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Research paper

Meta-analysis of the relationship between teachers' self-efficacy and attitudes toward inclusive education☆

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HIGHLIGHTS

- A meta-analysis was used to examine relationship between teachers' attitudes and self-efficacy in inclusion.
- Effects of 43 unique samples of in-service teachers are aggregated.
- Meta-analyses reveal a positive sample size weighted correlation between teachers' self-efficacy and attitudes.
- Findings suggest the relationship might be somewhat universal regardless of time, culture, or gender.
- Implications for teacher training and future research directions are discussed.

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ABSTRACT

This meta-study aims to examine the size of the relationship between teachers' self-efficacy and attitudes toward inclusive education of K-12 students with special educational needs and to identify potential moderators (publication, sample, and research procedure characteristics). We synthesized the research conducted from 1994 to 2018, and 41 studies were included. Bare-bones meta-analysis with random effect model revealed a sample size weighted correlation coefficient between teachers' self-efficacy and attitudes as $\bar{r} = 0.35$ ($CI = 0.31$-0.39). The between-study variations were not associated with hypothesized publication and sample characteristics. However, the self-efficacy measurement method accounted for a statistically significant strength of association.

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1. Introduction

Since the importance of the implementation of inclusive education has been reinforced by many international documents (United Nations Educational, Scientific and Cultural Organization [UNESCO], 1994, United Nations Educational, Scientific and Cultural Organization, 2005; United Nations, 2006; United Nations General Assembly, 2015), research about this topic has also increased. The publication of UNESCO's (1994) Salamanca Statement and Framework for Action on Special Needs paved the way for further reform toward inclusive education. A long term development in understanding inclusive education is that it is nowadays regarded as an effort to developing school systems in which children with disabilities or special educational needs (SENs)—along with those of any gender, ethnic background, or economic status—are welcomed in the same local educational organizations (Mitchell, 2005; Savolainen et al., 2012; United Nations Educational, Scientific and Cultural Organization, 2020). All along this path of development, teachers' attitudes toward inclusive education have been a very popular research topic (see, e.g., Avramidis & Norwich, 2002; Avramidis & Toulia, 2020; de Boer et al., 2011; Lüke & Grosche, 2018), perhaps because negative attitudes have long been considered a major obstacle for inclusion. For instance, searching for the keywords "attitude" and "inclusion" and/or "disabilities" within

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publications in the ERIC online library in this 10-year period (2010–2020), 7535 hits were found (retrieved on June 10, 2020). Teachers are key stakeholders in the implementation of inclusive education, and their positive attitudes toward it are of crucial importance in building truly inclusive educational systems (Avramidis & Norwich, 2002; Avramidis & Toulia, 2020; de Boer et al., 2011; Moberg et al., 2019; Schwab, 2018). Moreover, in line with attitudes, teachers' self-efficacy is seen as a crucial element for the successful implementation of a good educational system (e.g., Gibson & Dembo, 1984; Schwab, 2019; Sharma et al., 2012).

In a recent systematic literature review, the authors concluded that teachers' attitudes toward inclusive education was one of the main themes studied widely in research on inclusive education (Van Mieghem et al., 2020). It has been suggested that teachers' negative attitudes toward inclusion or disabilities can be a barrier to implementing an inclusive education (Guralnick, 2008) because teachers' attitudes appear to be associated with their behavior (i.e., inclusive practices) (Ajzen, 2012; Sharma & Jacobs, 2016), in turn, that could influence children's educational experience in inclusive classrooms (van Steen & Wilson, 2020). Further, previous studies have shown that the attitudes are relatively stable over time (Savolainen et al., 2020; Schwab, 2018), which may be difficult to change. However, a recent meta-analytic study by van Steen and Wilson (2020) reported that teachers' attitudes toward inclusive education are highly influenced by an interplay of cultural and demographical factors, and it is necessary to take those factors into account when developing interventions aimed at enhancement of the attitudes. Several lines of evidence indicate that teachers' self-efficacy is crucial and related to good educational practices (e.g., Gibson & Dembo, 1984; Soodak & Podell, 1993), and high teacher self-efficacy is associated with their positive attitudes toward inclusion (Savolainen et al., 2012, 2020; Yada et al., 2018). More recently, in a substantial number of studies, scholars have reported correlations between teachers' self-efficacy in inclusive practices and their attitudes toward inclusive education in various samples, such as those involving teachers from different countries (Malinen et al., 2013; Savolainen et al., 2012; Sharma et al., 2018; Sharma & Jacobs, 2016; Yada et al., 2018), teachers who were instructing at different levels (Lee et al., 2014; Malak et al., 2018; Munthe & Thuen, 2009), and teachers with different types of certificates (Chan, 2016; Hernandez et al., 2016; Kormos & Nijakowska, 2017). If teachers' self-efficacy is related to their attitudes, that may open a door to gradually changing attitudes in a positive direction and, thus, improve the possibilities for inclusive education.

Previous research findings into the relationship between teachers' self-efficacy and attitudes in inclusive education have been somewhat inconsistent; the authors of some of the studies reported a high correlation among them (Morgan, 2013; Omer, 2015), but other researchers found them as weak or non-significant (Chan, 2016; Wood, 2017). Moreover, there has been only a few longitudinal studies conducted (Carew et al., 2018; Kormos & Nijakowska, 2017), but recent research tested the causal direction between attitudes and efficacy with a cross-lagged longitudinal design and suggested that teachers' self-efficacy beliefs affect their attitudes toward inclusion rather than vice-versa (Savolainen et al., 2020). The aim of this systematic review was to draw a comprehensive picture regarding the relationship between teachers' self-efficacy and their attitudes toward inclusive education of K-12 students with special educational needs.

1.1. Teachers' self-efficacy in inclusive practices

The concept of self-efficacy was first articulated by Bandura (1977) as part of his social cognitive theory and popularized in his book called "Self-Efficacy: The Exercise of Control" (Bandura, 1997). In it, he defined self-efficacy as one's belief about his or her capability to conduct a particular course of performance successfully. Additionally, he pointed out that the belief of efficacy influences controlling one's exercise over action and regulating one's cognitive and psychological processes. In the literature, teachers' self-efficacy can broadly be defined as their beliefs in their ability to positively influence students' outcomes (Gibson & Dembo, 1984; Klassen et al., 2011; Ross & Bruce, 2007; Tschannen-Moran and Woolfolk Hoy, 2001). Based on Bandura's (1997) argument that self-efficacy beliefs have a context-specific nature, the authors of several studies have investigated teachers' self-efficacy in specific teaching domains, such as math, language, science, and technology (Klassen et al., 2011). Although such studies offer useful insights for teachers to make context-specific decisions on their specific teaching behaviors (Klassen et al., 2011), critics have also argued that the more the domain specificity of self-efficacy research increases, the less the generalizability to other contexts, and, thus, it may lose practical usefulness (Pajares, 1996; Tschannen-Moran et al., 1998). In this vein, a number of authors have explored general teacher self-efficacy, which refers to teachers' self-efficacy related to most teaching situations, such as beliefs regarding suitable instruction, managing the classroom, and developing students' motivation and engagement (Klassen et al., 2011; Tschannen-Moran et al., 1998).

Recently, a considerable amount of research has been published on teachers' self-efficacy in implementing inclusive education, echoing the international debate on inclusion (UNESCO, 1994; United Nations, 2006; United Nations General Assembly, 2015). Teachers' self-efficacy in inclusive practices might be considered a domain-specific construct (Sharma et al., 2012). However, inclusive practices could be applied in every kind of school setting despite the school levels and subjects that are taught (Yada, 2020). For instance, when we compare two scales that are widely used in the research area, the Teachers' Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001) developed for measuring teacher self-efficacy in most teaching contexts and the Teacher Efficacy for Inclusive Practices scale (TEIP; Sharma et al., 2012) made for assessing teachers' self-efficacy in inclusive education, both measures similar domains such as self-efficacy in instruction and classroom management. Thus, teachers' self-efficacy in inclusive practices can be seen as a construct that combines both domain specificity and generalizability.

Several lines of evidence suggest that teachers' behavior in inclusive classrooms is influenced by their self-efficacy. For instance, one study by Gibson and Dembo (1984), which compared high-efficacy and low-efficacy teachers, demonstrated that teachers with high teaching efficacy rarely provided critical feedback to students' incorrect answers and were more persistent in students' failures. Furthermore, a number of scholars have indicated that mainstream education teachers with a high sense of self-efficacy were more willing to utilize new teaching instruction methods and strategies (Ghaith & Yaghi, 1997; Guskey, 1988; Milner, 2002) and less likely to request referral of difficult students to special education (Meijer & Foster, 1988; Soodak & Podell, 1993).

1.2. Relationship between teachers' self-efficacy and attitudes

In a large and growing body of literature, researchers have linked teachers' self-efficacy and their attitudes toward inclusive education. The term "attitude" can be broadly defined as a person's cognitive and affective evaluation of an attitude object or specific behavior, whether it is favorable or unfavorable (Ajzen, 2012; Bohner & Dickel, 2011; Eagly & Chaiken, 1993). In 1980, Ajzen and Fishbein articulated the theory of reasoned action, which provides an understanding of an individual's attitude and behavior. Based on

it, Ajzen (2012) formulated his theory of planned behavior, centered around three factors that predict one's behavioral intention and subsequent behavior: (a) attitude toward the behavior; (b) subjective norm; and (c) perceived behavioral control. The concept of perceived behavioral control is regarded as similar to Bandura's (1997) self-efficacy, and the three factors are intricately intertwined and influence behavioral intention and actual behavior (Ajzen, 2012).

Teachers' attitudes toward inclusive education refer to their beliefs and feelings about including children with diverse educational needs in mainstream classrooms (Avramidis & Norwich, 2002; Forlin et al., 2011). In several previous studies, researchers found that teachers' self-efficacy was positively correlated with their attitudes toward inclusive education (e.g., Lifshitz et al., 2004; MacFarlane & Woolfson, 2013; Malinen et al., 2013; Savolainen et al., 2012; Yada & Savolainen, 2017). Meanwhile, the authors of other studies have identified the self-efficacy–attitudes relationship as weak or non-significant (Carew et al., 2018; Chan, 2016; Lee et al., 2014), which indicates that teachers' self-efficacy and attitudes are divergent concepts (Saloviita, 2015).

The inconsistent findings of previous studies may be influenced by several potential factors. In a meta-analysis of teachers' attitudes toward inclusion, van Steen and Wilson (2020) considered whether their attitudes are moderated by demographical and cultural factors. These include publication year, teacher type, gender differences, type of disability, cultural differences, and the measures which were used to evaluate teachers' attitudes. It is found that those factors are intricately intertwined and influenced teachers' attitudes toward inclusion (van Steen & Wilson, 2020). Publication type, publication year, and sampling method are the factors that are often included in meta-analysis studies (Card, 2011). It has been indicated that the studies whose authors found negative results or no statistically significant results were less likely to be accepted for publication (i.e., publication bias) and might be reported only via unpublished dissertations, theses, or conference papers (Card, 2011; Cooper et al., 1997). Empirical studies on the relationship between teachers' self-efficacy and attitudes in inclusive education may not be an exception. Furthermore, an evaluation of publication year as a moderator in a meta-study may reveal historical trends of the effect sizes over time (Card, 2011). For instance, Qi and Ha (2012) reviewed 75 studies on inclusion in physical education and illustrated that the quantity of studies was increasing with time, which might be echoing the international trends toward inclusion (UNESCO, 1994; United Nations Educational, Scientific and Cultural Organization, 2005; United Nations, 2006; United Nations General Assembly, 2015). In the case of teachers' self-efficacy, Klassen et al. (2011) conducted a literature review and concluded that the number of teacher self-efficacy studies has significantly increased year over year, with increasing diversity in the methods used, specific teaching domains, and the use of international samples. Concerning the sampling method, whether the authors used convenience sampling or random sampling may have affected the accuracy of the study results (such as estimated standard errors) as well as the generalizability of the findings (Fan et al., 2017). It has been suggested that using random sampling is rare in many fields (Card, 2011), which is also the case for the subject area of this study. In a meta-analysis study by Fan et al. (2017), the authors found that the effect sizes of studies whose authors used non-random sampling were larger than those of studies that used random sampling. Overall, differences in publication type, publication year, and sampling method may have a potential influence on the effect sizes of the relationship between teachers' self-efficacy and attitudes in inclusive education.

The cultural differences among samples are another likely factor that might correlate with the effect sizes of the self-efficacy–attitude relationship. Leading scholars have seen studying inclusive education as well as learning and teaching in a cross-cultural context and have found each to be extremely relevant and important (Artiles & Dyson, 2005; Mitchell, 2005; Pajares, 2007). Of course, cross-cultural comparisons are complex, and it is important to ensure that the constructs are measured in the same way (e.g., by ensuring measurement equivalence) in different countries as, for example, culturally valued orientations and response styles among countries might exist (see Vieluf et al., 2013). However, some scholars have provided empirical evidence that self-efficacy scales are measurement-invariant across countries (Avanzi et al., 2013; Teo & Kam, 2014; Yada et al., 2018). Previous researchers have conclusively shown that teachers' self-efficacy in inclusive practices and their attitudes toward inclusive education vary by country (Moberg et al., 2019; Savolainen et al., 2012; Sharma et al., 2018; Yada et al., 2018). One framework used to illustrate cultural differences in the understanding of self is the classification of cultures into two categories, in that they rely mainly on individualism or collectivism (Markus & Kitayama, 1991). It has been demonstrated that those from individualistic cultures view the self as independent, whereas those from collectivistic cultures see the self as interdependent with contexts (Markus & Kitayama, 1991). Klassen (2004) analyzed the data from 270 South Asian immigrant and Anglo-Canadian nonimmigrant students and concluded that self-efficacy in collectivistic cultures might be more influenced by relationships with others. Moreover, a systematic literature review found that the cultural dimension of individualism had a significantly positive effect on teachers' attitudes toward inclusion when other cultural dimension factors were taken into account (van Steen & Wilson, 2020). Although caution must be applied against generalizing a specific population (Bandura, 2002; Klassen, 2004), this cultural classification framework may provide useful insights into explaining variation among the effect sizes of correlations between teachers' self-efficacy and attitudes.

In previous research, scholars suggested that the association between self-efficacy and attitudes in inclusive education might be moderated by the grade level teachers are instructing, as well as their gender. For instance, Klassen and Chiu (2010) found that teachers who taught in elementary schools and kindergartens showed higher self-efficacy in student engagement and classroom management. This view is supported by Tschannen-Moran and Woolfolk Hoy(2007), who wrote that, among the experienced teachers, teaching the youngest children was linked with a higher sense of self-efficacy. Research findings into the effect of grade level on teachers' attitudes toward inclusive education have been somewhat inconsistent. While the findings from some studies indicate that upper secondary school teachers have significantly more positive attitudes toward integration than those of lower secondary and primary school teachers (e.g., Leyser et al., 1994), findings from other studies suggest that teachers of grades kindergarten through five show more positive attitudes toward students with disabilities than those of high school teachers (e.g., Leahy, 2014). In terms of teachers' gender, the authors of various studies have pointed out contradictory findings, in which some authors indicated there were gender differences in teachers' self-efficacy and attitudes, with higher self-efficacy in classroom management associated with male teachers (Klassen & Chiu, 2010) and more positive attitudes among female teachers (Alghazo & Gaad, 2004). On the other hand, several lines of evidence suggest there is no significant effect of gender on teachers' self-efficacy or their attitudes toward inclusive education (Desombre et al., 2019; Leyser et al., 1994; Yada & Savolainen, 2017). In summary, evidence regarding the influence of the roles of instructional grade level and gender as determinants of teachers' attitudes or levels of efficacy

has been inconsistent and contradictory but will be included as a moderator in this meta-analysis.

Finally, several measures were used in previous studies of teachers' levels of self-efficacy and their attitudes, with some scales showing high reliability and validity (e.g., Sharma et al., 2012; Tschannen-Moran & Woolfolk Hoy, 2001), whereas others have found moderate reliability (e.g., Benton-Borghi, 2006; Forlin et al., 2011). In addition, some of the studies measured teachers' self-efficacy and attitudes with regard to including all kinds of children (e.g., Avery, 2017; Desombre et al., 2019), while other authors assessed them in relation to including children with special educational needs or specific disabilities, such as children with hearing loss (Eriks-Brophy & Whittingham, 2013), dyslexia (Kormos & Nijakowska, 2017), and emotional and behavioral difficulties (MacFarlane & Woolfson, 2013). Since Bandura (2012) mentioned that the assessment of self-efficacy is influenced by the validity of the measures and by contextual factors, the above characteristics of measurements may likely serve as potential moderators in this study.

1.3. The present study

The purpose of this study was to explore the magnitude of the relationship between teachers' self-efficacy and attitudes in implementing inclusive education of K-12 students with SENs. Specifically, the aim was to answer the two research questions (RQs):

RQ 1. How strong is the overall correlation between teachers' self-efficacy and attitudes in inclusive education?
RQ 2. How is the relationship moderated by the following potential moderators?
RQ 2a. Publication characteristics: publication type (peer-reviewed articles vs. academic dissertations and theses) and year of publication.
RQ 2b. Sample characteristics: cultural differences (collectivism vs. individualism), grade level taught, and gender differences.
RQ 2c. Research procedure characteristics: sampling method, measurement of teachers' self-efficacy and attitudes, context and reliability of scales, number of items, and type of Likert scale.

2. Method

2.1. Data collection

Studies investigating the relationship between teachers' self-efficacy and attitudes in implementing inclusive education were identified through a search of several databases and the perusal of relevant journal webpages. The search process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement protocol (Moher et al. & The PRISMA Group, 2009). The literature search criteria and inclusion process are presented in Fig. 1. The databases were consulted for the time span between 1994 and 2018; this period was selected to include studies conducted after the Salamanca Statement on Principles (UNESCO, 1994) was published, which is considered as a primary point to implement inclusive education in policies and practices. To avoid publication bias, in which only those studies with statistically significant results would be included (Greenwald, 1975), we searched both peer-reviewed and non-reviewed studies as well as unpublished dissertations.

First, we searched the online databases (ERIC, Web of Science, PsycArticles, PsycINFO, EBSCOhost Academic Search Elite, Science Direct, Scopus, JSTOR, ProQuest Education and Psychology Journals, and Google Scholar) for publications in English with the following query in the title and abstract: [(teach*) AND (efficacy) AND (inclusi*) AND (attitude*)]. The query enabled us to search the studies that included terms such as *teacher(s), teaching, efficacy, self-efficacy, inclusion, inclusive education, inclusive settings, and attitude(s).*

Second, online dissertations and theses were searched through the databases (ERIC, ProQuest Dissertations & Theses, and Google Scholar) using the same query. Third, we searched the web pages of journals related to inclusive education, educational and psychological research, and comparative education for relevant studies (e.g., *American Educational Research Journal, Comparative Education, International Journal of Inclusive Education, Journal of Educational Psychology, Teaching and Teacher Education,* and *The Journal of Special Education*). The search procedure yielded 855 potential studies; these were scanned for duplicates, which resulted in the removal of 326 studies. Finally, 529 were identified and reviewed to determine whether they met the inclusion criteria for further analysis.

2.2. Inclusion and exclusion criteria

Both an initial screening of the studies' titles and abstracts and a full-text screening were conducted using a computer software package called Covidence (Veritas Health Innovation, 2019). Two people (one of the authors and a student pursuing a master's degree in education) separately reviewed the studies in both screening processes, and conflicts between the two raters were carefully discussed to achieve agreement. Inter-rater reliability was 86.5% in the initial screening and 74.0% in the full-text screening. The relatively low inter-rater reliability in the full-text screening was due to uncertainty regarding the definition of inclusive education in the criteria, and, thus, two raters carefully discussed the conflicts and agreed on inclusion/exclusion. We used the following inclusionary and exclusionary criteria for the initial screening:

(a) The study must report original empirical data;
(b) The study must be written in English;
(c) The study must assess the relationship between teachers' self-efficacy and attitudes in inclusive settings, which includes the broad meaning of inclusive education (e.g., attitudes toward disabilities, students with special educational needs, and students with behavioral problems); and
(d) Participants of the study must be teachers working in pre-schools, primary schools, or secondary schools (K-12).
(e) Case studies and qualitative studies were excluded.

According to the inclusion and exclusion criteria, 212 studies were selected in this first round. The full text of these studies was retrieved from online databases (or the authors were contacted with a request to provide them). Full-text versions were not available for five studies; thus, 207 were uploaded into Covidence and read by the two raters. The inclusionary and exclusionary criteria for the full-text screening were that:

(f) Participants in the study must be in-service teachers working in pre-schools, primary schools, or secondary schools (K-12);
(g) The concepts (both teachers' self-efficacy and attitudes) must be measured quantitatively (e.g., using scales);
(h) The study must assess the relationship between teachers' self-efficacy and attitudes in inclusive settings using Pearson's or Spearman's correlation coefficient (*r* or *rho*); and
(i) The study must report a sample size or degree of freedom for Pearson's or Spearman's correlation coefficient (*r* or *rho*).

If criteria (f) and (g) were satisfied but the study did not report a

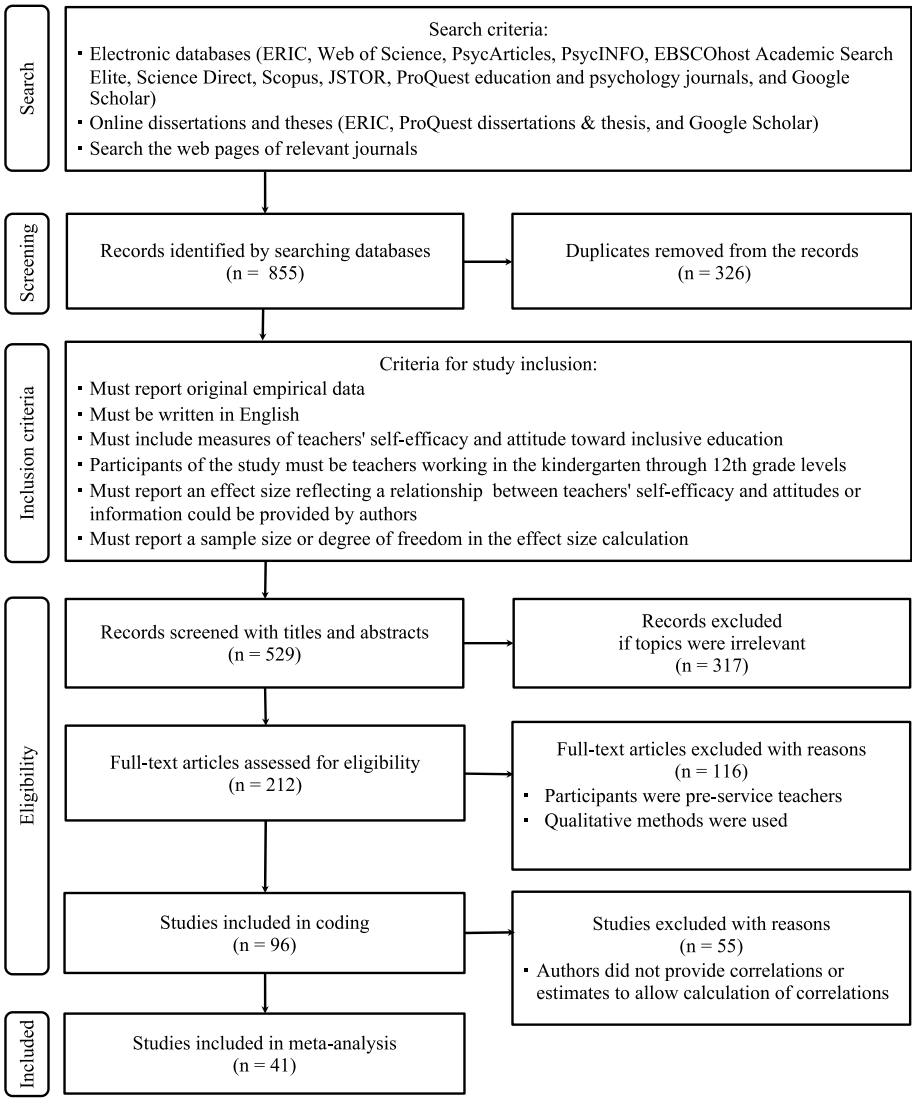


Fig. 1. Flow diagram for the literature search and inclusion process.

correlation coefficient, the study was tentatively included in a further coding process to ask the authors to provide the necessary information. This second round of selection resulted in 96 studies for coding.

2.3. Coding procedures

Coding was done by the first author of the article; the process included two phases. In the first phase, pilot coding was conducted with eight studies. The content of the tentative coding table was discussed with all the authors to include as many study features as possible, which was considered relevant to further analysis. After the pilot coding was finished, the research team discussed the issues raised during the pilot coding and made necessary revisions to the coding table. In the second phase, all the included studies were coded using the revised coding table, and the issues encountered in the coding process were again discussed with the research team.

The study features included in the final coding table were: (a) publication year (1994–2018); (b) publication type; (c) sampling method; (d) number of participants; (e) country; (f) grade level taught; (g) rate of female participants; (h) the type of measures used for evaluating teachers' self-efficacy and attitudes; and (i) reliability of the used scales. In some studies, measures were coded so that a negative correlation coefficient indicated a positive relationship between teachers' self-efficacy and attitudes. Thus, in those cases, correlation coefficients were recoded so that a positive correlation always meant that higher self-efficacy was associated with more positive attitudes. Also, when a correlation coefficient was not reported, we contacted the authors and kindly asked them to provide it through an email or social networking service (e.g., ResearchGate or LinkedIn) if an email address was not available. We contacted the authors a second time if they did not respond to the message. Altogether 23 authors were sent requests and 14 responded (response rate = 60.8%). Of those who responded, three were not able to provide the information for some reasons (e.g., old data set). The studies that the authors' contact information was not available, authors did not reply, or authors were not able to provide necessary information were excluded from the analysis.

It should be noted that some primary studies measured teachers' attitudes and concerns separately and reported each correlation coefficient between teachers' self-efficacy (Chan, 2016; Sokal & Sharma, 2013). In such cases, we included only the correlation coefficient using the attitude scale because the attitudes scales closely reflected our aforementioned definition of attitude. Furthermore,

the authors of several primary studies used the Scale of Teachers' Attitudes Toward Inclusive Classrooms (STATIC [Cochran, 1997]) or the Opinions Relative to Integration of Students with Disabilities scale (ORI [Antonak & Larrivee, 1995]), which contains a sub-scale that measures concepts similar to self-efficacy (i.e., "professional issues" and "perceived ability to teach students with disabilities," respectively). Because these sub-scales would have caused a confounding bias, we asked authors to provide information without the sub-scales, and the studies were included only if the authors provided the information. Studies with a small sample size (less than 30) were also excluded to assure the reliability of the scale and the correlation coefficient (Samuels, 2015).

Among the 96 studies selected as relevant to this one, 41 were finally identified as having the necessary information, and thus, they were included in our meta-analysis. The authors of these 41 studies reported findings according to 43 independent samples, which resulted in an accumulated total number of 10 929 participants ($M = 254.16$). The authors of two studies reported results from two independent samples from different countries. Moreover, three studies adopted longitudinal design. Since this study is not focusing on the intervention effect, correlation coefficients of the first time point were included in the meta-analysis. The detailed information included in the final coding table for all the studies in this meta-analysis is presented in Table 1.

2.4. Moderators

Three types of moderators were coded in our meta-regression analysis: publication, sample, and procedural characteristics. The publication characteristics included publication type (journal article vs. thesis) and year (1994–2018). The sample characteristics consisted of cultural differences (collectivism vs. individualism), grade level taught (primary vs. secondary vs. mixed), and percentage of female participants. The cultural differences moderator was a dichotomous factor, where studies were coded as individualism or collectivism using Hofstede's country comparison tool on his website (hofstede-insights.com) (Hofstede et al., 2010). Based on his cultural dimensions theory (Hofstede, 2001), the indicator enables us to divide different countries into individualism/collectivism cultures. Finally, the procedural characteristics contained the sampling method (random vs. non-random), measurement of teachers' self-efficacy (the TEIP scale vs. the TSES vs. the Teacher Efficacy Scale [TES; Gibson & Dembo, 1984] vs. other), the context of teachers' self-efficacy scale (self-efficacy with including all students vs. students with SEN vs. students with specific disability), the context of attitude scale (attitudes toward inclusion of students with SENs vs. students with specific disability), reliability of scales, number of items, and type of Likert scale.

2.5. Calculating effect sizes

The effect size measure adopted in this study was the Pearson's correlation coefficient (r) between teachers' self-efficacy for inclusive practices and their attitudes toward inclusive education. In addition, the authors of three studies reported Spearman's correlation coefficient (*rho*), which was also included in the analysis. The majority of the effect sizes were correlation coefficients reported in the original studies or provided by the author of the studies. Some authors did not provide an overall correlation coefficient between teachers' self-efficacy and attitudes but reported several correlations among sub-scales. In this situation, the mean of correlation coefficients was calculated, in which each effect size was first transformed into the Fisher Z value and the averaged Z value was transformed back into Pearson's correlation coefficient.

2.6. Meta-analytic integration

The estimation methods were the bare-bones meta-analysis with a random-effects model, meta-regressions with the restricted maximum likelihood (REML), and the Hartung-Knapp (van Aert & Jackson, 2019) method. Using the Comprehensive Meta-Analysis (CMA, Version 3) software package (Borenstein et al., 2013), sample sizes were used as weights (i.e., inverse of variances). The funnel plot asymmetry was elaborated first with a classic fail-safe N method (Rosenthal, 1979) to identify the possibility for publication biases (alpha 0.05, two-tailed p-value). We did not use Orwin's fail-safe N, because setting values for trivial correlation and speculating the level of correlation in missing studies would have been products of arbitrary guesses. Furthermore, Duval and Tweedie's fill and trim method did not suggest trimmed studies to the left or right of the mean for the random-effects model (Shi & Lin, 2019). Therefore, only observed studies were included in the funnel plot.

Meta-regressions were done separately for each of the bivariate, dummy-coded moderator variables to explain the heterogeneity of the correlation coefficients (reference category 0 represents other combined categories; 1 represents an interest category, and; intercept was included in the models). We obtained statistically significant estimates (referred to next as β-coefficients) to indicate whether the interest category held higher explanation power over other categories (positive sign) or lower explanation power (negative sign). We omitted analyzing the significance of moderation factors by the multiple meta-regression method due to the relatively low number of studies. Also, we were not able to take into account the possible interaction effects of the moderators. To illustrate heterogeneity in the models, we chose to report variances among the studies (τ^2, REML estimate). We also chose to report the percentages of variability not associated with sampling errors (I^2) to illustrate heterogeneity in the models.

3. Results

3.1. Analysis of effect sizes

The search for the literature resulted in 855 papers, and we narrowed them down to 529 candidate studies by removing duplicates. Further title and abstract screening yielded 212 potentially relevant studies. After the reading and coding of the full text, we had 41 individual studies consisting of 43 unique samples.

The major findings, including meta-analysis based on effect size and study-effect meta-analysis, are presented in Table 2. The overall correlation between teachers' self-efficacy and attitudes in inclusive education was $\bar{r} = 0.351$ ($k = 43$, $p < .001$), with a 95% confidence interval ranging from 0.307 to 0.394. The results indicated that although there was inconsistency among the individual studies, a moderate correlation existed between teachers' self-efficacy and attitudes in inclusive education.

The funnel plot graph provided in Fig. 2 shows where all the correlation coefficients were plotted relative to their standardized errors. The symmetrical distribution of plots around the vertical line indicates that there is no publication bias (Card, 2011). Our data showed symmetrical patterns; thus, publication bias might not exist. In addition, the classic fail-safe N analysis was conducted to check for robustness. The results indicated that 3164 studies with null results were needed for the effect to be nullified. Overall, these results indicated that the effect of publication bias on effect sizes would be minimal and negligible.

Fig. 3 presents a forest plot graph, which graphically describes the results from the random-effects modeling analysis of the 43 effect sizes. Here, each square dot indicates the effect size of each sample, and the horizontal line indicates the 95% confidence

Table 1
Description of Studies Included in the Meta-Analysis.

Author (years)	Pub type	Location	*n*	Female %	TSE measure	Reliability TSE	Attitude measure	Reliability attitude	*r*
Alaverdyan (2018)	TD	The Republic of Armenia	187	95.6	Teacher Efficacy for Inclusive Practices scale (TEIP)	.9	Sentiments, Attitudes, and Concerns about Inclusive Education Revised (SACIE-R)	.77	.271
Angiulo (2014)	TD	USA	154	77	Teachers' Sense of Efficacy Scale (TSES)	–	Autism Attitude Scale for Teachers-Revised (AAST-R)	–	.51
Avery (2017)	TD	USA	44	–	TSES	.929	Stages of Concerns Questionnaire (SoCQ)	–	.36[1]
Bender et al. (1995)	JA	USA	127	92.1	Teacher Efficacy Scale (TES)	–	Mainstreaming attitudes	–	.36 and .23
Benton-Borghi (2006)	TD	USA	227	74	TSES	.92	Attitude toward inclusion	.78	.273
Bettineski (2015)	TD	USA	90	–	TSES	–	Attitudes Toward Teaching All Students (ATTAS-mm)	–	.027
Carew et al. (2018)	JA	Kenya	123	46.1 and 43.3	Teaching self-efficacy	.72	Beliefs and feelings about inclusive education	.63 and .63	.07 and .26
Chan (2016)	TD	Hong Kong	309	94.2	General Self-Efficacy Scale (GSE)	.91	SACIE-R	.65	-.06
Davis (2015)	TD	USA	65	85	TSES	–	Scale of Teachers' Attitude Toward Inclusive Classrooms (STATIC)	–	.303
Desombre et al. (2019)	JA	France	554	79.6	TES (only used personal efficacy sub-scale)	.74	Multidimensional Attitudes Toward Inclusive Education Scale (MATIES)	.88	.43
Eriks-Brophy and Whittingham (2013)	JA	Canada	63	73	Teacher confidence in teaching children with hearing loss	.78	Teacher attitudes toward inclusion of children with hearing loss	.66	.398[1]
Frizzell (2018)	TD	USA	180	–	Perceptions of teacher self-efficacy in meeting the needs of students with disabilities	–	Teacher attitudes toward inclusion	–	.608
Glaubman and Lifshitz (2001)	JA	Israel	136	50	TES	.6	The second part of the regular education initiative questionnaire	.83	.29
Hernandez et al. (2016)	JA	USA	118	95.7	TSES	.94	STATIC	.8	.33
Kormos and Nijakowska (2017)	JA	–	1187	92.8	Self-efficacy beliefs relating to the successful application of inclusive second language teaching approaches (4 items adapted from TEIP)	.82	Attitudes to inclusive second language education and concerns about inclusion and the successful application of inclusive teaching practices (8 items adapted from SACIE-R)	.665 and .711	.208
Kuittinen (2017)	TD	Chile	108	74.1	TEIP	.96	SACIE-R	.72	.393
Lee et al. (2014)	JA	Hong Kong	275	100	Efficacy	.67	Resistance to inclusion and Endorsement of SEN	.79	.23
Lifshitz et al. (2004)	JA	Israel and Palestine	66 and 192	95 and 100	Gemmel-Crosby & Hanzlik (1994) Questionnaire	.8	Gemmel-Crosby & Hanzlik (1994) Questionnaire	.87	.45
MacFarlane and Woolfson (2013)	JA	Scotland	111	94.6	TSES modified for children with social, emotional, and behavioral difficulties (SEBD)	.93	MATIES modified for children with SEBD	.75	.44 and .44
Malak et al. (2018)	JA	Bangladesh	1090	42.3	Teachers' Efficacy in Classroom Management and Discipline (TECMD) scale	.77	Teachers' Attitudes Toward Students' Inappropriate Behavior (TASIB)	.92	.422
Malinen et al. (2012)	JA	China	451	85.4	TEIP	.91	SACIE-R	.69	.41
Mian (2017)	TD	Singapore	183	72.7	TEIP	.927	SACIE-R	.701	.403
		Japan	189	48.1	TEIP	.915	SACIE-R	.707	.307
Montgomery and Mirenda (2014)	JA	Canada	100	87	TEIP	.65–.77	SACIE-R	.68–.82	.215–.561
Morgan (2013)	TD	USA	142	–	Self-efficacy scale	.92	Attitudes towards including a child with autism spectrum disorder	.92	.59
Munsell (2015)	TD	USA	370	82.4	TSES	.9	MATIES	.78 and .79	.311 and .446
Munthe and Thuen (2009)	JA	Norway	74	63.5	Teachers' efficacy about pupil learning and behavior	.60 and .78	The agreement of inclusion	.78	.100 and .256
Omer (2015)	TD	Ethiopia	76	–	TES	–	Teachers' attitudes toward inclusive education	–	.638
Randoll (2008)	TD	Canada	34	94.1	Teacher Efficacy Scale: Long Form	–	Attitudes Toward Inclusive Education Scale (ATIES)	–	.399
Samms (2017)	TD	Jamaica	191	91.15	TEIP	.879	SACIE-R	.702	.197–.234
Savolainen et al. (2012)	JA	Finland	855	78.3	TEIP	.88	SACIE-R	.74	.42
		South Africa	322	82.1	TEIP	.91	SACIE-R	.66	.194

(*continued on next page*)

Table 1 (*continued*)

Author (years)	Pub type	Location	*n*	Female %	TSE measure	Reliability TSE	Attitude measure	Reliability attitude	*r*
Skuller (2011)	TD	USA	267	84.3	Teacher Efficacy Scale	.696 and .759	The scale developed based on the Autism Attitude Scale for Teachers (AAST)	–	.146–.499
Sokal and Sharma (2013)	JA	Canada	131	87	TEIP	.91	School principals' attitudes toward inclusion	.86	.44[1]
Stanovic (1996)	TD	Canada	33	78.8	TES	.82	Attitude Toward Mainstreaming Scale (ATMS)	.93	.43
Tasnuba and Tsokova (2015)	JA	Bangladesh	400	–	TEIP	.89	2 sub-scales from SACIE-R	.60 and .64	.25
Tsakiridou and Polyzopoulou (2014)	JA	Greece	416	68.3	The self-efficacy belief scale	.864	Attitudes toward inclusive education scale	.85	.156
Urton et al. (2014)	JA	Germany	276	96	Wirksamkeit Lehrer	.86	Attitudes toward inclusion	.85	.51
Wang et al. (2012)	JA	China	323	–	TEIP	–	Concerns About Inclusive Education Scale (CIES)	–	.32
Weisel and Dror (2006)	JA	Israel	139	100	TES	.77 and .86	Teachers' attitudes toward Inclusion questionnaire	.97	.67 and .52
Wilson et al. (2016)	JA	Scotland	145	85	Theory of Planned Behavior (TPB) questionnaires	.89	TPB questionnaires	.96	.392
Wood (2017)	TD	USA	47	87.2	TEIP	.874	Attitudes Toward Teaching All Students (ATTAS)	.771	.12
Yada and Savolainen (2017)	JA	Japan	359	53.5	TEIP	.93	SACIE-R	.75	.396

Note. [1] = Spearman's correlation coefficient was reported; TSE = teachers' self-efficacy; TD = thesis and dissertation; JA = journal article.

interval of the effect size. The correlation coefficients of unique samples varied between −0.06 and 0.64. There was large variation across the correlation coefficients, and the result of Q tests for heterogeneity among the effect sizes indicated substantive heterogeneity ($Q[42] = 254.77$, $p < .001$) justifying the random-effect approach.

3.2. Analysis of moderator variables

According to the overall heterogeneity test, the effect sizes were shown to be considerably inconsistent among the unique samples, indicating the existence of potential moderators that may have contributed to these inconsistencies. As mentioned above, three types of moderators were included in the meta-regression analysis: publication, sample, and procedural characteristics.

First, the roles of publication type (journal article vs. thesis) and year (1994–2018) were examined. The results indicated that publication type and year of publication were not statistically significant moderators of the teachers' self-efficacy–attitudes relationship.

The sample characteristics included cultural differences (collectivism vs. individualism), grade level taught (primary vs. secondary vs. mixed), and percentage of female participants. The included samples were categorized either as representing a collectivistic or individualistic culture based on Hofstede's individualism/collectivism indicator (Hofstede et al., 2010). The mean effect size of the individualistic culture was larger than that of the collectivistic culture, although the result was not statistically significant. Moreover, no statistically significant differences were found in the regression analyses of grade level taught and gender (rate of female participants).

The last type of moderator was that of procedural characteristics. The meta-regression analysis revealed that the sampling method (random vs. non-random) was not a significant moderator. The measurement of teachers' self-efficacy (the TEIP scale vs. the TSES vs. the TES vs. other) was also not a significant moderator associated with the variations among studies. However, the context of the teachers' self-efficacy scale (self-efficacy in including all students vs. students with SENs vs. students with specific disabilities) predicted the relationship between teachers' self-efficacy and attitudes. More specifically, the correlations were lower for the studies using teachers' self-efficacy measures in the context of including all students ($\beta = -.111$, $p < .05$). Furthermore, the correlations were higher when the studies adopted teachers' self-efficacy measures in the context of including students with specific disabilities ($\beta = 0.135$, $p < .05$). The context of attitude scale (attitudes toward inclusion of students with SENs vs. students with specific disabilities) moderator showed a similar tendency, indicating that effect sizes for attitudes toward the inclusion of students with specific disabilities were larger than that of students with SENs ($\beta = 0.124$, $p = .059$), though the significance level was slightly above the alpha level of 0.05. In terms of the reliability of scales, higher reliability of the attitude scale was associated with larger effect sizes ($\beta = 0.973$, $p < .001$), whereas such a relationship was not found for the reliability of the teachers' self-efficacy scale. Finally, the number of items and the type of Likert scale for both teachers' self-efficacy and the attitude scales were not significant moderators.

4. Discussion

Over the last decade, the authors of several studies have shown that there is a positive relationship between teachers' self-efficacy and their attitudes toward inclusive education (e.g., Savolainen

Table 2
Relationship between Teachers' Self-Efficacy and Attitudes in Inclusive Education: Overall Results and Meta-Regression Analyses.

	k	Estimate	*SE*	*t*-value	*df*	*p*	95% CI	τ^2	I^2
Null model									
Intercept	43	.367[1]	.026	13.95	42	<.000	[.314[1], .420[1]]	.023	83.51
Publication moderators									
Publication year									
Intercept	43	5.359	10.169	0.53	41	.601	[-15.178, 25.896]	.023	83.51
Year	43	-.003	.005	−0.49	41	.626	[-.013, .008]	.023	83.80
Publication type									
Intercept	43	.368	.042	8.808	41	.000	[.283, .452]	.023	83.51
Article	43	-.001	.054	−0.010	41	.992	[-.110, .109]	.024	83.88
Sample moderators									
Cultural differences									
Intercept	38	.315	.043	7.376	36	.000	[.229, .402]	.023	82.11
Individual culture	38	.083	.056	1.494	36	.144	[-.030, .196]	.021	80.94
Grade level									
Intercept	38	.366	.032	11.565	36	.000	[.302, .430]	.022	83.35
Primary	38	-.031	.064	−0.481	36	.634	[-.162, .100]	.022	83.76
Rate of females									
Intercept	36	.280	.106	2.656	34	.012	[.066, .495]	.017	81.89
Females	36	.001	.001	0.709	34	.483	[-.002, .004]	.017	82.01
Procedural moderators									
Sampling method									
Intercept	43	.368	.029	12.555	41	.000	[.309, .427]	.023	83.51
Random	43	-.002	.071	−0.026	41	.979	[-.145, .141]	.024	82.86
TSE measurement 1									
Intercept	43	.380	.033	11.587	41	.000	[.313, .446]	.023	83.51
TEIP	43	-.036	.056	−0.638	41	.527	[-.149, .077]	.023	83.90
TSE measurement 2									
Intercept	43	.371	.029	12.656	41	.000	[.311, .430]	.024	83.90
TSES	43	-.019	.071	−0.263	41	.794	[-.161, .124]	.021	83.51
TSE measurement 3									
Intercept	43	.349	.028	12.681	41	.000	[.294, .405]	.023	83.51
TES	43	.140	.077	1.813	41	.077	[-.016, .296]	.022	82.88
Context of TSE scale 1									
Intercept	40	.451	.046	9.778	38	.000	[.358, .544]	.018	78.39
All students	40	-.111	.054	−2.045	38	.048	[-.221, −.001]	.017	78.94
Context of TSE scale 2									
Intercept	40	.367	.027	13.700	38	.000	[.313, .422]	.018	78.39
Students with SEN	40	.035	.082	0.423	38	.675	[-.131, .200]	.018	78.68
Context of TSE scale 3									
Intercept	40	.483	.059	8.134	38	.000	[.294, .402]	.018	78.39
Students with a specific disability	40	.135	.065	2.066	38	.046	[.003, .266]	.017	78.83
Context of TAT scale 1 (students with SENs)									
Intercept	42	.464	.056	8.239	40	.000	[.350, .578]	.023	83.91
Students with SENs	42	-.124	.064	−1.946	40	.059	[-.252, .005]	.022	84.22
Context of TAT scale 2									
Intercept	42	.340	.030	11.533	40	.000	[.281, .400]	.023	83.91
Students with a specific disability	42	.124	.064	1.946	40	.059	[-.005, .252]	.022	84.22
Number of items									
Intercept	42	.345	.063	5.513	40	.000	[.218, .471]	.024	83.89
TSE	42	.002	.004	0.384	40	.703	[-.006, .009]	.024	83.01
Number of items									
Intercept	42	.291	.067	4.349	40	.000	[.156, .426]	.024	83.89
TAT	42	.006	.005	1.260	40	.215	[-.004, .015]	.023	83.32
Type of Likert scale									
Intercept	42	.346	.110	3.142	40	.003	[.123, .568]	.023	83.89
TSE	42	.004	.017	0.217	40	.829	[-.030, .037]	.024	84.13
Type of Likert scale									
Intercept	42	.319	.108	2.966	40	.005	[.102, .536]	.021	83.27
TAT	42	.008	.020	0.390	40	.699	[-.033, .049]	.022	82.86
Reliability of TSE scale									
Intercept	35	.240	.244	0.982	33	.334	[-.257, .737]	.020	83.85
TSE	35	.136	.288	0.472	33	.640	[-.449, .721]	.019	83.37
Reliability of TAT scale									
Intercept	33	-.402	.190	−2.120	31	.042	[-.790, −.015]	.020	84.34
TAT	33	.973	.243	4.011	31	<.001	[.478, 1.467]	.012	76.59

Note. [1] = Fisher's Z coefficient; k = number of samples; Estimate: REML meta-regression estimate with Knapp-Hartung method; SE: standard error; df = degree of freedom; CI: confidence interval; TSE = teachers' self-efficacy; TEIP = Teacher Efficacy for Inclusive Practices scale (Sharma et al., 2012); TSES = Teachers' Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001); TES = Teacher Efficacy Scale (Gibson & Dembo, 1984); TAT = teachers' attitudes.

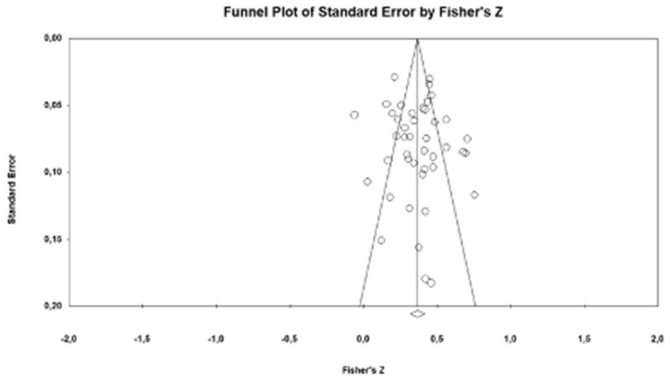


Fig. 2. *A Funnel Plot Graph of the Correlation Coefficients in the Unique Samples (N = 43).*

et al., 2012; Sokal & Sharma, 2013; Weisel & Dror, 2006; Yada & Savolainen, 2017). A recent systematic literature review by van Steen and Wilson (2020) concluded that teachers' attitudes toward inclusion were positive and moderated by an interplay of several factors. However, there has been no study in which a research team quantitatively synthesized the results of the relationship between teachers' self-efficacy and their attitudes toward inclusive education. Thus, the primary aim of this study was to explore the overall relationship between teachers' self-efficacy and their attitudes toward inclusive education. Many scholars have claimed that improving efficacy might be one way to improve teachers' attitudes, and, while the results from several studies have suggested, those of this study provided—for the first time—more conclusive evidence of the relevance of this hypothesis.

Our statistical estimation did not suggest a publication bias, and this is in line with recent findings by van Steen and Wilson (2020) in their meta-study. Further, the analysis revealed an average significant positive relationship ($\bar{r} = 0.351$) between teachers' self-efficacy and attitudes, which can be considered a moderate effect size (Cohen, 1988). Additionally, the results indicated that the correlations among single studies varied widely, which highlights the importance of using the results of meta-studies when summarizing the body of literature. The result is consistent with the previous meta-analyses that have positive links with teacher efficacy. For example, teachers' self-efficacy has been shown to positively influence their evaluated teaching performance (Klassen & Tze, 2014) and their commitment to the teaching profession (Chesnut & Burley, 2015); it has been negatively associated with their burnout (Aloe et al., 2014).

Also, with this study, we aimed to examine whether different moderators influenced the effect size of the teachers' self-efficacy–attitudes relationship. We found that neither publication characteristics (i.e., publication type and year) nor sample characteristics (i.e., cultural differences, grade level taught, and rate of female participants) were significant predictors of the relationship between teachers' self-efficacy and attitudes in inclusive education. These findings suggest that the relationship between teachers' self-efficacy and their attitudes is quite universal, regardless of the time, culture, grade level taught, or gender, even though the magnitude of teachers' attitudes and self-efficacy might differ based on the factors (Klassen et al., 2011; van Steen & Wilson, 2020). This finding is in line with earlier studies indicating that teachers' self-efficacy and attitudes have a positive relationship in different countries (Avramidis et al., 2019; San Martin et al., 2021; Sharma & Jacobs, 2016; Yada et al., 2018).

In light of procedural characteristics, the meta-regression analysis indicated that the sampling method did not influence the increase or decrease of effect sizes. Though there is a common understanding that studies with random sampling gather representative data, the effect size may not differ in the case of the relationship between teachers' self-efficacy and attitudes. The efforts involved in randomization are complex and might impact on the mean of variables or constructs but not on the associations among different constructs. However, this result should be interpreted with caution because, in this study, only 7 out of 43 samples were collected with random sampling. Since sampling methods were not used as a moderator variable in previous meta-analysis studies in teachers' self-efficacy research, future work is required to ensure whether the teachers' self-efficacy–attitudes relationship is influenced by sampling methods.

Different measurements of teachers' self-efficacy did not explain a significant amount of variance in the relationship between their self-efficacy and attitudes toward inclusive education. A possible explanation for this might be that although there are some teachers' self-efficacy scales that are often used in research,

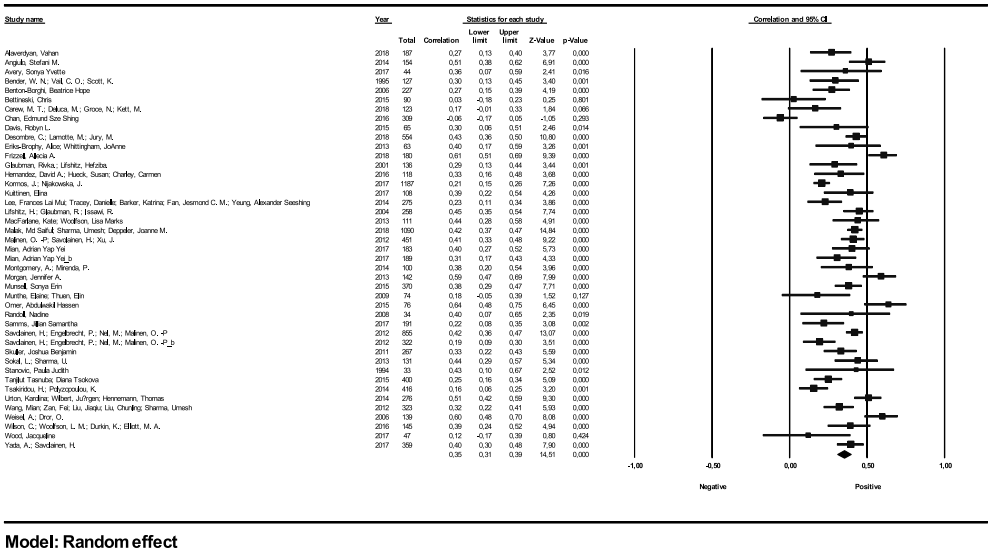


Fig. 3. Overall Random-Effects Model Meta-Analysis Average Correlation Coefficient of Teachers' Self-Efficacy-Attitudes, Correlation Coefficients in the Unique Samples (N = 43), and Coefficients with a 95% Confidence Interval for Each Study.

these scales measure similar constructs of self-efficacy in inclusive education. However, contexts of teachers' self-efficacy scales accounted for the variation among the correlations, in which self-efficacy in including all students predicted lower correlations than scales including students with SENs and specific disabilities. In other words, if the context of the scale is more specific to students with particular disabilities, correlations between teachers' self-efficacy and attitudes become stronger. A similar tendency was found for the contexts of the attitudes scale, although the significance level was slightly above .05. These tendencies can be explained in part by the context-specific nature of self-efficacy (Bandura, 1997). If the scale is more context-sensitive toward including children with specific disabilities, teachers' self-efficacy might become higher, which matches the context of attitudes scale better, and, thus, its correlation became higher. The results are in accord with a recent study that found only a weak correlation between general teacher self-efficacy and attitudes toward including students with SENs (Saloviita, 2020). Furthermore, these results may reflect the fact that inclusive pedagogy (that is, pedagogy to include all learners) remains ambiguous and is less studied compared to special education pedagogy (Florian & Black-Hawkins, 2011; Schwab, 2020). These findings suggest that single studies need to be interpreted with much more caution, especially in the way of the introduction, whether the study is about including all students, students with SENs, or students with specific disabilities. Moreover, the findings of this study further support the idea that although the relationship between teachers' self-efficacy and attitudes seems to be universal, how other variables such as experience in teaching students with SENs, the amount of inclusive education training, and sources of self-efficacy might affect the outcomes differently in different countries, as pointed out in previous research (Bonneville-Roussy et al., 2019; Malinen et al., 2013; Savolainen et al., 2012; Yada et al., 2018, 2019). Therefore, further research should be undertaken to investigate how those variables predict the self-efficacy–attitudes relationship.

Finally, the number of items and the type of Likert scale for both teachers' self-efficacy and attitude scales failed to explain the variance in the relationship between the two. However, the reliability of the attitude scale had a significant effect on the self-efficacy–attitudes relationship, in which higher reliability predicted a larger correlation coefficient. Nonetheless, such an effect was not found for the teachers' self-efficacy scale. These results are likely to be related to the variation of reliability, in which reliabilities of attitude scales varied from moderate to high (between .62 and .97; $M = 0.78$), but those of self-efficacy scales were mostly high (between 0.60 and 0.94; $M = 0.85$). If we believe that the studies using more reliable instruments represent results from the actual population, these findings appear to suggest that the relationship between teachers' self-efficacy and attitudes could be slightly higher than what the general literature would suggest. Because this issue was not discussed in previous research, caution is warranted in interpreting the results, and further work is required.

5. Limitations and future direction

Although this study contributed to the understanding of the overall picture of empirical research on teachers' self-efficacy and attitudes in inclusive education, some limitations should be noted. First, our search procedure may not have included some relevant studies because we only included published studies, theses, and dissertations in which the information was available in online databases. In a similar vein, this research is limited to reports written in English, though there might be related studies written in other languages. Likewise, as in all reviews, zero effect sizes are rarely reported in the publications, and, therefore, the correlation might be overestimated. Further, because of a long process of literature search and coding, the present study was not able to include recent studies conducted between 2019 and 2021 (e.g., Avramidis et al., 2019; Kisbu-Sakarya & Doenyas, 2021; Narkun & Smogorzewska, 2019; Opoku et al., 2020; Saloviita, 2020; Schwab & Alnahdi, 2020). These issues could cause some publication bias (Cooper et al., 1997; Scargle, 2000).

Second, this study was limited by the absence of some moderators that may affect the relationship between teachers' self-efficacy and attitudes. For instance, we could not include teachers' working places (i.e., in regular classes, special classes, or special schools) as a moderator because usually those teachers were included in one sample, though previous studies suggested that teachers in special education were more likely to have positive attitudes toward inclusion (Forlin et al., 2015; Norwich, 1994). Similarly, several variables, such as the number of years of each of their teaching careers, the amount of training in inclusive education, and experience in teaching students with SENs were identified as influencing teachers' self-efficacy and attitudes (e.g., de Boer et al., 2011; Savolainen et al., 2012; Yada et al., 2018). Moreover, it has been suggested that student-related variables such as severity and type of students' disabilities might affect teachers' attitudes toward inclusive education (Avramidis & Norwich, 2002). It is unfortunate that this study could not include such student-related variables because only nine studies were focusing on specific disabilities such as autism, hearing, and behavior disability. These variables may explain a significant amount of variance in the self-efficacy–attitudes relationship, and more studies are also required to identify potential interaction effects among the various moderators.

Third, another note of caution regarding cultural differences is that the present study examined whether individualism/collectivism culture affected the relationship between self-efficacy and attitudes. Although this dichotomy is useful, there might be a need to examine the relationship by considering the interplay of other cultural dimensions such as power distance and uncertainty avoidance (Hofstede, 2001; van Steen & Wilson, 2020). Since it was impossible to divide studies into more groups because of the small sample size in this study, future studies on the current topic with a large sample size are recommended. Similarly, inclusive education is greatly influenced by each country's policies and educational system (Yada et al., 2018). Further studies regarding the role of not only cultural contexts but also national policies and educational systems would be worthwhile.

Fourth, while there is a common understanding that teachers' self-efficacy comes first and attitudes follow as an outcome (Ajzen & Madden, 1986), solid evidence of such causal direction using longitudinal data is only beginning to emerge (see Savolainen et al., 2020). Further systematic reviews on the self-efficacy–attitudes relationship using longitudinal studies should be carried out to confirm the causal relationship of teachers' self-efficacy on their attitudes.

Finally, our quantitative synthesis provided an overarching picture of the relationship; however, it did not offer a procedural understanding of how teachers' self-efficacy influences their attitudes toward inclusive education. Thus, it would be highly useful to include studies whose authors used qualitative methods to provide detailed descriptions of what happens regarding this relationship.

Methodically evaluated, we did not correct study artifacts potentially biasing the true correlation between teachers' self-efficacy and attitudes toward inclusive education (Hunter & Schmidt, 2015). This is, we recognize, a major limitation. However, because we saw large measurement instrument variation among studies, we concluded that we were not able to correct measurements to the level that they are invariant enough across studies.

Consequently, there is a need to develop further self-efficacy and attitude measurement scales, test their latent structures' properties, and demonstrate that invariant assumption holds for different settings and contexts.

Power is a major concern for all meta-analytical studies (Jackson & Turner, 2017). We identified 43 studies, which is a relatively large number for providing a trustworthy point estimate and narrow confidence interval. The same is not true for meta-regressions. Some subgroups were rather small, which lowers power and may lead to statistically non-significant results. We decided not to use the multiple meta-regression method because it would have lowered the number of studies to 20. As noted earlier, we did not analyze interaction patterns, which, in turn, should be taken into account in future meta-analysis studies. Finally, future studies may benefit from other and more sophisticated methods than this barebones meta-analysis (e.g., Bayesian meta-analysis; Röver, 2017).

6. Conclusions and implications

The results of this study indicated that the link between teachers' self-efficacy beliefs and their attitudes toward inclusive education is positive and moderate ($\bar{r}$=0.351). More specifically, the correlation between the two concepts was found to vary widely, which underpins the meaningfulness of investigating existing studies' results more systematically. Our findings suggest that single studies should not be over-interpreted when summarizing existing results, as they are somewhat heterogeneous. Furthermore, findings from this study revealed that teachers' self-efficacy has a significant relationship with one of teacher attributes (i.e., attitudes in this study), as has been indicated in previous teachers' self-efficacy research (Aloe et al., 2014; Chesnut & Burley, 2015; Klassen & Tze, 2014). One contribution of this study has been to provide further evidence in support of two often used theories, that is, the self-efficacy theory of Bandura (1977) and the theory of planned behavior (Ajzen, 2012). Bandura (1994) claims that self-beliefs of efficacy affect human functioning, that is, cognitive, motivational, selection, and affective processes including one's attitudes. Although our study did not reveal a causal relationship of self-efficacy on attitudes, it provided some evidence on the universality of this relationships and the importance of context specificity of self-efficacy as described by Bandura (1977). The present study also partially relates to the theory of planned behavior in terms of the relationship between self-efficacy and attitudes (Ajzen, 2012) and suggests that studies on inclusive practices should perhaps consider both attitudes and efficacy as possible predictors of teacher behavior. However, what has remained unclear in this study as well as previous literature is whether self-efficacy and attitudes influence actual behavior (i.e., inclusive practices) (Carew et al., 2018). Thus, a major implication is that further work is needed to fully understand the relationship among teachers' self-efficacy, attitudes, and behavior in classroom.

Our findings further highlight the importance of teachers' self-efficacy not only in inclusive practices but also in different kinds of teaching settings. A practical implication of this finding is in line with that of an earlier study indicating that greater efforts are needed to develop pre- and in-service teacher training, in which teachers can increase their self-efficacy (Avramidis et al., 2019; Desombre et al., 2019; Lee et al., 2014). Some studies reviewed in this paper (N = 3 out of the 41 studies, 1568 in-service teachers) conducted an intervention in teacher training programs, which aimed to improve teachers' self-efficacy and attitudes in inclusive education, and they found that the intervention enhanced their self-efficacy and attitudes (Carew et al., 2018; Kormos & Nijakowska, 2017; Lifshitz et al., 2004). For example, Carew et al. (2018) reported that intervention programs covering various subjects such as key concepts of inclusive education, child-centered learning approaches, and classroom management increased teaching self-efficacy and produced more positive attitudes toward inclusive education. Further, one longitudinal study found that a short online course related to inclusive practices, which took a task-based approach for teacher professional development, had a positive influence in terms of elevating teachers' self-efficacy and alleviating their concerns on inclusion (Kormos & Nijakowska, 2017). In the time of the COVID-19 pandemic, organizing such online courses in pre- and in-service teacher training might be beneficial to enhance teachers' self-efficacy and diminish their concerns about inclusive education. When attitudes toward inclusion are regarded as one barrier for inclusive education, it is of utmost importance that new teachers are given a chance to experience inclusive teaching in a safe and supporting environment as a part of their initial teacher education and, thus, hopefully, gain positive experiences and support to have a stronger efficacy to enter the demanding realities of inclusive schools of today.

In addition, some previous studies suggested that targeting the four different sources of self-efficacy, that is, mastery experience, vicarious experience, verbal persuasion, and affective state, might be one way to improve teachers' self-efficacy (Bandura, 1997; Desombre et al., 2019; Morris et al., 2017). Since mastery experience is considered as the most powerful source among the four (Bandura, 1997), creating possibilities to trainees to gain positive and successful experiences in inclusive practices in pre- and in-service training would be worthwhile and could increase teachers' self-efficacy (Desombre et al., 2019; Yada et al., 2019). Moreover, verbal persuasion, which means feedback from colleagues and other professionals, may have a significant influence on teachers' self-efficacy (Morris et al., 2017; Yada et al., 2019). Therefore, school leaders and policy makers should pay more attention to developing a learning community in schools, in which teachers can have regular and positive discussions with their colleagues to improve their self-efficacy beliefs, and subsequently their attitudes, to work successfully in an inclusive education context.

Furthermore, the current study found that the relationship between teachers' self-efficacy and attitudes toward inclusive education became stronger when the context of the scales is specific to including children with disabilities. Looking at this from a different angle, this study revealed that a large amount of research on inclusive education still focuses on including children with disabilities or SENs, even though many international documents emphasize inclusive education for all children (UNESCO, 1994; United Nations Educational, Scientific and Cultural Organization, 2005; United Nations, 2006; United Nations General Assembly, 2015). Further work on including all kinds of children will have to be conducted in order to bridge this apparent gap between policy documents and actual practices.

Finally, our findings are relevant not only for teachers but also for other stakeholders such as students and parents. As mentioned, teachers' self-efficacy and attitudes may be related to their behavior, that is, to their inclusive practices in this particular context (Ajzen, 2012; Sharma & Jacobs, 2016), and it could further influence students' educational experience in school (van Steen & Wilson, 2020). If students and parents experience a more positive inclusive classroom and get familiar with various kinds of children, they could be more confident to communicate with diverse children and their attitudes toward inclusion might be enhanced in a positive direction. This may contribute toward the development of a more inclusive society in the future.

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