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Teachers' attitude towards inclusive education from 2000 to 2020: An extended meta-analysis

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ABSTRACT

This article presents a meta-analysis of the studies related to teachers' attitudes towards inclusive education for students with disabilities. It covers a total sample of 40512 in-service or pre-service teachers from 55 different countries. Globally, the teachers' attitude is positive. A meta-regression analysis shows that the attitude has notably progressed from 2000 to 2020. In addition, teachers' attitude is more favourable when the country's Human Development Index (HDI) is higher and special education teachers are more favourable to inclusive education than ordinary ones.

Introduction

This article studies teachers' attitudes towards inclusive education. To what extent are teachers favourable to it or not? This is an important question, since the attitude of teachers towards the schooling of students with disabilities in general classes is one of the key factors of success in inclusive education (Boyle et al., 2020). This research study has several objectives: the first is to determine whether teachers are favourable to inclusive education, and to what extent. The second objective is to determine whether this attitude has evolved over the last 20 years to our knowledge, no study has been published showing a change in attitude. The third one is to study the impact of various moderators in order to better understand the differences between countries. To achieve these objectives, it was decided to conduct an extensive meta-analysis on the largest possible dataset. Thus, studies with different types of teachers at different levels, studies in different countries, studies in the same country at different dates were collected. Then, to take into account the heterogeneity and to control the influence of each variable, a multiple regression was conducted.

Inclusive education worldwide, evolution over the last 20 years

Inclusive education consists in giving students with disabilities the possibility to study with other, non-disabled student. In the 21st Century, the notion of inclusion has gradually replaced that of integration, implying that it is up to the education system to adapt to everyone's needs. The main step forward was the adoption, in 2006, of the

Convention on the Rights of Persons with Disabilities (CRPD) by the General Assembly of the United Nations (2006). The states that ratified that convention commit themselves to ensure that "Persons with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live". To this day, it has been ratified by 163 countries. Thus, progressively, the right of students with disabilities to inclusive education has become effective. Today, the notion of an inclusive school has been broadened to a school that adapts to each individual needs. This entails a change of learning design, teaching and evaluation techniques, with a larger importance given to collaboration among people involved in the education and to a positive classroom climate (Booth et al., 2002; Loreman et al., 2014).

Numerous studies underline the fact that a positive attitude of teachers participates in the success of inclusive education (Avramidis & Norwich, 2002; De Boer et al., 2011). It has been observed that the more positive teachers' attitudes are, the more inclusive classroom practices are (Sharma & Sokal, 2016). The research conducted with students show that the attitude of teachers towards inclusion has a significant effect on the learning environment of pupils with special educational needs (Monsen et al., 2014; Monsen & Frederickson, 2004). For these reasons, it is important to study teachers' attitudes towards inclusive education.

Scruggs & Mastropieri (1996) conducted a literature review on 28 studies published between 1958 and 1995. Their conclusions were that teachers supported the concept of inclusion, but were reluctant to welcome disabled pupils in their classroom. Avramidis et al. (2000) reviewed the factors influencing teachers' attitude. Their attitude was

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judged globally positive, but did not show a desire to include every student whatever their disability. The teachers' attitude is strongly influenced by the nature and severity of the students' disabilities, and less strongly so by variables linked to the teachers themselves. Furthermore, variables linked to the environment such as the availability of physical and human support also influence their attitude. More recently, [De Boer et al. \(2011\)](#) reviewed the attitude of primary school teachers in general classes. They went through 26 studies published between 1998 and 2008. Their conclusions were different than those of the previous reviews. According to them, teachers have either negative or neutral attitudes towards inclusion.

Several meta-analyses of teachers' attitude (opinions, beliefs, feelings, etc.) towards inclusive education have been conducted recently. [Orakci et al.'s study \(2016\)](#) focuses on the effect of gender and training on teachers' attitude based on 23 studies published between 2005 and 2015 in 12 different countries. The authors' conclusions were that neither the teachers' gender nor their training had a significant impact on their attitude. [Van Steen et al.'s study \(2020\)](#), by means of a meta-regression analysis of 38 samples, brings to light the link between teachers' attitude and a cultural aspect of their country: individualism. The higher the country's level of individualism, the more favourable to inclusive education the teachers seem to be. The other cultural aspects and the moderators are not significant in multiple meta-regression analysis.

Measuring attitude with various scales

To study attitudes in a quantitative way for a large number of teachers, the use of questionnaires is widespread. Various scales are used: either standardized scales that have been used previously or scales designed for the study. One of the oldest scales is the one developed by [Larivee & Cook \(1979\)](#): the ORM scale (Opinions Relative to Mainstreaming). It has been updated since then; the vocabulary has been adapted, for example by replacing the term "handicapped" with "disabled" ([Antonak & Larivee, 1995](#)). The new version is called ORI (Opinions Relative to Integration). One example of question is "The challenge of being in a general classroom will promote the academic growth of the student with a disability", to which the teacher must answer according to a Likert scale in 6 points ranging from "Strongly disagree" to "Strongly agree". This first questionnaire only measures the cognitive dimension of attitude, i.e. the knowledge and beliefs that people have on the topic. The STATIC questionnaire developed by [Cochran \(1997\)](#) measures the cognitive aspects but also the feelings of teachers towards inclusion. The ATIES questionnaire ([Wilczenski, 1995](#)) measures inclusion through its social, physical and behavioural dimensions. Based on these scales, new questionnaires have been more recently developed. The SACIER-R questionnaire ([Forlin et al., 2011](#)), reuses 7 items from the ATIES one, as well as items from other earlier scales regarding attitudes towards disabled people and worries related to inclusion. As for the MATIES questionnaire ([Mahat, 2008](#)), it measures attitude in three fields and according to three aspects of inclusion. The more recent AIS questionnaire ([Sharma & Jacobs, 2016](#)) is a short one that measures teachers' attitude and behaviour towards inclusion. A comparative study of the main scales used for research has been conducted by [Ewing et al. \(2018\)](#). The study reviews 9 questionnaires. Their validity and reliability levels are correct. Only two of these questionnaires take into account the three components of attitude, i.e. the cognitive, affective and behavioural aspects – namely, the SACIER-R and MATIES questionnaires. All studies used in the meta-analysis are based on questionnaires, those described above will be qualified as "widespread" later on.

Factors that can influence teachers' attitude

Level of development and cultural differences from country to country

A significant number of publications compare the attitude of teachers in two countries or more. Studies comparing more than two countries are rare. One of the oldest studies is the one conducted by UNESCO in 14 countries ([Bowman, 1986](#)). It interviews teachers from both developed and developing countries, using the same tools. [Leyser et al.'s study \(1994\)](#) looks at teachers' attitudes in 6 countries. [Sharma et al. \(2008\)](#) study the impact of training courses on the attitude of pre-service teachers in 5 different countries. Studies that compare two countries are conversely very numerous. The countries compared are sometimes close as far as their socio-economic level is concerned, such as, for example, Canada and Germany ([Miesera & Gebhardt, 2018](#)) or very distant, such as Finland compared to Zambia ([Moberg & Savolainen, 2003](#)). The differences highlighted between the countries can be explained according to three factors: first, the country's socio-economic situation, as well as the way disability is perceived in that society; second, how long the laws in favour of inclusion have been in existence and third, the organization of the current education system in the country and whether or not there are separate schools for pupils with special educational needs ([Leyser et al., 1994](#); [Miesera & Gebhardt, 2018](#); [Ojok & Wormnæs, 2013](#); [Saloviita & Schaffus, 2016](#); [Sharma et al., 2015](#); [Sharma et al., 2015](#)).

Year of publication

To our knowledge, there is no study on the trend of teachers' attitudes within a country. We did not find any articles comparing teachers' attitudes at two different dates in the same country, for example before or after the signing of the CRPD or before and after the implementation of measures for inclusive education in the country. The [Van Steen et al.'s \(2020\)](#) meta-analysis includes date as a moderator, but no significant effect was found.

Pre-service teachers and the age factor

Several studies show that younger teachers and pre-service teachers are more favourable to inclusive education ([Avramidis et al., 2000](#)). [Costello & Boyle \(2013\)](#) highlight the favourable attitude of pre-service teachers at the beginning of their studies, which decreases through the years then increases again once they graduate. In the same way, [Sari et al. \(2009\)](#) in Turkey find that pre-service teachers are more favourable to inclusive education than teachers in service. According to the authors, the difficult working conditions once on the job can explain this decrease, especially the number of working hours, the size of the classrooms, the lack of support by special education teachers and the lack of knowledge.

Special education teachers/ordinary teachers

The most commonly found result is a more favourable attitude of special education teachers. In [Avramidis et al.'s study \(2019\)](#), they are more favourable to inclusion, due to the fact that they have more knowledge and skills for teaching pupils with disabilities. In [Alnahdi et al.'s research \(2019\)](#), special education teachers are more favourable to inclusive education than others only in the Saudi Arabian population sample; in the Finnish sample, there is no difference.

Conversely, some studies, like that of [Sharma et al. \(2015\)](#), do not show a more positive attitude of special education teachers, in particular when their role is to teach in special schools. [Helldin et al. \(2011\)](#), when comparing the attitude of South-African teachers and Swedish teachers, highlight a significant difference regarding the role of special education teachers. Indeed, while in Sweden they are the go-to persons for ordinary teachers, with whom they have been working in collaboration since

the 1990s, in South Africa, their role is limited to teaching in special classes.

Gender

According to the literature review conducted by Avramidis & Norwich (2002), there is no clear difference in attitude from one gender to another, more recent studies confirm this finding, with some studies concluding that men's attitudes are more favourable, as in Pakistan (Sharma et al., 2015). Other studies conclude that there is a more favourable attitude of women, in Saudi Arabia, Bangladesh, England. Avramidis et al. (2000) explain that women are more positive in the conative component. Orakci et al.'s meta-analysis (2016) also comes to the conclusion that gender has overall no significant effect.

Level taught

Attitudes are different depending on the level taught. Preschool in-service and preservice teachers are the most favourable to inclusive education (Galović et al., 2014; Gigante & Gilmore, 2018). At this level teachers do not focus on learning skills but on individual differences, and the available resources in terms of support are important (Gigante & Gilmore, 2018). In primary and secondary school, attitudes are less favourable than in preschool (Galović et al., 2014). Larrivee & Cook (1979) have shown that teachers' attitude become increasingly less positive with ascending grade level. However, some studies show that attitude scores in higher education are greater than in primary and secondary schools (Galović et al., 2014; Leyser et al., 1994).

The following meta-regression will enable us to quantify the effect of these various factors by analysing them jointly in a great number of studies while controlling their quality indicators. It will answer the following questions:

- Is teachers' attitude globally positive, neutral or negative? The most recent results conclude the attitude is rather positive (van Steen & Wilson, 2020) some earlier studies conclude that the attitude is negative or neutral (De Boer et al., 2011), we will try to measure this effect.
- What is the effect of context related factors? Two factors are studied, the year of publication and the level of development of the country.
- We assume that attitude has changed favourably between 2000 and 2020 in relation to the development of international inclusive policies including the ratification of the CRPD (United Nations, 2006)
- Based on studies comparing a few countries, we hypothesise that the more developed a country is, the more supportive of inclusive education teachers are (Leyser et al., 1994; Moberg & Savolainen, 2003; Sharma et al., 2008).
- What is the effect of methodological related factor? We examine the effect of the type of questionnaire used in the study.

Previous research shows that attitude is also related to student-related factors such as the type of disability, the severity of the disability or the presence of behavioural problems (Avramidis & Norwich, 2002). We do not examine these factors because the selected studies do not focus on a particular disability, but on inclusive education in general.

Method

Research strategy

The bibliographical research has been conducted in two phases. First, a search on 4 digital international databases: SCOPUS, PsycINFO, ERIC (EBSCO) and Google Scholar. The words we looked up were ("inclusion" or "inclusive education") and ("attitude" or "perception") and ("teacher"), either in the title, abstract or key words of the article. In

the EBSCO database, we selected the scales related to inclusion as an additional criterion; in the SCOPUS database, we added the key word "scale". The articles listed in literature studies and meta-analyses previously conducted on the topic were also added to the results of this search. After that, a complementary search was conducted with, as key words, the scales used for measuring attitude as identified in the articles found in the first research phase. A PRISMA-type diagram representing the research process (Moher et al., 2009) was drafted (Fig. 1).

Inclusion and exclusion criteria

Only the articles in English that actually deal with teachers' attitude towards inclusive education or their perception of inclusion have been selected. The period covered runs from January 2000 to March 2021, the time period was chosen to cover a period before and after the adoption of the CRPD by the UN in 2005. The selected articles had to comprise a quantitative measurement of teachers' attitude by means of a scale. The scales had to comprise at least 4 items and take the form of a Likert scale with at least 4 modalities. We subsequently checked that the data needed for the meta-analysis was included in the publication, i.e., the mean of individuals on the scale used, the standard deviation, and the median point of the scale. The scales studied are such that a result below the median point of the scale indicates a negative attitude towards inclusion, and a result above the median point a positive one. Some scales that worked in the opposite way had to be reversed, which enabled us to include them.

The research conducted allowed us to identify 494 documents. The selection process led us to choose 131 studies meeting the inclusion criteria.

Quality of the studies

The research was not restrained to peer-reviewed journals. This choice was made in order to avoid a publication bias and to collect a maximum number of research studies on the topic, including PhD theses, Master's theses or institutional reports. Nevertheless, the nature of the publication was recorded in order to examine a potential meta-analysis bias depending on the type of publication. This way of proceeding follows one of the methods suggested by Valentine, "How not to address study quality" (Cooper et al., 2019). We did not conduct any assessment of the quality of the studies beforehand; yet this assessment was indirectly made when we chose to include only the studies that mentioned all the elements needed for a meta-analysis (protocol description, numbers, means, and standard deviation). Thus, 110 studies were excluded during the selection process because they did not meet these criteria of quality, and 131 were retained. The full list of references for the selected studies can be found in supplementary material <https://doi.org/10.17632/j595b5w736.1>.

Data coding

We read the articles and collected the necessary data. For each publication, we recorded the year and type of publication, the country, the goal of the research study, the type of questionnaire, the number of items and the internal consistency of the scale used, the median point of the scale, the number of participants, their distribution by gender, and their average age. In addition to that, we recorded whether the teachers were special education or ordinary teachers, in service or pre-service teachers, and at what level they were teaching. We then noted the mean and standard deviation of the participants in order to calculate the effect size by reference to the median point of the scale. A total of 17 variables were double coded for each study. The joint global probability agreement on all coded variables (qualitative and quantitative), before discussion was equal to 97%. No subjective coding was performed, only the values present in the studies were reported. Disagreements in coding resulted from reading errors and were resolved after discussion. The

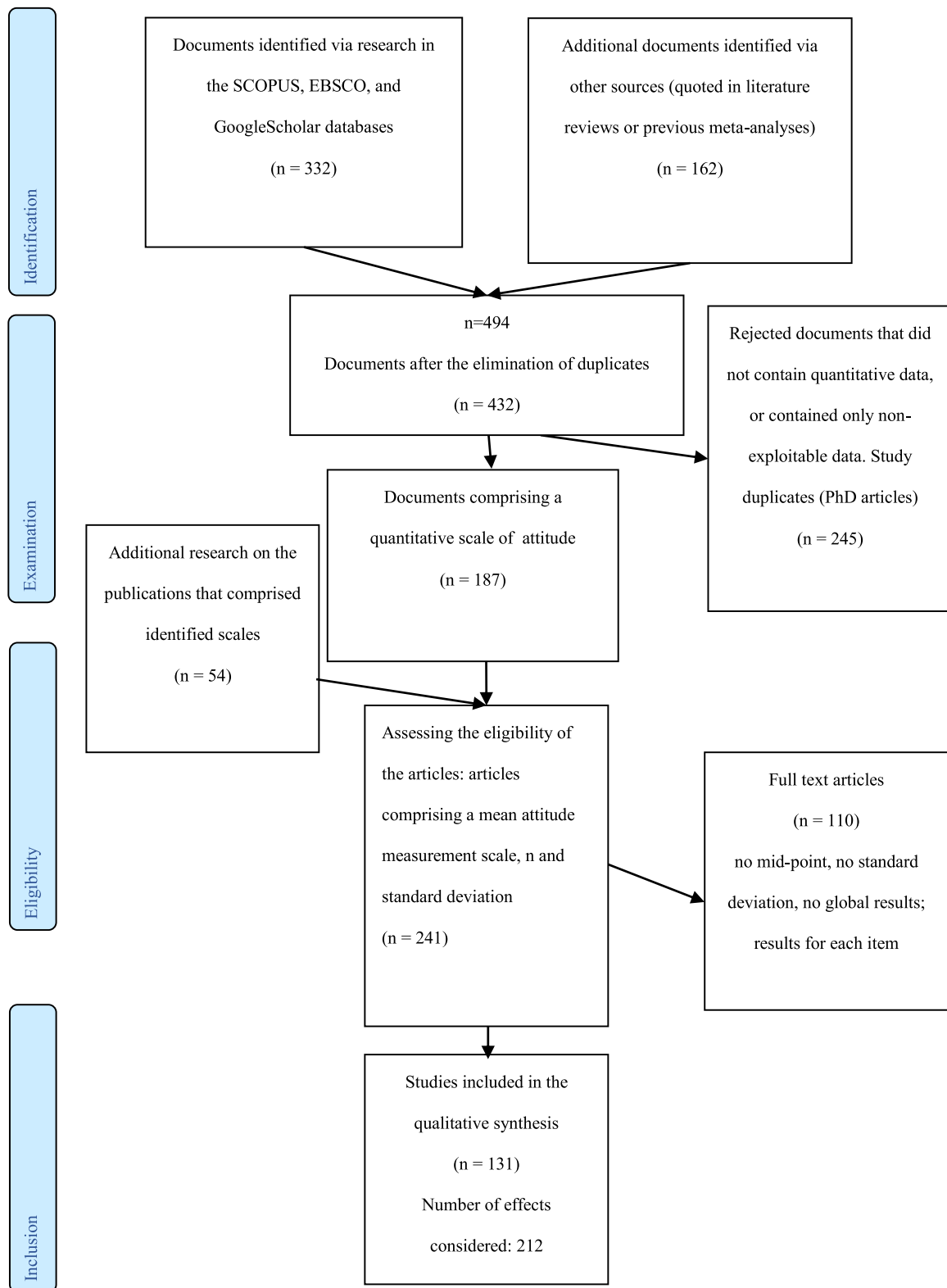


Fig. 1. Article selection process (PRISMA).

table with the coded data is available online at the following address <https://doi.org/10.17632/j595b5w736.1>.

Moderators

Several moderators were analysed: moderators linked to the quality

of the study (Q1 to Q4) and moderators of interest (I1 to I7).

The indicators that could help detect a potential publication bias or judge the quality of the studies were recorded. First of all, the type of publication (Q1): we established two different categories: they were either classified as “article” (peer-reviewed) or as “other kind of document”. This second category gathers together PhD or Master’s theses.

The studies were then distributed into four big categories (Q2): studies about teachers' attitude in one country, international comparisons, studies regarding the effect of training and lastly, studies mixing an international comparison with the effect of training. After that, we collected some indications about the sampling context. Some studies were conducted with a specific population of teachers. Indeed, a lot of research projects are conducted while teachers are attending a lecture or enrolled in a training course about inclusive education. Whether or not the teachers interviewed were following or had followed a training course related to inclusive education was noted according to two modalities (Q3). Finally, the presence and value of the internal consistency coefficients of the scales used (Cronbach's alpha) were recorded (Q4).

Six moderators of interest were coded for all studies. The date of publication of the study was recorded (I1). Whether the teachers were already in service or pre-service teachers was specified (I3). In the same way, whether the teachers were special education teachers or not was coded according to two modalities (I4). It was not possible to separate special needs teachers working in separate classrooms from those working as resource persons in ordinary classrooms. Indeed, in the studies considered, these two types of teachers were mixed. The studies that do not separate the results of special education teacher from those of ordinary teachers were coded as "other" for this variable. The studies that do not separate the two categories were also coded as "other". The level taught (I5) was coded according to three levels: preschool, primary school, secondary school. The preschool level corresponds to children around 4 or 5 years old, the primary school level, to pupils aged between 6 and 12, and the secondary school level, to teens (13 to 19 years old). The studies that mix several categories, or for which the categories were inadequate, were coded as "other".

For each study the reference of the questionnaire used was noted. The questionnaires that were used more than 5 times were selected (see Table 1), the others were coded as "other scales". A new variable (I6) was introduced indicating whether the questionnaire was widespread, i. e. frequently used (more than 5 occurrences) or not (less than 5 occurrences). The ORM and ORI questionnaires were joined together in a single one: indeed, they are two versions of the same questionnaire, the original version and the revised one. For the same reason, the SACIE and SACIE-R questionnaires were also joined together. Two additional moderators were coded, but these were not available for all studies: the percentage of women in the sample was recorded when available in the article (I7), as well as the participants' average age (I8).

In order to assess the level of human and economic development of the country studied, the Human Development Index (HDI) was added as a moderator (United Nations Development Programme, 2021). This index is published every year by the United Nations Development Programme. It is calculated based on 4 sub-indexes: the Gross National Income (GNI) per capita, the life expectancy at birth, the expected years of schooling and the mean years of schooling. The expected years of schooling (I2) corresponds to the number of years a two-year-old child can expect to spend at school, based on the country's current school enrolment rates by age group. It is different from the mean years of schooling which is calculated based on the whole population of the country. The higher the index, the better the country's human and economic development conditions are. The HDI and its sub-indexes as published in 2020 were recorded for the 55 countries of the study.

Statistical analyses

A preliminary power analysis was conducted. We needed to collect at least 45 effect sizes to detect a global effect size superior to 0.2 with medium-sized samples of 50 individuals in very heterogeneous conditions, in order to guarantee a power of .90 (Valentine et al., 2010). Our study comprises 212 effect sizes, which is well above this threshold.

Mixed-effects meta-analyses were conducted: the random effects correspond to the effects of each study; the fixed effects correspond to the effects of the various moderators. This choice was made due to the

Table 1
Descriptive statistics of selected studies.

Moderating factors	Degree of factors	Number of effects available	%	
Country	55 countries	212	100%	
Continent	Africa	20	9.4%	
	America	44	20.8%	
	Asia	73	34.4%	
	Europe	58	27.4%	
	Oceania	17	8%	
	Total	212	100%	
Publication Type (Q1)	Article	197	92.9%	
	Other documents	15	7.1%	
Design (Q2)	Total	212	100%	
	Attitude in one country	145	68.4%	
	International comparison	41	19.3%	
	Effect of training	19	9%	
	International comparison and effect of training	7	3.3%	
Sampling context (Q3)	Total	212	100%	
	During a special training course	38	17.9%	
	Not during a special training course	174	82.1%	
Reliability (Q4)	Total	212	100%	
	Alpha available	152	71.7%	
	Not available	60	28.3%	
Year (I1)	Total	212	100%	
	2000 to 2020	212	100%	
	HDI: Expected years of schooling (I2)	<12 years	22	10.4%
		12-16 years	63	39.7%
		16-20 years	113	53.3%
Service (I3)	>20 years	14	6.6%	
	Total	212	100%	
	Pre-service	66	31.1%	
	In-service	141	66.5%	
	Other (unspecified or mixed)	5	2.4%	
Type (I4)	Total	212	100%	
	Ordinary	175	82.5%	
	Special education	19	9%	
	Other (mixed)	20	8.5%	
Level taught (I5)	Total	212	100%	
	Preschool	12	5.7%	
	Primary school	63	29.7%	
	Secondary school	30	14.2%	
	Others (multiple levels and unspecified)	107	50.5%	
	Questionnaire	Total	212	100%
		AIS (Sharma & Jacobs, 2016)	5	2.4%
ATIES (Wilczenski, 1995)		29	13.7%	
Best Educational Environment (Moberg & Savolainen, 2003)		5	2.4%	
MAS (Alghazo & Nagggar Gaad, 2004)		5	2.4%	
MATIES (Mahat, 2008)		11	5.2%	
MTAI (Stoiber et al., 1998)		11	5.2%	
ORM and ORI (Antonak & Larrivee, 1995)		32	15.1%	
SACIE-R and SACIE (Forlin et al., 2011)		27	12.7%	
STATIC (Cochran, 1997)		10	4.7%	
TAIS (Saloviita, 2015)		8	3.8%	
Other scale		69	32.5%	
Total		212	100%	
Scale (I6)		Widespread scale	143	67.5%
	Other scale	69	32.5%	
	Total	212	100%	
Percentage of women (I7)	Valid	152	71.7%	
	Missing	50	23.6%	
	Total	212	100%	
Participants' average age (I8)	Valid	73	34.4%	
	Missing	139	65.5%	
	Total	212	100%	

great heterogeneity between the studies (Borenstein et al., 2009). A three-level analysis was also tested to account for dependencies between effects from the same studies, but the need to use effects calculated from the same individuals led to overestimating the importance of some studies. It was therefore chosen to aggregate the effects from the same individuals into a single study. All analyses were programmed with the R software (R Development Core Team, 2010), using the metafor package (Viechtbauer, 2010).

For most of the studies, only one effect size is noted, so there is no problem of dependence between effect sizes. This problem arises in some studies when there are several effect sizes for independent sub-groups. For example, the men and women sub-groups, teachers and pre-service teachers subgroups, ordinary and special education teacher subgroups, or sub-groups corresponding to different countries. Borenstein et al. (2009) states that in the case of independent groups that contribute information independently from each other, it is possible to treat them as independent studies.

The problem of dependent effect sizes in repeated measures also arises. Indeed, the pre- and post-intervention measurements are dependent because they are conducted on the same individuals. We chose to only keep the pre-intervention measure. In the same way, when several measures of attitude (various sub-scales) were available, an aggregation of the different subscales was performed.

The effect size can be measured thanks to Cohen's d for a sample. It is obtained by calculating the difference between the mean of the observed attitude M and the median point of the scale m_0 , divided by the standard deviation of the attitude SD : $d = (M - m_0) / SD$ (Borenstein et al., 2009). For example, on a Likert scale with five modalities, the median point of the scale is 3 and d is worth $(M - 3) / SD$. Thus, a positive d indicates a positive attitude, a negative d a negative attitude. The problem with Cohen's d is that it is essentially biased. It was thus preferable to use Hedge's g . It is a version of Cohen's d that has been modified in order to become an unbiased estimator. The variance of the effect size of Hedge's g was then calculated using the adequate formulas for comparing a mean with a constant (Aoki et al., 2019).

Results

The research study has enabled us to record 212 effect sizes from the 131 selected documents. The selected effects always concern different individuals, there are no repeated measures. The size of the samples analysed varies from 14 to 2315 individuals with a mean of 191 individuals. A total number of 40512 teachers have been included. Table 1 presents the descriptive statistics related to the 212 effect sizes analysed.

To begin with, a random-effects meta-analysis was conducted, using the restricted maximum likelihood method to estimate the mean effect size. The mean effect is moderate: $g = 0.57$, $SE = 0.08$, 95% CI [0.42, 0.72], $p < 0.001$. The omnibus test of all the coefficients is significant: $Q(1) = 56.45$, $p < .001$. This shows that on average, teachers have a positive attitude towards inclusive education. The effect is heterogeneous, the residual heterogeneity test is significant: $Q(211) = 13439.1$, $p < .001$. The percentage of variance due to heterogeneity, calculated thanks to the I^2 statistic, is worth 99.4%, which indicates a considerable heterogeneity (Higgins & Cochrane, 2020). This incited us to test various moderators to try and explain this heterogeneity of the results.

Influential points

Influential points in a meta-analysis are detected thanks to the combination of several indexes, notably the standardized residual, Cook's distance and DFFITS (Difference in Fits). Four points were detected as influential. The random meta-analysis conducted without these influential points led us to the same conclusion, $g = 0.53$, $SD = 0.07$, IC95% [0.40, 0.65] $p < .001$. The results are thus very little sensitive to influential points. Therefore, they were re-included in the

following phases of the analysis.

Quality of the studies, publication bias

We made the choice not to judge the quality of the studies directly; moderators were introduced in the global meta-regression model in order to indirectly assess quality.

It was interesting to conduct a test in order to determine whether or not a publication bias existed. The Funnel plot seems to be slightly asymmetrical on the right side (Fig. 2a). The result of the publication bias test, taking into account the heterogeneity of the results, is not significant: $\chi(4) = 4.86$, $p = .302$, which indicates that there is no publication bias.

Analysis of the moderators

We tested a multiple meta-regression model. This model comprises 4 moderators indicating the quality of the studies and 6 moderators of interest collected in the various studies. The "country" variable could not be added to the regression because for some countries only one study is present. The "continent" variable was tested and found to be significant, but it did not allow us to distinguish countries where attitudes were very different, for example on the Asian continent. Finally, in order to explain the heterogeneity between countries and continents, we added a Human Development Index.

The Human Development Index (HDI) calculation is based on 4 sub-indexes. These 4 sub-indexes are strongly correlated to each other (correlations above .6) and are also correlated to the HDI with correlations above .85. Teachers' attitude is correlated in a different way to each of the sub-indexes. It is not significantly correlated to the GNI per capita of the country: $r = .09$, $p = .21$. Conversely it is significantly correlated to the global HDI: $r = .16$, $p = .022$, and to the other three sub-indexes, with correlations above .16. In order to avoid variance inflation, only the index that was the most correlated to teachers' attitude was chosen to be included in the meta-regression analysis, i.e. the expected years of schooling, which is moderately correlated to attitude $r = .27$, $p < .001$.

The calculation method used for meta-regression analysis is maximum likelihood estimation, and the coefficients are tested via a Wald test. This model was globally significant: $Q(16) = 58.62$, $p < .001$. It explains 16.44% of the heterogeneity of the results ($R^2 = 16.44\%$). The I^2 percentage of residual heterogeneity in comparison with unaccounted for heterogeneity remains high, at 99.2%. The model quality can be considered as good given the great number of effects studied (212) compared to the small number of explicative moderators (6).

None of the coefficients of the study quality moderators are significant, which indicates that attitude does not depend on the type of publication (Q1), the design of the study (Q2), the fact that teachers follow a training course (Q3) or not, or the use of an internal consistency coefficient (Q4), see Table 2 for numerical results. Among the moderators of interest, the year of publication (I1) coefficient is, significantly, above zero: $b = .052$, $z = 3.504$, $p = .0005$, which shows that attitude evolves over the years, – with a progress of 0.052 per year – since the other factors are controlled. The expected years of schooling coefficient (I2) is significant: $b = .068$, $z = 2.5981$, $p = .009$. The longer children stay at school, the more favourable to inclusion the teachers' attitude in the country is. Special education teachers (I4) are significantly more positive towards inclusion than ordinary teachers: $b = .651$, $z = 2.136$, $p = .032$. Finally, the type of scale (I6) used has a significant effect on the measurement of attitude. Standardized, widespread scales lead to an estimation that is lower by .677 than those obtained with rarely used scales: $b = -.677$, $z = 4.160$, $p < .0001$. No significant difference was found between the attitude of pre-service teachers and that of teachers already in service (I3). There is no significant difference either depending on the level taught (I5).

The Funnel plot for residual value (Fig. 2b) shows that heterogeneity

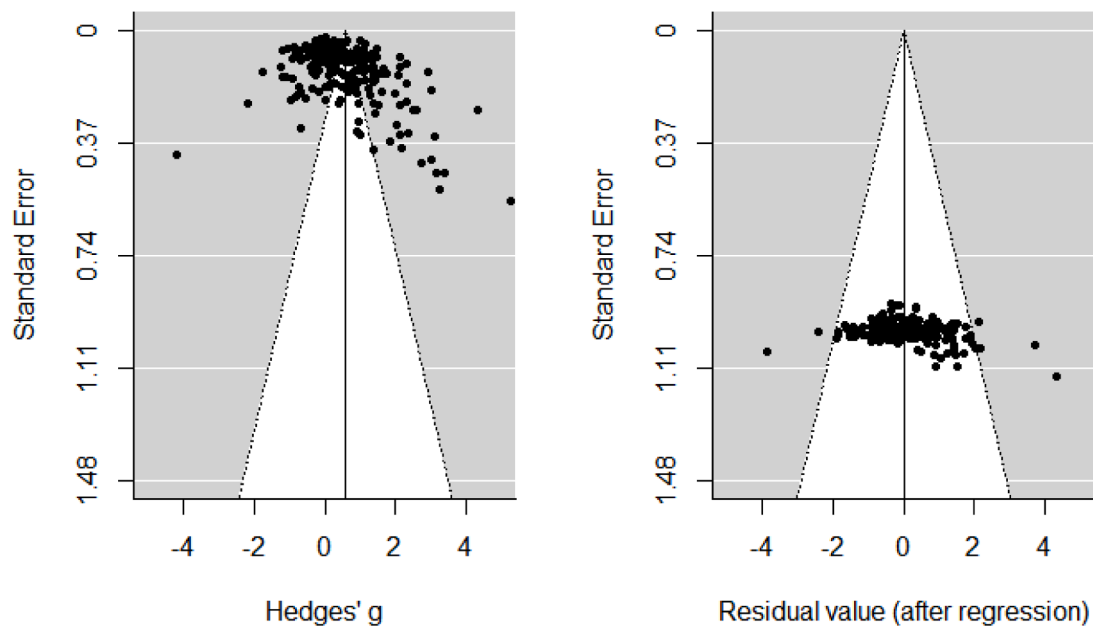


Fig. 2. Funnel plots.

greatly decreased thanks to the addition of predictors: only 8 points out of 212 are outside of the confidence triangle, which represents less than 5% of the points. Moreover, the calculation of the Variance Inflation Factors (VIF) for each moderator shows that all values are lower than 5. This indicates that the regression model does not pose a multicollinearity problem.

To complete this analysis, the percentage of women (17) and the average age (18) moderators were added to the regression analysis. Since these data were not available for all studies, the regression was only conducted on 56 effect sizes. The meta-regression shows that none of these two moderators has a significant effect on attitude. Finally, a last analysis was conducted to test the effect of gender crossed with continent on attitude. No significant effect was found.

Discussion

The first finding of this meta-analysis is that teachers' attitude is globally favourable to inclusion, with a g effect size of 0.574; i.e. an attitude above the median point of the scale, or corresponding to the first positive point of the scale ("somewhat agree"). This result is in line with several previous studies and meta-analyses (Avramidis & Norwich, 2002; Scruggs & Mastropieri, 1996; van Steen & Wilson, 2020), but contradicts the results found by De Boer et al. (2011) who concluded that teachers' attitude was either negative or neutral. It is important to note that this study includes a much larger number of documents (131) than the previous meta-analyses, 50 articles for van Steen & Wilson, 2020 and 26 for De Boer et al. (2011). This statistical result can be tempered. The use of measurement scales is influenced by social desirability and stereotypes about disability (Fiske et al., 2002). Lücke & Grosche (2018) showed that participants' responses about their attitude towards inclusive education are more influenced by the organization conducting the study (whether it is a university or not for example) than by the participants' personal characteristics. In our study, we partially controlled for this factor by including a variable indicating whether the study was conducted in a special education teaching session or not. It would be interesting for future studies to introduce another variable into the meta-analysis indicating by whom the study was conducted.

The second finding is a progress in attitude since 2000. To our knowledge, no study has so far shown such a result. This progress is moderate yet significant; it seems to follow the evolution of society

regarding the generalization of the inclusive school concept. This evolution is to be put in parallel with the adoption in 2006 of the Convention on the Rights of Persons with Disabilities (CRPD) by the General Assembly of the United Nations (2006) and its gradual ratification by numerous countries in the world. Moreover, in 2009, the UNESCO published "Policy Guidelines on Inclusion in Education" (UNESCO, 2009); then, more recently, in 2017, a "guide for ensuring inclusion and equity in education" intended to "support countries in embedding inclusion and equity in educational policy" (UNESCO, 2017).

Correlation analysis shows that attitudes are related to the level of human development of the country where the study is conducted. The human development index is made up of four sub-indices. It is interesting to note that the teachers' attitude is not significantly linked to the HDI sub-index GNI per capita in their country. But that the attitude is significantly linked to the HDI sub-index expected years of schooling (United Nations Development Programme, 2021). This sub-index was introduced in the meta-analysis to be tested together with the other variables. The meta-analysis shows that the higher the years of schooling expectancy in a country is, the more favourable to inclusive education the teachers are. This result confirms those of studies comparing two or more countries with different levels of development (Engelbrecht et al., 2013; Helldin et al., 2011; Moberg & Savolainen, 2003). In order to improve inclusion in countries with a low level of development, it is essential, as underlined in the United Nations reports, to "make the right to education a reality for all" (UNESCO IIEP & United Nations Children's Fund, 2019).

The meta-analysis shows that special education teachers are more favourable to inclusion compared to ordinary teachers. The effect of this factor is important: it is more than two times higher for special education teachers. A closer look at the articles shows that this result is true in all countries, both in those with a strong inclusive tradition such as Italy or Norway, but also in countries where separate teaching for pupils with special educational needs is the norm, such as in Germany or to a lesser extent in Finland (Cameron, 2017; Miesera et al., 2019; Saloviita, 2020; Saloviita & Consegna, 2019). In only one country (Pakistan) there is no difference between special and ordinary teachers, but both categories support inclusion (Sharma et al., 2015). Special education teachers, regardless of the country's education system, are aware of the importance of providing inclusive education for all.

Table 2
Multiple meta-regression

Coefficients		Estimate	SE	Z	p
Intercept		-105.558	29.85	-3.536	<.001***
Quality of study moderators					
Publication type (Q1)	Article vs other documents	0.379	0.292	1.297	0.195
Design (Q2)	Effect of training vs Attitude in one country	-0.156	0.326	-0.698	0.485
	Effect of training and international comparison vs Attitude in one country	0.171	0.476	0.360	0.719
	International comparison vs Attitude in one country	0.037	0.192	0.195	0.846
Sampling context (Q3)	During a special training course vs not during a special training course	-0.101	0.271	-0.374	0.709
Reliability (Q4)	Alpha available vs alpha not available	-0.156	0.170	-0.920	0.358
Moderators of interest					
Year (I1)	Year of publication	0.052	0.015	3.504	<.001***
HDI (I2)	Expected years of schooling	0.068	0.026	2.598	0.009**
Service (I3)	Pre-service vs In-service	0.177	0.189	0.936	0.3493
	Other vs In-service	0.166	0.562	0.2946	0.7683
Type (I4)	Special vs Ordinary	0.56	0.260	2.136	0.03*
	Other vs Ordinary	-0.651	0.313	-2.083	0.032*
Level taught (I5)	Primary vs preschool	-0.080	0.339	-0.236	0.814
	Secondary vs Preschool	-0.1048	0.364	-0.288	0.774
	Others vs Preschool	0.212	0.335	0.632	0.527
Scale (I6)	Widespread scale vs other scale	-0.677	0.163	-4.160	<.001***

*p < .05, **p < .01, ***p < .001

The effect of gender has been studied in several articles, with contradictory results men’s more positive in Pakistan (Sharma et al., 2015) women more positive in Saudi Arabia, Bangladesh, England (Ahsan et al., 2013; Alnahdi et al., 2019; Ellins & Porter, 2005). The meta-analysis does not show that the men/women distribution in the studies affects attitude. The effect of continent crossed with gender was also tested in a complementary analyse without significant results, the differences or lack of difference seem to depend only on the country considered. It would be necessary to have several studies on the same country to conclude on this point. In the same way, no significant difference could be shown between pre-service teachers and teachers in service. As for the level taught, the meta-analysis does not show any significant differences; yet it is interesting to point out that the higher means can be found at preschool level, the lower in primary and secondary school. The very high variance of measures in preschool is due to the small number of studies and leads to a non-significant result.

One last important finding is that the most widespread questionnaires, which are validated and standardized, give significantly less positive results than other questionnaires. This conclusion had been suggested by van Steen and Wilson’s study (van Steen & Wilson, 2020) but was not highlighted in their meta-regression analysis. One hypothesis is that when a scale is designed for a specific study, it measures only specific items of interest, whereas a validated and standardized scale

tries to look at attitude in a broader way.

Limits and perspectives

This meta-regression analysis simultaneously tested 10 moderators for which data were available in all studies. A significant number of additional data are available in the articles, but could not be included in the meta-analysis, since they were only available in a small number of studies. Moreover, we were not able to test the interaction effects, for example the effect of gender in interaction with the country, or the effect of the type of questionnaire over time, given the small number of publications for each interaction effect. Additionally, for countries with a high level of development, significant differences in attitude exist. It would be interesting to study other moderators, in particular how long the policies in favour of inclusion have been in existence in those countries. Another interesting moderator would be the percentage of disabled pupils placed in segregative institutions as well as the type of educational system implemented in the country (one track, two tracks, or a mix of both) for example, for Europe, by using data from the European Agency for Development in Special Needs Education (2018). One hypothesis is that the higher the percentage of children in segregated institutions, the more unfavourable teachers are to inclusion, as shown for example in the study by Miesera & Gebhardt (2018), in Germany the percentage of children in non-inclusive environments is higher than in Canada and teachers’ attitudes towards inclusion are more negative. Unfortunately, such data are not available on a worldwide scale. Furthermore, the various components of attitude could also be studied and subtler differences could be observed between countries. Lastly, the significant deviation between results depending on the scales used strongly advocates for the use of validated and previously used scales in future research, so as to allow for potential comparisons between countries or the identification of changes over time.

Conclusion

The main find of this study is the positive attitude of teachers towards inclusive education and its significant progress over the last 20 years. The results of the various studies are very heterogeneous and depend on numerous factors. Attitude is linked to the years of schooling expectancy: the higher it is in a country, the more favourable the teachers’ attitude is towards inclusive education. Special education teachers are more favourable to inclusion than teachers in general classes, this is true regardless of the system in place in the country. The various questionnaires that measure attitude give different results; notably, the questionnaires used for only one study give more positive results than those that are frequently used. No significant effect of gender, age or the fact that teachers are still in training (pre-service) or already in service was highlighted. The research could be taken further in several directions. First, not many studies are available for some countries. It would be interesting to get more data on some European countries, for instance. The Netherlands, Denmark, France, Belgium or Sweden countries for which we have only one or zero study in the meta-analysis. Studies are also rare in the countries that have the lowest level of development. Second, understanding how attitude changes depending on the level of teaching would make it possible to support the development of inclusive education throughout the years of schooling. Finally, the importance of using standardized scales seems obvious, considering the results of this meta-analysis.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendices

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