient values in a sample of Spanish secondary school students (Reina Vaillo et al., 2016; Rojo-Ramos et al., 2024). However, this research reported a factorial structure composed of two components comprising 15 items after eliminating two items from the original scale, as pointed out by previous research in the region of Extremadura. Nevertheless, to the best of our knowledge, no other research has explored the psychometric properties of this questionnaire, much less its MI. In the present study, sex met the assumption of MI. However, there is some controversy regarding the sex variable in attitudes towards disability in PA participation. Navarro-Mateu et al. (2019) pointed out that it was the most influential variable in attitudes, with female students showing better attitudes toward their peers with disabilities. The results of other studies support this school of thought in secondary school students (Campos et al., 2014); however, studies have emerged that indicate that the differences in these attitudes between males and females are trivial (Bebetsos et al., 2014). These differences were explored in a meta-analysis conducted by Vella et al. (2016), finding that women establish more positive relationships with peers in terms of solving the tasks proposed in PE classrooms. In terms of demographic location, the scientific literature on students' attitudes towards disability in PE is scarce. Despite this, the AISDPE scale showed configural and metric invariance among the participants in the present study. In a previous investigation of primary school students in the same Spanish region, differences between schools in demographic locations with different population sizes showed statistically significant differences in favor of rural settings (Rojo-Ramos et al., 2022). However, another study on high school students from the same region found no significant differences in the aforementioned variables (Delgado-Gil et al., 2023). Nevertheless, it has been demonstrated that students who attend schools with less favorable environments and whose families have lower financial positions exhibit more positive attitudes toward inclusion (Szumski et al., 2020).

Similarly, educational stage becomes an interesting variable to consider when assessing attitudes towards disability in PE, demonstrating its MI in this study. Abellán et al. (2018a) found significant inverse correlations between age and the scores obtained in the components of the AISDPE questionnaire in secondary school students. Other research has already shown that the older the student, and therefore the higher the academic level, the more the attitudes towards disability improve considerably, for example, when comparing the attitudes of secondary school and university students (Suria-Martinez, 2011).



In the contemporary literature, there is growing attention on whether prior interactions with individuals with impairments influence attitudes (McKay, 2018). Contact with people with disabilities is typically assumed to be an effective method for improving young people (Armstrong et al., 2017b). A systematic review (Scior, 2011) indicated that students who had previous contact with people with disabilities showed better attitudes towards students with intellectual disabilities. However, Arampatzi et al. (2011) demonstrated that students who attended schools without children with special educational needs had more positive attitudes toward disabilities than their peers in inclusive school settings. Therefore, previous positive experiences with classmates with disabilities do not necessarily positively influence peers' attitudes toward disabilities (Schwab, 2017).

Regarding previous participation in PA, the current research indicates that attitudes of students with disabilities who have previously participated in activities in a school environment are better (Ocete et al., 2022). It is reasonable to assume that PE participants who have never engaged in PA with people with disabilities could perceive the encounter as less constructive (Turner et al., 2007). Another study supports this claim, showing that peers without disabilities favor those with good athletic features and consider inclusion only when the goal requires athletic ability (Bebetsos et al., 2014). Therefore, it is necessary to consider that the beliefs and stereotypes that PE students have about the inclusion of children with disabilities may condition their acceptance of relevant changes in the games to make inclusive activities feasible (Campos et al., 2014).

### **Limitations and future lines**

This study had several limitations. First, we did not explore possible data pertaining to students in the last cycle of primary education, so we could not validate the properties and invariance of the measurement throughout adolescence. Furthermore, in addition to the convenience sampling method used to select participants, sociocultural variables may have influenced the results because they were restricted to the Community of Extremadura. Likewise, there is a very precarious body of scientific literature on this questionnaire at the selected educational stage, at the same time that its MI is being treated for the first time; therefore, so the results cannot be verified. To gather as much information as possible about attitudes towards disability in PE, it would be highly interesting to extend the sample to the Spanish region in further research. Similarly, expanding data collection over time would be intriguing to evaluate temporal stability and authorize longitudinal research. Additionally, it can be intriguing to include invariance variables, such as academic year.

### **Conclusions**

A sample of secondary students from the Autonomous Community of Extremadura (Spain) was tested with an instrument that has been widely validated in another educational stage (Primary Education), which enables the investigation of attitudes toward disability in PE classrooms. In this regard, a fifteen-item bifactorial structure with a variety of error correlations and good goodness-of-fit indices was established. In addition, the instrument demonstrated MI for all the demographic variables included in the analysis. Reliability and convergent validity yielded positive results in the focal population.

### **References**

- Abellán, J., Sáez-Gallego, N. M., & Reina, R. (2018a). Evaluación de las actitudes hacia la discapacidad en educación física: Efecto diferencial del sexo, contacto previo y la percepción de habilidad y competencia. *Cuadernos de Psicología del Deporte*, 18(1), Article 1. <https://revistas.um.es/cpd/article/view/282581>
- Abellán, J., Sáez-Gallego, N., & Reina, R. (2018b). Explorando el efecto del contacto y el deporte inclusivo en Educación Física en las actitudes hacia la discapacidad intelectual en estudiantes de secundaria. [Exploring the effect of contact and inclusive sport on Physical Education in the attitudes toward intellectual disability of high school students]. *RICYDE. Revista Internacional de Ciencias Del Deporte*, 14(53), 233–242. <https://doi.org/10.5232/ricyde2018.05304>
- Alhumaid, M. M., Althikr Allah, B. A., Alhuwail, A. A., Alobaid, M. A., Abu Hamad, N. N., Alsalman, Z. A., Alqahtani, S. S., Alherz, A. M., Alwael, W. M., Alhelal, A. K., Alsubaie, S. A., Alwarthan, M. S.,



- Alnaeem, F. O., Aleid, S. H., Almuhausen, S. Y., Alobaydullah, A. A., Alzamami, A. R., Alqadiri, S. A., Alsubhi, S. H., ... Bastos, T. (2022). Physical education teachers' attitudes toward inclusion of students with disabilities in Saudi Arabia. *Frontiers in Psychology, 13*. <https://doi.org/doi.org/10.3389/fpsyg.2022.1006461>
- Allport, G. W., Clark, K., & Pettigrew, T. (1954). *The nature of prejudice*.
- Alshahrani, B. F. (2022). Interaction between students with and without disabilities in an inclusive schools from their teachers perspective. *Journal of Science Education for Students with Disabilities*. <https://doi.org/10.14448/jsesd.14.0009>
- Arampatzi, A., Mouratidou, K., Evaggelinou, C., Koidou, E., & Barkoukis, V. (2011). Social Developmental Parameters in Primary Schools: Inclusive Settings' and Gender Differences on Pupils' Aggressive and Social Insecure Behaviour and Their Attitudes towards Disability. *International Journal of Special Education, 26*(2), 58–69. <https://eric.ed.gov/?id=EJ937175>
- Armstrong, M., Morris, C., Abraham, C., & Tarrant, M. (2017a). Interventions utilising contact with people with disabilities to improve children's attitudes towards disability: A systematic review and meta-analysis. *Disability and Health Journal, 10*(1), 11–22. <https://doi.org/10.1016/j.dhjo.2016.10.003>
- Armstrong, M., Morris, C., Abraham, C., & Tarrant, M. (2017b). Interventions utilising contact with people with disabilities to improve children's attitudes towards disability: A systematic review and meta-analysis. *Disability and Health Journal, 10*(1), 11–22. <https://doi.org/10.1016/j.dhjo.2016.10.003>
- Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical Considerations for Using Exploratory Factor Analysis in Educational Research. *Practical Assessment, Research, and Evaluation, 18*(1). <https://doi.org/10.7275/QV2Q-RK76>
- Bebetsos, E., Derri, V., Filippou, F., Zetou, E., & Vernadakis, N. (2014). Elementary School Children's Behavior towards the Inclusion of Peers with Disabilities, in Mainstream Physical Education Classes. *Procedia - Social and Behavioral Sciences, 152*, 819–823. <https://doi.org/10.1016/j.sbspro.2014.09.327>
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>
- Block, M. E. (1995). Development and Validation of the Children's Attitudes Toward Integrated Physical Education–Revised (CAIPE–R) Inventory. *Adapted Physical Activity Quarterly, 12*(1), 60–77. <https://doi.org/10.1123/apaq.12.1.60>
- Cameron, L., Rutland, A., Turner, R., Holman-Nicolas, R., & Powell, C. (2011). “Changing attitudes with a little imagination”: Imagined contact effects on young children's intergroup bias. *Anales de Psicología, 27*(3), 708–717.
- Campos, M. J., Ferreira, J. P., & Block, M. E. (2014). Influence of an Awareness Program on Portuguese Middle and High School Students' Perceptions of Peers with Disabilities. *Psychological Reports, 115*(3), 897–912. <https://doi.org/10.2466/11.15.PR0.115c26z7>
- Canales Nuñez, P., Aravena Kenigs, O., Carcamo-Oyarzun, J., Lorca Tapia, J., & Martinez-Salazar, C. (2018). Prácticas pedagógicas que favorecen u obstaculizan la inclusión educativa en el aula de educación física desde la perspectiva del alumnado y profesorado (Students' and teachers' perspective on pedagogical practices promoting or holding up educational incl. *Retos, 34*, 212–217. <https://doi.org/10.47197/retos.v0i34.59620>
- Carter, E. W., Tuttle, M., Asmus, J. M., Moss, C. K., & Lloyd, B. P. (2024). Observations of Students With and Without Severe Disabilities in General Education Classes: A Portrait of Inclusion? *Focus on Autism and Other Developmental Disabilities, 39*(1), 3–13. <https://doi.org/10.1177/10883576231178268>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. [https://doi.org/10.1207/S15328007SEM0902\\_5](https://doi.org/10.1207/S15328007SEM0902_5)
- Delgado-Gil, S., Mendoza-Muñoz, D. M., Galán-Arroyo, C., Denche-Zamorano, Á., Adsuar, J. C., Mañanas-Iglesias, C., Castillo-Paredes, A., & Rojo-Ramos, J. (2023). Attitudes of Non-Disabled Pupils towards Disabled Pupils to Promote Inclusion in the Physical Education Classroom. *Children, 10*(6), 1008. <https://doi.org/10.3390/children10061008>

- Di Maggio, I., Ginevra, M. C., Santilli, S., & Nota, L. (2022). Elementary school students' attitudes towards peers with disabilities: The role of personal and contextual factors. *Journal of Intellectual & Developmental Disability, 47*(1), 3–11. <https://doi.org/10.3109/13668250.2021.1920091>
- Dukes, C., & Berlingo, L. (2020). Fissuring Barriers to Inclusive Education for Students with Severe Disabilities. *Research and Practice for Persons with Severe Disabilities, 45*(1), 14–17. <https://doi.org/10.1177/1540796919895968>
- Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology, 105*(3), 399–412.
- Felipe-Rello, C., Garoz Puerta, I., & Tejero-González, C. M. (2019). Cambiando las actitudes hacia la discapacidad: Diseño de un programa de sensibilización en Educación Física (Changing attitudes towards disability: design of an awareness program in Physical Education). *Retos, 37*, 713–721. <https://doi.org/10.47197/retos.v37i37.69909>
- Ferrando, P. J., & Lorenzo-Seva, U. (2017). Program FACTOR at 10: Origins, development and future directions. *Psicothema, 29*(2), 236–240. <https://doi.org/10.7334/psicothema2016.304>
- Ferrando Piera, P. J., & Lorenzo Seva, U. (2016). A note on improving EAP trait estimation in oblique factor-analytic and item response theory models. *Psicológica: Revista de Metodología y Psicología Experimental, 37*(2), 235–247. <https://dialnet.unirioja.es/servlet/articulo?codigo=5807806>
- Freer, J. R. R. (2021). Students' attitudes toward disability: A systematic literature review (2012–2019). *International Journal of Inclusive Education, 1*–19. <https://doi.org/10.1080/13603116.2020.1866688>
- Giangreco, M. F., Shogren, K. A., & Dymond, S. K. (2020). Education students with severe disabilities: Foundational concepts and practices. In *Instruction of students with severe disabilities* (9th ed.). Pearson.
- Hair, J. F. (Ed.). (2010). *Multivariate data analysis* (7th ed). Prentice Hall.
- Iñiguez Santiago, M. del C., Ferriz, R., Martínez Galindo, M. C., Cebrián Sánchez, M. M., & Reina Vaillo, R. (2017). Análisis factorial de la escala de actitudes hacia el alumnado con discapacidad en educación física (EAADEF). *Psychology, Society & Education, 9*(3), 493–504. <https://doi.org/10.25115/psye.v9i3.652>
- Jeon, M. (2018). Meta-Analysis of Disability Simulation Research for Elementary Students in Korea. *International Journal of Special Education, 33*(1), 140–151. <https://eric.ed.gov/?id=EJ1184078>
- Katz, D. (1960). The Functional Approach to the Study of Attitudes. *Public Opinion Quarterly, 24*(2, Special Issue: Attitude Change), 163–204. <https://doi.org/10.1086/266945>
- Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486–507.
- Larsen, R., & Warne, R. T. (2010). Estimating confidence intervals for eigenvalues in exploratory factor analysis. *Behavior Research Methods, 42*(3), 871–876. <https://doi.org/10.3758/BRM.42.3.871>
- Lindsay, S., & Edwards, A. (2013). A systematic review of disability awareness interventions for children and youth. *Disability and Rehabilitation, 35*(8), 623–646. <https://doi.org/10.3109/09638288.2012.702850>
- Lorenzo-Seva, U. (2022). SOLOMON: A method for splitting a sample into equivalent subsamples in factor analysis. *Behavior Research Methods, 54*(6), 2665–2677. <https://doi.org/10.3758/s13428-021-01750-y>
- McKay, C. (2018). The Value of Contact: Unpacking Allport's Contact Theory to Support Inclusive Education. *PALAESTRA, 32*(1), Article 1. <https://js.sagamorepub.com/index.php/palaestra/article/view/8934>
- McKay, C., Park, J. Y., & Block, M. (2021). Exploring the variables associated with student attitudes toward inclusion in physical education after taking part in the Paralympic School Day programme. *International Journal of Inclusive Education, 25*(3), 329–347. <https://doi.org/10.1080/13603116.2018.1550117>
- Ministerio de Educación y Formación Profesional. (2022). *Estadística de las enseñanzas no universitarias. Alumnado con necesidad específica de apoyo educativo. Curso 2020-2021*. <https://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas/no-universitaria/alumnado/apoyo/2020-2021.html>

- Moreno Murcia, J. A., Cervelló Gimeno, E., Martínez Galindo, M. C., & Moreno González, R. (2013). Validación de la Escala de Creencias Implícitas de habilidad (CNAAQ-2) al contexto español: Diferencias según la práctica físico-deportiva. *RICYDE. Revista Internacional de Ciencias del Deporte*, 9(32), 100–113. <https://dialnet.unirioja.es/servlet/articulo?codigo=4249394>
- Navarro-Mateu, D., Franco-Ochoa, J., Valero-Moreno, S., & Prado-Gascó, V. (2019). To be or not to be an inclusive teacher: Are empathy and social dominance relevant factors to positive attitudes towards inclusive education? *PLoS ONE*, 14. <https://doi.org/10.1371/journal.pone.0225993>
- Nieto Carmona, C., & Moriña Díez, A. (2021). Barreras y facilitadores para la inclusión educativa de personas con discapacidad intelectual. *Siglo Cero Revista Española Sobre Discapacidad Intelectual*, 52(4), 29–49. <https://doi.org/10.14201/scero20215242949>
- Ocete, C., Pérez-Tejero, J., Coterón, J., & Reina, R. (2022). How do competitiveness and previous contact with people with disabilities impact on attitudes after an awareness intervention in physical education? *Physical Education and Sport Pedagogy*, 27(1), 19–31. <https://doi.org/10.1080/17408989.2020.1834527>
- Ocete Calvo, C., Pérez-Tejero, J., Franco, E., & Coterón, J. (2017). Validación de la versión española del cuestionario “Actitudes de los alumnos hacia la integración en educación física (CAIPE-R).” *Psychology, Society & Education*, 9(3), 447–458. <https://doi.org/10.25115/psye.v9i3.1025>
- Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (1995). *Conferencia Mundial sobre Necesidades Educativas Especiales: Acceso y Calidad: Informe final—UNESCO Biblioteca Digital*. [https://unesdoc.unesco.org/ark:/48223/pf0000110753\\_spa](https://unesdoc.unesco.org/ark:/48223/pf0000110753_spa)
- Polo Sánchez, M. T., & López Justicia, M. D. (2014). Actitudes hacia las personas con discapacidad de estudiantes de la Universidad de Granada. *REOP - Revista Española de Orientación y Psicopedagogía*, 17(2), 195. <https://doi.org/10.5944/reop.vol.17.num.2.2006.11346>
- Reina Vaillo, R., Hutzler, Y., Santiago, M. C. I., & Murcia, J. A. M. (2016). Attitudes towards Inclusion of Students with Disabilities in Physical Education Questionnaire (AISDPE): A two-component scale in Spanish. *European Journal of Human Movement*, 36, 75–87. <http://eurjhm.com/index.php/eurjhm/article/view/368>
- Rojo-Ramos, J., Gómez-Paniagua, S., Da Silva Batista, M. A., Silveira, P., & Galán-Arroyo, C. (2024). Reliability of a Scale for Improving Attitudes towards Inclusion of Students with Disabilities in Physical Education. *Retos*, 56, 1111–1119. <https://doi.org/10.47197/retos.v56.104878>
- Rojo-Ramos, J., Vega-Muñoz, A., Contreras-Barraza, N., & Barrios-Fernandez, S. (2022). Female and Rural School Students Show More Positive Attitudes toward Disability during Physical Education Lessons. *International Journal of Environmental Research and Public Health*, 19(10), 5881. <https://doi.org/10.3390/ijerph19105881>
- Rosenbaum, P. L., Armstrong, R. W., & King, S. M. (1986). Children’s Attitudes Toward Disabled Peers: A Self-Report Measure. *Journal of Pediatric Psychology*, 11(4), 517–530. <https://doi.org/10.1093/jpepsy/11.4.517>
- Rosenberg, M. J., Hovland, C. I., McGuire, W. J., Abelson, R. P., & Brehm, J. W. (1960). *Attitude organization and change: An analysis of consistency among attitude components. (Yales studies in attitude and communication.)*, Vol. III (pp. x, 239). Yale Univer. Press.
- Salkind, N. J., Escalona, R. L., & Valdés Salmerón, V. (1999). *Métodos de investigación*. Prentice-Hall.
- Sánchez-Díaz, M. N., & Morgado, B. (2022). Moving toward the Inclusion of University Students with Disabilities: Barriers, Facilitators, and Recommendations Identified by Inclusive Faculty. *The Journal of Continuing Higher Education*, 70(3), 175–191. <https://doi.org/10.1080/07377363.2021.1946635>
- Schwab, S. (2017). The impact of contact on students’ attitudes towards peers with disabilities. *Research in Developmental Disabilities*, 62, 160–165. <https://doi.org/10.1016/j.ridd.2017.01.015>
- Scior, K. (2011). Public awareness, attitudes and beliefs regarding intellectual disability: A systematic review. *Research in Developmental Disabilities*, 32(6), 2164–2182. <https://doi.org/10.1016/j.ridd.2011.07.005>
- Shi, D., Maydeu-Olivares, A., & Rosseel, Y. (2020). Assessing Fit in Ordinal Factor Analysis Models: SRMR vs. RMSEA. *Structural Equation Modeling: A Multidisciplinary Journal*, 27(1), 1–15. <https://doi.org/10.1080/10705511.2019.1611434>
- Suria-Martinez, R. (2011). Comparative Analysis of Students’ Attitudes toward Their Classmates with Disabilities. *Electronic Journal of Research in Educational Psychology*, 9(1), 197–216.



- Szumski, G., Smogorzewska, J., & Grygiel, P. (2020). Attitudes of students toward people with disabilities, moral identity and inclusive education—A two-level analysis. *Research in Developmental Disabilities, 102*, 103685. <https://doi.org/10.1016/j.ridd.2020.103685>
- Trujillo González, Y., Anguiano Escobar, B., & Cervantes Arreola, D. I. (2023). Experiencias de familias de estudiantes que enfrentan barreras para el aprendizaje y la participación. Realidades ante el discurso escolar de educación inclusiva. *RECIE. Revista Electrónica Científica de Investigación Educativa, 7*, e1744. <https://doi.org/10.33010/recie.v7i0.1744>
- Turner, R. N., Crisp, R. J., & Lambert, E. (2007). Imagining Intergroup Contact Can Improve Intergroup Attitudes. *Group Processes & Intergroup Relations, 10*(4), 427–441. <https://doi.org/10.1177/1368430207081533>
- Velázquez Buendía, R., & Maldonado Rico, A. (2004). Las actitudes y su evaluación en educación física. In *La evaluación en educación física: Investigación y práctica en el ámbito escolar* (pp. 169–204). Graó. <https://dialnet.unirioja.es/servlet/articulo?codigo=1006236>
- Vella, S. A., Braithewaite, R. E., Gardner, L. A., & Spray, C. M. (2016). A systematic review and meta-analysis of implicit theory research in sport, physical activity, and physical education. *International Review of Sport and Exercise Psychology, 9*(1), 191–214. <https://doi.org/10.1080/1750984X.2016.1160418>
- Yaşlıoğlu, M., & Toplu Yaşlıoğlu, D. (2020). How and When to Use Which Fit Indices? A Practical and Critical Review of the Methodology. *Istanbul Management Journal, 1*–20. <https://doi.org/10.26650/imj.2020.88.0001>

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