

Rethinking the disability-type hierarchy of peer attitudes toward inclusive physical education

ISSAM EL BOUHALI^{1*}, SOUFIANE EL BOUHALI¹, JAMAL TSOULI MOUSTAIED²

¹Policies in Education and Social Dynamics (PEDS), Faculty of Educational Sciences, Mohammed V University in Rabat

²Faculty of Educational Sciences, Mohammed V University in Rabat, MOROCCO

Published online: August 31, 2026

Accepted for publication: August 15, 2026

DOI:10.7752/jpes.2026.08151

Abstract

Problem Statement. Peer attitudes are a critical determinant of successful inclusion in physical education (PE). The disability-type hierarchy documented extensively in Western samples derives from between-subjects designs that confound attitudinal variation with individual differences, and from high-income Western countries, leaving cultural and contextual factors largely unexplored. **Approach.** This study provides the first within-subjects, multi-disability attitudinal profile of secondary-school students in inclusive PE. A total of 195 Moroccan secondary-school students (62.1% female; 59.0% urban) each evaluated four parallel vignettes adapted from the Children's Attitudes Toward Integrated Physical Education-Revised (CAIPE-R), describing classmates with Physical Disability (PD), Visual Impairment (VI), Intellectual Disability (ID), and Autism Spectrum Disorder (ASD). Confirmatory factor analyses supported a unidimensional five-item structure for each subscale, and measurement invariance across moderator groups was supported at the metric and scalar levels. **Purpose.** The study tested whether the standardised Western hierarchy generalises to the Moroccan context and whether it is moderated by gender, zone, prior personal contact, prior inclusive PE experience, and age. **Results.** A one-way repeated-measures ANOVA revealed a significant main effect of disability type, $F(2.79, 541.62) = 7.54$, $p < .001$, partial $\eta^2 = .037$. Bonferroni-adjusted comparisons described a two-tier hierarchy, $PD \geq ASD > ID \geq VI$, diverging from the strict ordinal pattern reported in Western samples: ASD was statistically indistinguishable from PD, while VI occupied the least favourable position. The hierarchy's shape was robust across gender, zone, prior inclusive PE experience, and age, but was moderated by prior personal contact, $F(3, 579) = 4.40$, $p = .004$, partial $\eta^2 = .022$, which attenuated the disability-type gradient; overall attitude level was independently higher among urban students. **Conclusions.** These findings challenge the presumed universality of category-prototypicality and visibility-salience accounts and point toward culturally contingent mechanisms shaping peer attitudes, with direct implications for disability-specific sensitisation programmes and contact-based teacher training in Morocco and the wider MENA region.

Key Words: inclusive physical education; disability-type hierarchy; CAIPE-R; Contact Theory; adapted physical education.

Introduction

The social inclusion of students with disabilities in mainstream educational settings ranks among the most persistent challenges facing contemporary education systems. Physical education (PE) occupies a distinctive place within this broader project. Academic classrooms permit passive, individualised interaction, but PE is social, cooperative, and physically demanding by nature; it is frequently the first and most frequent setting in which students with and without disabilities engage in structured, cooperative activity (Block & Obrusnikova, 2007). This makes PE a natural setting for studying peer attitudes toward disability. The attitudes of students without disabilities toward their peers with disabilities are widely regarded as key predictors of successful inclusion in PE (Reina et al., 2019; Wang & Qi, 2019). Despite decades of research, however, a culturally sensitive account of how these attitudes are structured, and how they vary across disability types, remains largely absent outside Western settings.

Studies conducted primarily in Western, high-income countries show that typically developing students' attitudes toward peers with disabilities vary systematically by disability type. Attitudes tend to run more positive toward physical and sensory disabilities than toward intellectual disabilities, and less favourable still toward conditions involving behavioural or social difficulties (Laws & Kelly, 2005; Nowicki, 2006; de Boer et al., 2012; Pijl et al., 2008). This pattern has often been summarised as a strict ordinal hierarchy, physical disabilities rated most favourably, followed by visual impairment, intellectual disability, and finally autism spectrum disorder ($PD > VI > ID > ASD$), with each category occupying a stable rank relative to the others across studies and samples. This disability-type hierarchy has held remarkably stable across decades of research, leading some scholars to propose that it reflects relatively consistent psychological mechanisms. One account emphasises category

prototypicality: physical disabilities are widely treated as more representative of the category "disability" and therefore elicit more familiar, less uncertain responses than conditions perceived as behavioural or cognitive (Jones et al., 1984; Tringo, 1970). A complementary account emphasises visibility salience: visible disabilities are more readily identifiable, which reduces uncertainty and negative arousal (Hebl & Kleck, 2000).

Recent evidence complicates this picture of stability. Studies from Saudi Arabia (Alhumaid, 2023) found generally positive attitudes among primary-school students toward peers with disabilities in PE, with age, school type, and having a friend with a disability accounting for some of the variation. Research from China (Wang & Qi, 2019) found the opposite pattern: elementary-school students held unfavourable attitudes toward PE inclusion overall, though gender and prior classroom exposure to a student with disabilities were associated with more favourable views. These divergent findings point to a need for culturally grounded, context-specific investigation of the disability-type hierarchy, particularly in regions where inclusive education is still taking shape.

The Middle East and North Africa (MENA) region is a particularly important and underexamined setting for this line of inquiry. Morocco ratified the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and its Optional Protocol in April 2009, committing under Article 24 to ensure an inclusive education system at all levels (United Nations, 2006, Art. 24). In June 2019, the Ministry of National Education, Vocational Training, Higher Education and Scientific Research operationalised this commitment by launching the National Inclusive Education Programme for children with disabilities, establishing inclusive classrooms, individualised pedagogical projects, and resource rooms within mainstream schools (MENFPESRS, 2019). This marked a significant policy shift toward inclusive schooling, yet empirical evidence on peer attitudes, a key micro-level barrier to inclusion, remains entirely absent from the region. Where research has begun to explore disability attitudes in MENA countries, it has concentrated largely on teacher perspectives or general population views rather than on the specific hierarchy of peer attitudes across disability types (Dukmak et al., 2024; Alhumaid et al., 2023).

Emerging Gulf evidence on peer, rather than teacher, attitudes remains scarce and largely non-comparative across disability types: Alhumaid et al. (2023) found generally positive attitudes among Saudi female primary-school students toward classmates with disabilities in PE, with disability type, prior contact, and school setting all contributing to variation, while Dukmak et al. (2024) reported that typically developing students in UAE classrooms held moderately favourable, but far from uniform, attitudes toward peers with disabilities, moderated by grade level and nationality. Neither study, however, isolated disability type using a within-subjects comparison of the kind pursued here. A recent systematic review identified the frequency and quality of contact with people with disabilities as among the most influential factors shaping public attitudes, although this evidence is drawn predominantly from Western samples (Wang et al., 2021). The cultural, religious, and educational contexts of MENA countries differ substantially from those that have dominated the literature, which raises open questions about whether the mechanisms proposed to explain the disability-type hierarchy travel across cultural boundaries.

Islamic teachings, for instance, emphasise compassion and respect for all individuals regardless of ability, a value orientation that could encourage more positive attitudes toward disability in general (Hammad et al., 2022). Cultural values that place weight on achievement and social conformity, by contrast, might intensify stigma toward conditions perceived as affecting intellectual functioning or social behaviour, as suggested by qualitative evidence on contact and attitudes toward intellectual and developmental disabilities among Korean-heritage youth navigating collectivist cultural norms (Lee & Koo, 2021). Without empirical data from the region, it remains unclear whether the disability-type hierarchy generalises across cultures or is instead reshaped by culture-specific factors that alter its structure and magnitude.

Two gaps motivate the present research. First, the disability-type hierarchy has been treated in much of the literature as a near-universal feature of peer attitudes, yet the mechanisms proposed to explain it, category prototypicality and visibility salience, have been tested almost exclusively in Western, high-income settings; whether this hierarchy holds, in shape or in magnitude, in a culturally and religiously distinct context such as Morocco is an open empirical question rather than a settled fact. Second, Morocco's ratification of the UNCRPD and its 2019 National Inclusive Education Programme have created a policy mandate for inclusive PE without a corresponding evidence base on the peer attitudes that determine whether that mandate succeeds in practice; teachers and policymakers currently have no empirical guidance, specific to this context, on which disability types are likely to elicit the least favourable peer attitudes and therefore warrant the most concentrated intervention. Addressing both gaps requires data that are simultaneously cross-disability, methodologically rigorous, and drawn from within the MENA region itself.

The present study addresses these intersecting gaps by offering the first within-subjects, multi-disability attitudinal profile of Moroccan secondary-school students in inclusive PE. Using a within-subjects design spanning four disability conditions (Physical Disability [PD], Visual Impairment [VI], Intellectual Disability [ID], and Autism Spectrum Disorder [ASD]), the study pursues three research questions. RQ1: do attitudes toward peers in inclusive PE differ significantly across disability types? RQ2: what is the nature of the disability-type hierarchy in the Moroccan context; does it replicate the Western pattern, or does a different structure emerge? RQ3: do gender, urban or rural zone, age, prior personal contact, and prior inclusive PE experience

moderate this hierarchy? Empirically, this involved administering the CAIPE-R General Attitudes vignettes to 195 Moroccan secondary-school students and analysing the resulting five-item composites with a one-way repeated-measures ANOVA to test the main effect of disability type, Bonferroni-adjusted pairwise comparisons to characterise the hierarchy's shape, and a series of mixed ANOVAs crossing disability type with each candidate moderator in turn.

The contribution of this work spans several fronts. It offers the first empirically validated attitudinal profile of Moroccan adolescents toward peers with different disabilities in inclusive PE, establishing a baseline for future research and policy development in the MENA region. Its within-subjects design also provides a more internally valid test of the hierarchy than has typically been possible, holding constant the individual differences that confound between-subjects comparisons. It tests, moreover, the generalisability of the Western hierarchy to a culturally and educationally distinct setting, bearing on the universality of the mechanisms presumed to underlie it, and it examines prior personal contact as a moderator, extending Contact Theory predictions to a new cultural context. Taken together, these contributions identify disability-specific patterns of peer attitude that can inform targeted sensitisation programmes and teacher training in similar contexts.

Theoretical framework

The theoretical frameworks invoked to explain the disability-type hierarchy offer competing predictions about its universality. One influential account holds that physical disabilities are treated as more prototypical of the category "disability" and therefore elicit more familiar, less threatening responses than conditions perceived as behavioural or cognitive (Jones et al., 1984; Tringo, 1970). A complementary visibility-salience account proposes that visible disabilities are more readily identifiable, which reduces uncertainty and negative arousal (Hebl & Kleck, 2000). Both mechanisms have often been treated as relatively culture-invariant, predicting a broadly consistent hierarchy across cultural settings, with physically and sensorially visible conditions occupying the most favourable positions and behaviourally or cognitively unfamiliar conditions occupying the least favourable. Recent findings strain this presumption. Some work has found implicit attitudes toward autism spectrum disorder (ASD) to be less negative than attitudes toward physical disabilities in certain contexts (Yokota & Tanaka, 2022), which suggests that visibility alone does not straightforwardly determine where a condition falls in the hierarchy.

Contact Theory (Allport, 1954; Pettigrew & Tropp, 2006) offers a markedly different account, one grounded in experience rather than category membership. Where category prototypicality and visibility salience predict a hierarchy fixed by the perceptual and categorical features of each disability type, Contact Theory predicts that its shape is contingent on accumulated interpersonal experience and should therefore vary with how much, and how meaningfully, individuals have interacted with people with disabilities. On this view, the hierarchy is not a fixed reflection of category prototypicality or visibility but a malleable pattern that should attenuate, or even reorganise, wherever contact with people with disabilities is more frequent or where inclusive practices are more firmly established. A meta-analysis of interventions employing direct contact with people with disabilities found such interventions effective in improving children's attitudes (Armstrong et al., 2017), which lends empirical weight to the idea that experience can reshape, rather than merely soften, an otherwise stable hierarchy. Category prototypicality and visibility salience, by contrast, predict a hierarchy that should hold regardless of contact, since it is presumed to arise from perceptual and categorical processes rather than accumulated interpersonal experience. These accounts generate genuinely competing predictions: if the hierarchy is structurally invariant, prior contact should raise attitudes uniformly across disability types without altering their relative ordering, whereas if contact operates through familiarity, it should narrow the gaps between conditions unevenly, benefiting the least familiar categories most.

Adjudicating between these accounts requires an instrument capable of capturing the hierarchy with precision and a design capable of isolating disability type from confounding sources of variation. The Children's Attitudes Toward Integrated Physical Education-Revised (CAIPE-R; Block, 1995) offers a validated instrument for this purpose, with a General Attitudes subscale that captures overall social acceptance, willingness to interact, and endorsement of shared participation in PE. Studies using the CAIPE-R have consistently found that attitudes vary by disability type, with physical disabilities typically receiving more positive ratings than intellectual or behavioural conditions (Reina et al., 2019; Wang & Qi, 2019). More consequentially, nearly all existing evidence on the hierarchy derives from between-subjects designs, which confound attitudinal variation across disability types with stable individual differences between the students evaluating them. A within-subjects design, in which each participant evaluates every disability type, removes this confound and yields effects free of between-person variability, offering a more internally valid test of whether, and how, the hierarchy is structured (Mavropoulou & Sideridis, 2014). Such a design also permits direct comparison of theoretical predictions within the same individuals, an important advantage for testing whether the mechanisms proposed by category prototypicality, visibility salience, and Contact Theory hold, diverge, or interact within a single cultural context. Taken together, these frameworks converge on a testable expectation: if category prototypicality and visibility salience operate as universally as the Western literature suggests, physical and sensory disabilities should occupy the most favourable positions in the hierarchy regardless of setting, and this ordering should be largely insensitive to demographic and experiential moderators other than contact. If the underlying mechanisms are instead culturally contingent, as suggested by the divergent evidence emerging from Saudi Arabia and China, a

markedly different ordering, and a different pattern of moderation, should emerge within this context. The present study was designed to test these competing possibilities directly.

Materials and Methods

Participants

The sample comprised 195 students enrolled in Moroccan secondary schools (middle or high school), aged between 12 and 18 years, recruited through a voluntary, non-incentivised procedure. Table I summarises the demographic composition of the cohort. The sample skewed female (62.1%) and was drawn more often from urban than rural establishments (59.0% versus 41.0%). Roughly half of participants (51.8%) reported some form of prior personal contact with a person with a disability, whereas fewer than a third (32.8%) had previously participated in a physical education lesson alongside a peer with a disability.

Table I. Demographic characteristics of the sample (N = 195)

Characteristic	Category	n	%
Gender	Male	74	37.9
	Female	121	62.1
Zone	Urban	115	59.0
	Rural	80	41.0
Prior personal contact	Yes	101	51.8
	No	94	48.2
Prior Inclusive PE Experience	Yes	64	32.8
	No	131	67.2

Instrument

Peer attitudes toward including classmates with disabilities in general physical education were assessed with an adapted version of the Children's Attitudes Toward Integrated Physical Education-Revised (CAIPE-R; Block, 1995). The instrument comprises two subscales: (a) a General Attitudes subscale, which taps overall social acceptance, willingness to interact, and endorsement of shared participation; and (b) a Sport-Specific subscale, which addresses attitudes toward activity modifications and adapted equipment. Each participant evaluated four parallel vignettes, presented in a within-subjects design, describing a hypothetical classmate with a Physical Disability (PD), a Visual Impairment (VI), an Intellectual Disability (ID), or Autism Spectrum Disorder (ASD). Administration was restricted to the General Attitudes subscale, rated on a 4-point scale from 1 (no) to 4 (yes), with higher means denoting more favourable attitudes.

Following standard CAIPE-R scoring conventions (Block, 1995), Items 2 and 5 of the General Attitudes subscale, both negatively worded, were reverse-coded prior to the item-diagnostic and factor-analytic work described below. This recoding was applied identically across all four vignette conditions and was in place before the item-total correlation and alpha-if-item-deleted diagnostics and the one- versus two-factor confirmatory comparisons that followed. As reported in Validity and reliability, Items 2 and 5 proved to be the two weakest performers across all four vignettes and were subsequently dropped; the final five-item composite retained for the reliability estimates, the measurement invariance testing, and every inferential (ANOVA) analysis in Results therefore comprises Items 1, 3, 4, 6, and 7. The Sport-Specific subscale, which requires disability-tailored rewording of activity-modification items, was deliberately omitted: retaining only the General Attitudes items preserved strict structural equivalence across the four vignette conditions, avoided introducing content confounds between disability types, and limited fatigue across four repeated evaluations. This exclusion restricts the present conclusions to general social-acceptance attitudes and may not generalise to attitudes toward activity-specific accommodation.

Cross-cultural adaptation followed established guidelines for instrument translation (Beaton et al., 2000; Brislin, 1970; Hambleton, 2005). A committee of three bilingual experts in physical education and adapted physical activity produced an Arabic version grounded in conceptual and experiential equivalence rather than literal translation, cross-checking the four vignette texts for identical phrasing and comparable reading difficulty. All seven original General Attitudes items were retained through this adaptation stage, pending empirical evaluation.

Validity and reliability

Internal consistency of the four vignette-specific subscales was first examined on the original seven-item version (N = 195). Reliability proved marginal, ranging from $\alpha = .664$ to $.687$ and $\omega = .735$ to $.751$, with Cronbach's alpha falling below the conventional $.70$ threshold for three of the four conditions (Nunnally & Bernstein, 1994). Corrected item-total correlations and alpha-if-item-deleted diagnostics converged on two items showing a consistently weak relationship with their parent subscale across all four vignettes ($r = .08-.22$): one concerning perceived disruption to lesson pacing, and one expressing a preference for segregated instructional placement.

To determine whether these items reflected a substantively distinct attitudinal facet rather than simple measurement noise, competing one- and two-factor confirmatory models were fitted separately for each vignette

subscale. Given the four-point ordinal response format of the General Attitudes items, all confirmatory factor analyses used the WLSMV (weighted least squares mean- and variance-adjusted) estimator. The two-factor solution did not improve fit relative to the one-factor model for PD or ASD ($\Delta\text{CFI} < .01$, with BIC favouring the more parsimonious structure), fit markedly worse for ID ($\text{CFI} = .61$ versus $.85$), and yielded an out-of-range inter-factor correlation for VI. The putative second factor also showed poor internal reliability across all four subscales ($\alpha \approx .34-.35$). On the strength of this converging evidence, both items were dropped and each subscale was retained as a unidimensional five-item measure.

Absolute fit statistics for the four retained one-factor models are reported in Table II. All four models showed acceptable to good fit (Hu & Bentler, 1999): CFI ranged from .93 (ID) to .96 (PD), RMSEA from .05 (PD) to .07 (ID), and SRMR from .04 (PD) to .06 (ID), supporting the unidimensional structure of each revised measure.

Table II. Confirmatory factor analysis fit indices for the four retained one-factor models (WLSMV estimator)

Condition	CFI	RMSEA	SRMR
PD	.96	.05	.04
VI	.94	.06	.05
ID	.93	.07	.06
ASD	.95	.06	.05

This refinement produced a consistent and substantial gain in internal consistency across all four subscales (Table III), with final estimates of $\alpha = .799$, $\omega = .817$ (PD); $\alpha = .799$, $\omega = .809$ (VI); $\alpha = .833$, $\omega = .843$ (ID); and $\alpha = .823$, $\omega = .837$ (ASD), all comfortably exceeding conventional adequacy thresholds. All results reported below are based on this revised five-item composite.

Because composite scores are compared across gender, zone, contact, prior inclusive PE experience, and age groups in the moderation analyses below, measurement invariance of the four vignette subscales was tested across gender, contact, zone, and prior inclusive PE experience groups using multiple-group confirmatory factor analysis with WLSMV estimation. Configural, metric, and scalar invariance models were compared using ΔCFI and ΔRMSEA , with invariance supported when $\Delta\text{CFI} \leq .01$ and $\Delta\text{RMSEA} \leq .015$ (Chen, 2007). Across all four vignettes and all four grouping variables, metric and scalar invariance were supported, indicating that the scales measure the same construct equivalently across these subgroups.

Procedure and ethical considerations

The study received formal authorisation from the Regional Directorate of Education for Skhirat-Témara. A convenience sampling strategy was employed, targeting secondary schools (middle and high schools) within the directorate's jurisdiction. A total of 5 schools were invited to participate, comprising 24 classes (18 middle school and 6 high school). Of the 240 students initially approached, 195 provided complete consent and data, yielding a response rate of 81.3%. Non-participation was primarily attributable to absence on the day of data collection, parental non-consent, or incomplete questionnaire submission.

Participation was strictly voluntary. Informed consent was obtained from parents or legal guardians prior to data collection, following distribution of an information sheet describing the study's aims, procedures, and participant rights. Guardians and students were informed that accessing and completing the questionnaire constituted voluntary agreement to participate and that participants retained the right to withdraw at any point without penalty or need for justification. The instrument was administered digitally through Google Forms via a secure link; no personally identifying information was collected, and responses were recorded anonymously throughout.

Statistical analysis

All analyses were conducted in R (version 4.3; R Core Team, 2023) using psych (Revelle, 2023) for reliability and item diagnostics, lavaan for the confirmatory one- versus two-factor comparisons and the measurement invariance sequence (WLSMV estimator throughout), ez (Lawrence, 2016) for the repeated-measures and mixed analyses of variance, and emmeans (Lenth, 2023) for estimated marginal means, the planned contrast, and Bonferroni-adjusted pairwise comparisons.

A sensitivity power analysis using Monte Carlo simulation (500 replications, drawn from a multivariate-normal model fitted to the observed condition means and covariance structure) indicated that the study was adequately powered ($\geq .80$) to detect effects of partial $\eta^2 \geq .02$ for the primary repeated-measures ANOVA ($\alpha = .05$, $N = 195$, four repeated measures). Post hoc power for the omnibus test and each pairwise comparison is reported alongside the corresponding result in Results (Table VI).

A one-way repeated-measures ANOVA examined the effect of disability type (PD, VI, ID, ASD) on the five-item attitude composite. Mauchly's test indicated a violation of sphericity, and the Greenhouse-Geisser correction (Greenhouse & Geisser, 1959; Mauchly, 1940) was applied throughout. A single planned orthogonal contrast tested the a priori prediction that attitudes toward PD would exceed the pooled mean of the three remaining conditions, reflecting the category-prototypicality and visibility-salience accounts, followed by Bonferroni-adjusted pairwise comparisons among all six disability-type pairs, with Cohen's d (Cohen, 1988) computed for each. Five mixed ANOVAs, each crossing disability type (within-subjects) with a single demographic or experiential factor (gender, zone, contact, prior inclusive PE experience, age group) entered

between-subjects, tested the moderation hypotheses in RQ3. All tests were two-tailed with $\alpha = .05$; effect sizes are reported as partial η^2 , supplemented by partial ω^2 for the omnibus test (Lakens, 2013). All data visualisations were produced in R using ggplot2 (Wickham, 2016).

Results

Participant characteristics and scale refinement

The final analytic sample comprised 195 Moroccan secondary-school students (62.1% female; see Table I), skewing urban (59.0% versus 41.0%). Slightly more than half (51.8%) reported prior personal contact with a person with a disability, while only a minority (32.8%) had previously attended a PE lesson alongside a peer with a disability. Confirmatory factor analysis using the WLSMV estimator supported a unidimensional five-item structure for each vignette condition (CFI = .93–.96, RMSEA = .05–.07, SRMR = .04–.06; Table II), and the revised five-item General Attitudes subscales showed good internal consistency across all four disability conditions ($\alpha = .799$ –.833, $\omega = .809$ –.843; Table III). Metric and scalar measurement invariance across gender, zone, contact, and prior inclusive PE experience groups was supported.

Descriptive statistics and attitude hierarchy

Table III presents descriptive statistics and reliability estimates for the four revised subscales. Attitudes were generally favourable across all disability categories, with means clustering in the upper half of the 1–4 range (PD: $M = 3.36$, $SD = 0.52$; ASD: $M = 3.30$, $SD = 0.56$; ID: $M = 3.27$, $SD = 0.58$; VI: $M = 3.21$, $SD = 0.55$). All four distributions displayed modest negative skew (–0.77 to –1.00) and elevated kurtosis (1.56–1.88), indicating a ceiling-leaning response pattern typical of socially desirable attitude items.

Figure I displays the full distribution underlying these means: overlapping interquartile ranges across all four conditions indicate that, despite the statistically reliable mean differences reported above, individual attitudes toward different disability types are far from categorically distinct, coexisting with substantial within-condition variability and a consistent leftward skew toward the upper end of the scale.

Table III. Descriptive statistics and reliability of the revised five-item General Attitudes subscales (N = 195)

Condition	M	SD	Median	IQR	α / ω
PD	3.36	0.52	3.4	0.8	.799 / .817
VI	3.21	0.55	3.2	0.6	.799 / .809
ID	3.27	0.58	3.4	0.8	.833 / .843
ASD	3.30	0.56	3.4	0.8	.823 / .837

Error bars represent 95% CI; n = 780 total observations

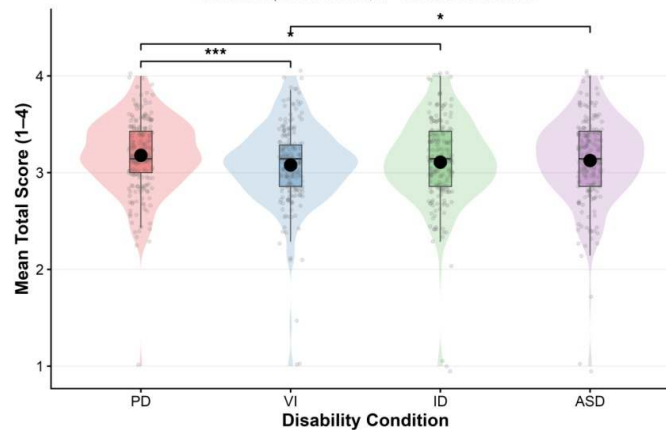


Figure I. Mean attitude scores by disability type. Error bars represent 95% CI; n = 780 total observations.

Main effect of disability type

A one-way repeated-measures ANOVA tested whether attitude scores varied by disability type. Mauchly's test indicated a violation of sphericity, $W = .902$, $\chi^2(5) = 19.87$, $p = .001$, and the Greenhouse-Geisser correction ($\epsilon = .931$) was applied. The analysis revealed a statistically significant main effect of disability type, $F(2.79, 541.62) = 7.54$, $p < .001$, partial $\eta^2 = .037$, partial $\omega^2 = .008$ (Table IV), a small effect by conventional benchmarks (Cohen, 1988), affirmatively answering RQ1. The sensitivity power analysis indicated the study was powered to detect effects of partial $\eta^2 \geq .02$ at power = .80; the observed effect (partial $\eta^2 = .037$) exceeded this threshold, with observed power for the omnibus test estimated at 99% (Table VI).

Table IV. One-way repeated-measures ANOVA: main effect of disability type

Effect	Mauchly W	p	GG ϵ	df1	df2	F / p / η^2 p
Disability type	.902	.001	.931	2.79	541.62	7.54 / <.001 / .037

Planned contrast and post hoc comparisons

A planned orthogonal contrast tested the a priori hypothesis that attitudes toward PD would exceed the pooled mean of VI, ID, and ASD. This contrast was confirmed, estimate = 0.104, SE = 0.026, 95% CI [0.054, 0.155], $t(194) = 4.061$, $p < .001$, $d = 0.291$. Bonferroni-adjusted pairwise comparisons (Table V) refined this picture. PD exceeded VI, MD = 0.152, $t(194) = 4.665$, $p < .001$, $d = 0.334$, and ID, MD = 0.095, $t(194) = 2.931$, $p = .021$, $d = 0.210$, but did not differ from ASD, MD = 0.066, $t(194) = 2.017$, $p = .265$, $d = 0.144$. VI was significantly lower than ASD, MD = -0.086, $t(194) = -2.647$, $p = .050$, $d = -0.190$, while VI and ID did not differ reliably, nor did ID and ASD.

Table V. Bonferroni-adjusted pairwise comparisons among disability-type conditions

Comparison	MD	SE	t(194)	p (adj)	d
PD vs. VI	0.152	0.033	4.665	<.001	0.334
PD vs. ID	0.095	0.033	2.931	.021	0.210
PD vs. ASD	0.066	0.033	2.017	.265	0.144
VI vs. ID	-0.056	0.033	-1.733	.501	-0.124
VI vs. ASD	-0.086	0.033	-2.647	.050	-0.190
ID vs. ASD	-0.030	0.033	-0.914	1.000	-0.065

Post hoc statistical power is summarised in Table VI. Power tracked effect magnitude closely: comparisons with the largest standardised differences (PD vs. VI) were well powered (99%), while the smallest (ID vs. ASD) was severely underpowered (3%).

Table VI. Post hoc statistical power for the omnibus test and pairwise comparisons

Analysis	Effect size	Power
Main ANOVA (disability type)	partial $\eta^2 = .037$	99%
PD vs. VI	$d = 0.334$	99%
PD vs. ID	$d = 0.210$	61%
PD vs. ASD	$d = 0.144$	31%
VI vs. ID	$d = -0.124$	18%
VI vs. ASD	$d = -0.190$	48%
ID vs. ASD	$d = -0.065$	3%

Together, the pairwise comparisons describe a two-tier hierarchy, $PD \geq ASD > ID \geq VI$, answering RQ2 by diverging from the pattern most consistently reported in Western samples, where physical and sensory disabilities typically rate more favourably than cognitive or behavioural conditions and VI sits near the top alongside PD. Here, VI occupied the least favourable position, while ASD was statistically equivalent to PD.

Item-level convergence of the hierarchy To determine whether the two-tier hierarchy reflected a general attitudinal orientation or was driven by a subset of items, mean scores for each of the five retained items were plotted separately by disability condition (Figure II). The four profiles converged closely on the two behavioural-intention items (Items 6 and 7), on which all conditions scored between 3.36 and 3.53, but diverged more visibly on Items 1 and 3, where VI trailed the other three conditions by 0.13–0.27 points. This pattern indicates that the composite hierarchy is not an artefact of any single item, but rather reflects a general orientation that is most pronounced for broad social-acceptance items and attenuates for items tapping concrete behavioural intentions.

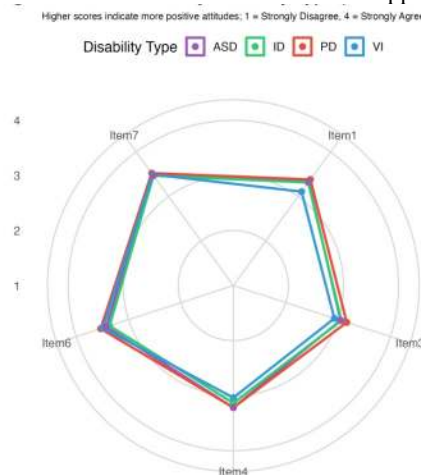


Figure II. Item profiles by disability type (revised scale). Higher scores indicate more positive attitudes; 1 = Strongly Disagree, 4 = Strongly Agree.

Moderation by demographic and experiential factors

Five mixed ANOVAs tested moderation of the hierarchy's shape (RQ3 for gender, zone, contact, age, and prior inclusive PE experience; Table VII). Within each model, the main effect of disability type remained significant. The interaction between disability type and the moderator was non-significant for gender, $F(3, 579) = 0.12$, $p = .951$, partial $\eta^2 = .001$; zone, $F(3, 579) = 0.79$, $p = .500$, partial $\eta^2 = .004$; prior inclusive PE experience, $F(3, 579) = 0.32$, $p = .810$, partial $\eta^2 = .002$; and age group, $F(6, 576) = 0.73$, $p = .626$, partial $\eta^2 = .008$. The hierarchy's shape therefore held consistently across these groups.

The Contact $\times$ Type interaction, by contrast, was significant, $F(3, 579) = 4.40$, $p = .004$, partial $\eta^2 = .022$. Participants reporting prior contact displayed higher attitude scores across all four types relative to those without. The elevation was largest for PD ($\Delta = +0.25$), followed by ID ($\Delta = +0.12$), with smaller gains for VI ($\Delta = +0.07$) and ASD ($\Delta = +0.03$), indicating that contact narrowed, without eliminating, the disability-type gradient. This pattern is visualised in Figure III: the contact-exposed group's advantage is widest for PD and narrows progressively toward ASD, where the two contact groups converge, illustrating how personal contact compresses rather than eliminates the disability-type gradient.

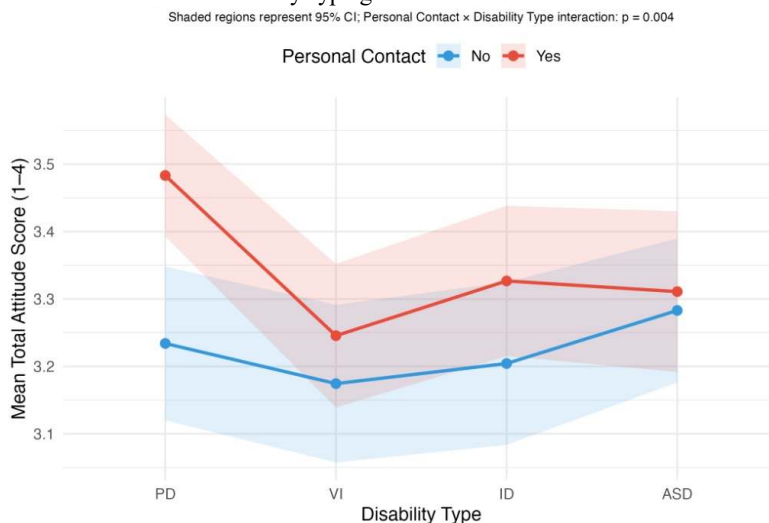


Figure III. Moderation of hierarchy by personal contact. Shaded regions represent 95% CI; Personal Contact $\times$ Disability Type interaction: $p = .004$.

The between-subjects main effect of zone on overall attitude level was significant, $F(1, 193) = 6.83$, $p = .010$, partial $\eta^2 = .034$: urban students reported more favourable attitudes overall than rural students. Gender, $F(1, 193) = 3.19$, $p = .075$, partial $\eta^2 = .016$, and contact, $F(1, 193) = 2.95$, $p = .087$, partial $\eta^2 = .015$, showed the same direction of effect but did not reach conventional significance; neither prior inclusive PE experience nor age group was significant.

Table VII. Mixed ANOVA: moderation of the disability-type hierarchy by demographic and experiential factors

Moderator	Between F	Between p	η^2p	Type F	Int. F	Int. p / η^2p
Gender	3.19	.075	.016	7.51	0.12	.951 / .001
Zone	6.83	.010	.034	7.54	0.79	.500 / .004
Contact	2.95	.087	.015	7.68	4.40	.004 / .022
Prior Inclusive PE	1.29	.258	.007	7.52	0.32	.810 / .002
Age group	0.69	.501	.007	7.52	0.73	.626 / .008

Discussion

A two-tier structure of the disability-type hierarchy

This study asked whether the disability-type hierarchy documented in Western educational research generalises to Moroccan secondary-school students in inclusive physical education, and whether contact, demographic factors, or age moderate its shape. In a within-subjects design where each participant evaluated Physical Disability (PD), Visual Impairment (VI), Intellectual Disability (ID), and Autism Spectrum Disorder (ASD), we found a significant but modest main effect of disability type, $F(2.79, 541.62) = 7.54$, $p < .001$, partial $\eta^2 = .037$. That modesty is informative: disability type accounted for well under 5% of attitude variance once between-person differences were removed, so condition-specific stereotypes are a minor contributor next to individual differences among raters, prior contact chief among them.

Contrary to the strict ordinal hierarchy reported in Western literature (PD > VI > ID > ASD; Laws & Kelly, 2005; de Boer et al., 2012), the observed ordering was PD $\geq$ ASD > ID $\geq$ VI. The contrasts are diagnostic:

PD outperformed VI and ID but not ASD, and ID differed reliably from neither VI nor ASD, suggesting two functional tiers, PD and ASD favoured over ID and VI, consistent with categorical rather than continuous stereotyping. Power varied sharply, though: only the PD-VI contrast and the omnibus test reached $\geq 80\%$, while the null ID-ASD and VI-ID contrasts stood at 3% and 18%. These nulls are inconclusive rather than evidence of equivalence, and the two-tier structure awaits confirmation in a larger sample.

Reinterpreting the position of autism spectrum disorder

The clearest departure from expectation is ASD's position, statistically indistinguishable from PD and above VI, which upends assumptions built on visibility salience. Western studies typically document unfavourable peer attitudes toward autism relative to physical and sensory disabilities, and toward behavioural conditions more broadly (Campbell et al., 2004; de Boer et al., 2012); here ASD sits with PD at the top, suggesting the hierarchy's mechanisms are more culturally contingent than assumed. Visibility may operate differently here: VI, though visible, may carry associations of dependency or burden in PE settings, whereas ASD, despite lower visibility, may be read through community narratives stressing participation over limitation. Islamic teachings on compassion, charity, and inherent dignity may also soften attitudes toward conditions seen as less controllable or innate (Hammad et al., 2022). Item-level results support this: reordering concentrated in general social-acceptance items, while behavioural-intention items converged within a narrow 0.17-point band across conditions. Willingness to act inclusively, playing alongside a classmate, appears fairly uniform, whereas abstract judgements of comfort and desirability as a partner are where stereotyping concentrates, pointing practitioners toward attitude-focused rather than purely behavioural interventions.

The distinct role of personal contact among other moderators

Of five candidate moderators, only prior contact significantly shaped the hierarchy, $F(3, 579) = 4.40$, $p = .004$, partial $\eta^2 = .022$. Students reporting contact showed more positive attitudes across all four conditions, with the largest gain for PD ($\Delta = +0.25$) and smallest for ASD ($\Delta = +0.03$), a compensatory rather than additive pattern: contact disproportionately lifted attitudes toward otherwise lowest-ranked conditions, consistent with a ceiling-limited account where less room remains for improvement once attitudes are already favourable. Contact-based interventions may thus be most cost-effective when targeted at whichever conditions a given population rates least favourably, rather than delivered uniformly. This supports Contact Theory and extends its applicability to Morocco (Allport, 1954; Pettigrew & Tropp, 2006), while the absence of shape-moderation by gender, zone, prior inclusive PE experience, or age reinforces the hierarchy's stability across strata. The null gender interaction is notable given that Western studies often report boys expressing more negative attitudes than girls (Nowicki, 2006). The null result for prior inclusive PE experience is more telling: sharing a class with a peer with a disability, without more, appears insufficient to reorganise the hierarchy, consistent with the contact literature's emphasis on quality of contact, not mere occurrence, as the active ingredient in attitude change (Pettigrew & Tropp, 2006; Koster et al., 2009).

The non-significant age moderation aligns with evidence that disability attitudes are relatively stable during adolescence and largely established by early secondary school (Nowicki, 2006; de Boer et al., 2012), suggesting intervention may work better earlier in childhood. The significant zone effect indicates that, while the hierarchy's shape is stable, overall attitude levels run higher among urban than rural students, perhaps reflecting differential exposure to inclusive-education messaging, disability services, or media. The within-subjects design merits its own comment. The small effect for disability type (partial $\eta^2 = .037$) is substantially smaller than typically reported in between-subjects studies (often .08 to .12; de Boer, Pijl, Post, & Minnaert, 2013). Controlling for individual differences yields a more conservative, internally valid estimate, suggesting disability type, though significant, may not be the primary driver of peer attitudes here.

Methodological contribution and measurement refinement

The study also offers a methodological contribution to cross-cultural measurement of disability attitudes. The revised five-item structure achieved acceptable-to-good fit for each vignette and supported metric and scalar invariance across gender, zone, contact, and prior inclusive PE experience subgroups, indicating comparable measurement across groups and that mean differences are unlikely to reflect differential item functioning. The same two items were removed during refinement across all four conditions, pointing to a systematic, condition-independent source of measurement noise, plausibly translation or cultural relevance, rather than error localised to one vignette. This points to the value of piloting translated instruments item-by-item rather than assuming invariance from the source-language version, and offers one of the first psychometrically validated Arabic-language adaptations of a multi-condition disability-attitude measure, a foundation for future cross-national comparisons in the MENA region.

Several limitations warrant acknowledgement. The vignette-based design may not fully capture real-life interaction; future work should incorporate behavioural observation and longitudinal tracking. Fixed vignette order may have introduced order effects, and the sample, drawn from a single region and educational level with an urban and female skew (Table I), limits how confidently observed attitude levels, if not the hierarchy's shape, can be generalised. Self-report leaves findings subject to social desirability bias, and excluding the Sport-Specific subscale restricts conclusions to general social-acceptance attitudes. Several pairwise comparisons underlying the two-tier hierarchy were underpowered (3-31%) and should be treated as inconclusive rather than confirmatory, and the cross-sectional design precludes causal inference about the effect of contact on attitudes.

Conclusions

This study provides the first within-subjects, multi-disability attitudinal profile of Moroccan secondary-school students in inclusive physical education, revealing a two-tier hierarchy, $PD \geq ASD > ID \geq VI$, that diverges from the strict ordinal pattern reported in Western samples. Autism Spectrum Disorder occupied a far more favourable position than Western evidence would predict, while Visual Impairment occupied the lowest tier, a divergence that challenges the presumed universality of category-prototypicality and visibility-salience accounts and points instead to religious, cultural, and contextual factors as shapers of peer attitudes. The significant moderation by prior personal contact supports Contact Theory and highlights the importance of meaningful intergroup interaction, while the absence of shape-moderation by gender, zone, prior inclusive PE experience, and age suggests this ordering is a stable phenomenon that transcends these demographic boundaries. Item-level analysis reinforces this interpretation: divergence between conditions concentrated in items tapping general social acceptance and comfort as a partner, while items tapping concrete behavioural intentions, such as willingness to play alongside a classmate, converged closely across all four conditions. This pattern suggests that Moroccan adolescents' willingness to act inclusively is comparatively uniform across disability types, and that the observed hierarchy reflects differences in abstract social evaluation rather than in the concrete cooperative behaviours PE actually requires, a distinction with direct bearing on where interventions should be targeted. The finding that personal contact, and only personal contact, moderated the hierarchy's shape further indicates that its structure is not immutable: attitudes toward the least-favoured conditions (ID and VI) were disproportionately elevated among students reporting prior contact, narrowing, without eliminating, the gap with PD and ASD. This selective malleability is consistent with Contact Theory's account of the hierarchy as an experience-dependent pattern rather than a fixed reflection of category prototypicality or visibility, and it identifies contact as the single most actionable lever available to practitioners seeking to reduce disability-specific stereotyping in this context.

Theoretically, this study contributes in two ways. First, by documenting a hierarchy that departs from the Western $PD > VI > ID > ASD$ ordering in both the elevated position of ASD and the depressed position of VI, it challenges the assumption that category prototypicality and visibility salience operate as culture-invariant mechanisms, and instead supports an account in which religious, cultural, and contextual factors reshape which disability types are perceived as more or less socially threatening. Second, by showing that personal contact, and no other candidate moderator, altered the hierarchy's shape, the study extends Contact Theory to a new cultural and educational setting and offers among the first direct evidence that its predictions travel to the MENA region. Methodologically, the within-subjects design constitutes a further contribution: by holding individual differences constant, it yields a more internally valid, and more conservative, estimate of the disability-type effect than the between-subjects designs that dominate this literature, and the psychometric validation of an Arabic-language, multi-condition CAIPE-R adaptation provides a reusable instrument for future cross-national work in the region. These findings carry direct implications for policy and practice. Sensitisation programmes should not assume uniform attitudes across disability types: the relatively favourable position of ASD and the unfavourable position of VI suggest that interventions be tailored to the specific concerns associated with each condition. Contact-based approaches should be prioritised, particularly those facilitating meaningful, cooperative interaction between students with and without disabilities in PE. Teacher training should emphasise building inclusive PE environments that support positive peer interaction rather than simple co-placement, and because age did not moderate the hierarchy's shape, intervention efforts should begin early, before attitude patterns become entrenched. Beyond Morocco, these findings offer the MENA region a first, culturally specific empirical baseline against which future disability-attitude research and inclusion programming can be benchmarked, addressing a gap that has, until now, left policymakers reliant on evidence generated in demographically and culturally distant settings.

In sum, Moroccan secondary students do not reproduce the Western $PD > VI > ID > ASD$ ordering: they instead show a two-tier $PD \geq ASD > ID \geq VI$ hierarchy in which a sensory disability ranks lowest and a behavioural condition ranks highest, giving Morocco and the broader MENA region a concrete, culturally specific starting point for designing disability-responsive inclusion programmes in PE.

Recommendations

For practitioners, the central implication is that inclusive PE programming in Morocco should not treat disability-specific attitudes as interchangeable, teacher training should explicitly address the comparatively unfavourable position of Visual Impairment and Intellectual Disability, and sensitisation materials should be tailored to the specific concerns students associate with each condition rather than designed around a single generic disability category. For policymakers, the finding that personal contact is the only factor that reliably reshapes the hierarchy argues for embedding structured, cooperative contact opportunities, rather than passive co-placement, within the National Inclusive Education Programme's implementation guidance.

These results are significant beyond their immediate empirical contribution. They demonstrate that a theoretical framework developed almost entirely from Western evidence does not transfer intact to a MENA setting, underscoring the broader methodological point that disability-attitude research cannot assume the generalisability of its central constructs across cultural contexts without direct testing. For a region in which

inclusive education policy has outpaced the empirical evidence needed to implement it well, the study offers a concrete, replicable template, a validated instrument, a within-subjects design, and a moderator-testing strategy, that other MENA researchers and ministries of education can adapt to their own national contexts.

Future research should build on these findings along several lines: cross-cultural comparisons that administer the same instrument and design across multiple MENA countries, to establish whether the two-tier $PD \geq ASD > ID \geq VI$ pattern observed here is specific to Morocco or reflects a broader regional pattern; longitudinal designs capable of clarifying the causal direction of the contact-attitude relationship, since the present cross-sectional data cannot establish whether contact improves attitudes, more positive attitudes encourage contact, or both; qualitative work exploring the lived mechanisms behind the favourable position of ASD and the unfavourable position of VI, which the present quantitative design can describe but not explain; larger, adequately powered samples capable of adjudicating the underpowered ID-ASD and VI-ID pairwise comparisons that remain inconclusive here; and structured intervention studies that test whether deliberately increasing contact, rather than simply measuring its naturally occurring variation, produces the same compensatory attenuation of the hierarchy observed in this study.

Conflicts of interest

The authors declare no conflicts of interest.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Claude AI in order to support minor linguistic editing and refinement of the English language. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Ethics Statement

This research was conducted in accordance with the principles of the Declaration of Helsinki. Respondents provided personal written consent to participate in the study, after which they received access to the questionnaires.

References

- Allport, G. W. (1954). *The nature of prejudice*. Addison-Wesley.
- Alhumaid, M. M. (2023). Primary students' attitudes towards peers with disabilities in physical education in Saudi Arabia. *Children*, 10(3), 580. <https://doi.org/10.3390/children10030580>
- Alhumaid, M. M., Alfozan, S. K., Alobaid, M. A., AlNajjar, N. A., Althikr Allah, B. A., & Said, M. A. (2023). Effects of disability type, prior contact, and school setting on attitudes toward peers with disabilities among Saudi female students aged 7 to 12 years. *PLoS ONE*, 18(9), e0291274. <https://doi.org/10.1371/journal.pone.0291274>
- Armstrong, M., Morris, C., Abraham, C., & Tarrant, M. (2017). 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>
- Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, 25(24), 3186–3191. <https://doi.org/10.1097/00007632-200012150-00014>
- 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>
- Block, M. E., & Obrusnikova, I. (2007). Inclusion in physical education: A review of the literature from 1995–2005. *Adapted Physical Activity Quarterly*, 24(2), 103–124. <https://doi.org/10.1123/apaq.24.2.103>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>
- Campbell, J. M., Ferguson, J. E., Herzinger, C. V., Jackson, J. N., & Marino, C. A. (2004). Combined descriptive and explanatory information improves peers' perceptions of autism. *Research in Developmental Disabilities*, 25(4), 321–339. <https://doi.org/10.1016/j.ridd.2004.01.005>
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, 14(3), 464–504. <https://doi.org/10.1080/10705510701301834>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum.
- de Boer, A., Pijl, S. J., & Minnaert, A. (2012). Students' attitudes towards peers with disabilities: A review of the literature. *International Journal of Disability, Development and Education*, 59(4), 379–392. <https://doi.org/10.1080/1034912X.2012.723944>

- de Boer, A., Pijl, S. J., Post, W., & Minnaert, A. (2013). Peer acceptance and friendships of students with disabilities in general education: The role of child, peer, and classroom variables. *Social Development*, 22(4), 831–844. <https://doi.org/10.1111/j.1467-9507.2012.00670.x>
- Dukmak, S., Abo Hamza, E. G., Alkhatib, R., Daghestani, W., & Bedewy, D. (2024). Inclusive attitudes: typically developing students and students with disabilities in UAE classrooms. *Frontiers in Education*, 9, Article 1388334. <https://doi.org/10.3389/educ.2024.1388334>
- Greenhouse, S. W., & Geisser, S. (1959). On methods in the analysis of profile data. *Psychometrika*, 24(2), 95–112. <https://doi.org/10.1007/BF02289823>
- Hambleton, R. K. (2005). Issues, designs, and technical guidelines for adapting tests into multiple languages and cultures. In R. K. Hambleton, P. F. Merenda, & C. D. Spielberger (Eds.), *Adapting educational and psychological tests for cross-cultural assessment* (pp. 3–38). Lawrence Erlbaum.
- Hammad, H., Elbarazi, I., Bendak, M., Obaideen, K., Amanatullah, A., Khan, B. S. B., Ismail, L., Kieu, A., & Khan, M. A. (2022). Influence of religiosity on youths' attitudes towards people with disabilities in the United Arab Emirates. *Journal of Religion and Health*, 63(3), 2423–2442. <https://doi.org/10.1007/s10943-022-01646-x>
- Hebl, M. R., & Kleck, R. E. (2000). The social consequences of physical disability. In T. F. Heatherton, R. E. Kleck, M. R. Hebl, & J. G. Hull (Eds.), *The social psychology of stigma* (pp. 419–439). Guilford Press.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jones, E. E., Farina, A., Hastorf, A. H., Markus, H., Miller, D. T., & Scott, R. A. (1984). *Social stigma: The psychology of marked relationships*. W. H. Freeman.
- Koster, M., Nakken, H., Pijl, S. J., & van Houten, E. (2009). Being part of the peer group: A literature study focusing on the social dimension of inclusion in education. *International Journal of Inclusive Education*, 13(2), 117–140. <https://doi.org/10.1080/13603110701284680>
- Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4, Article 863. <https://doi.org/10.3389/fpsyg.2013.00863>
- Laws, G., & Kelly, E. (2005). The attitudes and friendship intentions of children in United Kingdom mainstream schools towards peers with physical or intellectual disabilities. *International Journal of Disability, Development and Education*, 52(2), 79–99. <https://doi.org/10.1080/10349120500086298>
- Lawrence, M. A. (2016). ez: Easy analysis and visualization of factorial experiments (R package version 4.4-0). <https://CRAN.R-project.org/package=ez>
- Lenth, R. V. (2023). emmeans: Estimated marginal means, aka least-squares means (R package version 1.8.9). <https://CRAN.R-project.org/package=emmeans>
- Lee, J., & Koo, K. (2021). 'I was scared at first, but not anymore': Interpersonal contact and attitudes toward people with intellectual and developmental disabilities among Korean American adolescents and young adults. *International Journal of Developmental Disabilities*, 68(5), 671–680. <https://doi.org/10.1080/20473869.2021.1874602>
- Mauchly, J. W. (1940). Significance test for sphericity of a normal n-variate distribution. *The Annals of Mathematical Statistics*, 11(2), 204–209. <https://doi.org/10.1214/aoms/1177731915>
- Mavropoulou, S., & Sideridis, G. D. (2014). Knowledge of autism and attitudes of children towards their partially integrated peers with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 44(8), 1867–1885. <https://doi.org/10.1007/s10803-014-2059-0>
- Ministère de l'Éducation Nationale, de la Formation Professionnelle, de l'Enseignement Supérieur et de la Recherche Scientifique (MENFPESRS). (2019). *Mise en place du programme national de l'éducation inclusive au profit des enfants en situation de handicap : Mémento pour les directeurs régionaux et provinciaux d'éducation et de formation*. Direction des Curricula, in collaboration with UNICEF Morocco. <https://www.unicef.org/morocco/media/1496/file/Memento%20VF.pdf>
- Nowicki, E. A. (2006). A cross-sectional multivariate analysis of children's attitudes towards disabilities. *Journal of Intellectual Disability Research*, 50(5), 335–348. <https://doi.org/10.1111/j.1365-2788.2005.00781.x>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, 90(5), 751–783. <https://doi.org/10.1037/0022-3514.90.5.751>
- Pijl, S. J., Frostad, P., & Flem, A. (2008). The social position of pupils with special needs in regular schools. *Scandinavian Journal of Educational Research*, 52(4), 387–405. <https://doi.org/10.1080/00313830802184558>
- R Core Team. (2023). *R: A language and environment for statistical computing* (Version 4.3.2). R Foundation for Statistical Computing. <https://www.R-project.org/>
- Reina, R., Hutzler, Y., Iniguez-Santiago, M. C., & Moreno-Murcia, J. A. (2019). Student attitudes toward inclusion in physical education: The impact of ability beliefs, gender, and previous experiences. *Adapted Physical Activity Quarterly*, 36(1), 132–149. <https://doi.org/10.1123/apaq.2017-0146>

- Revelle, W. (2023). psych: Procedures for psychological, psychometric, and personality research (R package version 2.3.9). Northwestern University. <https://CRAN.R-project.org/package=psych>
- Tringo, J. L. (1970). The hierarchy of preference toward disability groups. *The Journal of Special Education*, 4(3), 295–306. <https://doi.org/10.1177/002246697000400306>
- United Nations. (2006). Convention on the Rights of Persons with Disabilities, Article 24 (Education). United Nations Treaty Series, 2515, 3. Adopted 13 December 2006; ratified by Morocco 8 April 2009. <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
- Wang, L., & Qi, J. (2019). Effect of student-related factors on their attitudes towards peers with disabilities in physical education: Evidence from elementary schools in China. *Asia Pacific Journal of Education*, 40(2), 143–153. <https://doi.org/10.1080/02188791.2019.1692781>
- Wang, Z., Xu, X., Han, Q., Chen, Y., Jiang, J., & Ni, G.-X. (2021). Factors associated with public attitudes towards persons with disabilities: A systematic review. *BMC Public Health*, 21, 1058. <https://doi.org/10.1186/s12889-021-11139-3>
- Wickham, H. (2016). ggplot2: Elegant graphics for data analysis (2nd ed.). Springer-Verlag. <https://doi.org/10.1007/978-3-319-24277-4>
- Yokota, S., & Tanaka, M. (2022). Less negative implicit attitudes toward autism spectrum disorder in university students: A comparison with physical disabilities. *Journal of Autism and Developmental Disorders*, 54(1), 182–192. Advance online publication. <https://doi.org/10.1007/s10803-022-05749-y>