Applying the Contact Theory in Inclusive Education: A Systematic Review on the Impact of Contact and Information on the Social Participation of Students With Disabilities

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The social participation of students with disabilities in general education is lagging behind and negative peer attitudes are often mentioned as the main barrier. Contact Theory can serve as a rationale for interventions that aim to promote positive attitudes and thereby also the social participation of students with disabilities. This review aims to elucidate to what extent the intervention components contact and information are related to both the attitudes of typically developing peers and the social participation of students with disabilities. The results indicate that interventions combining contact and information are associated with more positive attitudes and one theme of social participation (i.e., interactions). It was, surprisingly, not possible to study the mediating role of peer attitudes as no studies addressed this. In sum, Contact Theory can be validated in primary inclusive education regarding typically developing students' attitudes, but only partially regarding the social participation of students with disabilities.

Keywords: inclusive education, Contact Theory, attitudes, social participation, intervention, disability, systematic review

INTRODUCTION

The inclusion of students with disabilities in regular schools is increasingly promoted worldwide in the last few decades. An important philosophy behind inclusive education is that the chances for an optimal social participation should be maximized in a regular-education setting (see article 24 of the Convention on the Rights of Persons with a Disability, United Nations, 2006). Social participation is an important condition for students' development, because students develop social skills and gather knowledge while interacting with peers (Bedell and Dumas, 2004; Pepler and Bierman, 2018). In the context of inclusive education, social participation can be seen as an umbrella term including four themes: the acceptance of students with disabilities by their classmates (e.g., social preference, or rejection), the presence of positive social contact/interaction between students with disabilities and their classmates (e.g., by playing together), social relationships/friendships between students with and without disabilities, and the students' perception they are accepted by their classmates (e.g., social self-perception) (Koster et al., 2009). This operationalization shows that social participation is mainly about actual, overt behavior, in this case, of peers ensuring participation of the student

with disabilities. Without the facilitation of typically developing peers, students with disabilities are unable to participate. Evidently, students with disabilities should also seize opportunities to participate.

Even though the enrolment of students with disabilities in regular classrooms increases the opportunities for contact with typically developing peers, social participation does not always occur spontaneously for students with disabilities (Guralnick et al., 2007; Pijl et al., 2008). Numerous international studies have shown that students with disabilities experience difficulties at all four themes of social participation in regular-education settings compared to their typically developing peers (e.g., Hestenes and Carroll, 2000; Pavri and Monda-Amaya, 2000; Cambra and Silvestre, 2003; Margalit, 2004; Odom et al., 2006; Frostad and Pijl, 2007; Koster et al., 2007, 2010; Pijl et al., 2008; Kasari et al., 2011; Chung et al., 2012; Nepi et al., 2015; Schwab, 2015; Avramidis et al., 2018). This precarious situation can take away a sense of belonging at school, and can negatively impact the self-image, self-confidence, motivation and school performance (see Ladd and Kochenderfer-Ladd, 2016; Bukowski and Raufelder, 2018). Consequently, a downward spiral can emerge; when students' social participation is limited, they have fewer opportunities to develop their social competence, which leads to fewer chances to (positive) social contact with their peers, and even less social participation as a result (Van Geert and Steenbeek, 2005; Carter and Hughes, 2007; Frostad and Pijl, 2007; Steenbeek and van Geert, 2008).

The attitudes of typically developing peers toward children with disabilities are often mentioned as influencing the social participation of the latter group (World Health Organization, 2007). The relationship between peers' attitudes and their facilitation of the social participation of students with disabilities has been established in several studies (Vignes et al., 2009; Godeau et al., 2010; Bossaert and Petry, 2013; De Boer et al., 2013). This indicates that attitudes are an important starting point when aiming to promote the social participation of students with disabilities. An attitude can be defined as "a psychological tendency that is expressed by evaluating a particular entity with some favor or disfavor" (Eagly and Chaiken, 1993, p. 1), and consists of three evaluative responses: a cognitive, an affective and a behavioral evaluative response. The cognitive attitude includes thoughts and beliefs, the affective attitude refers to one's feelings regarding the attitude object, and the behavioral attitude refers to the predisposition to act in a certain manner (behavioral intentions). The attitudes of typically developing students toward students with disabilities are predominantly neutral to negative (Rose et al., 2011; De Boer et al., 2012; Bates et al., 2015), with the youngest students being the most negative (Dyson, 2005; Nowicki, 2006; De Boer et al., 2014). According to the Theory of Planned Behavior, the affective and cognitive attitudes predict the behavioral attitude, which, in turn, predicts behavior (Ajzen, 1991; see also Ajzen et al., 2019). Thus, students' beliefs and feelings about disabilities guide their behavioral intentions, and thereby, affect their social behavior toward a peer with a disability. This means that negative attitudes toward disabilities can be seen as a barrier to the social participation of students with disabilities (Nowicki and Sandieson, 2002; Vignes et al., 2009;

Bossaert et al., 2011), as typically developing students might limit behaviors facilitating social participation, or even avoid peers with disabilities.

Several factors play a role in attitude development. Already at an early age, students develop the awareness of social categories, which, when unchallenged, may lead to the emergence of explicit biases in favor of one's own category (Bigler and Liben, 2006; Killen and Rutland, 2011). This implies that students can start to develop negative attitudes from early age, especially toward people who are visibly different (Raabe and Beelmann, 2011). Furthermore, students' attitudes are shaped by their repeated direct and indirect experiences with the attitude object and the students' primary social group (i.e., peers, parents/family, and teachers) (Eagly and Chaiken, 1993; Favazza et al., 2016). Students' attitudes toward their peers with disabilities are also believed to be strongly influenced by their degree of knowledge about disabilities (Vignes et al., 2008; Ison et al., 2010).

Regarding the promotion of peers' attitudes, and thereby possibly also of the social participation of students with disabilities, both contact and information have been mentioned as important intervention components (Cambra and Silvestre, 2003; Lindsay and Edwards, 2013; Bates et al., 2015). The rationale for these two components can be found in the well-known and established Contact Theory of Allport (1954). First, Allport hypothesized that positive *interpersonal contact* is likely to reduce existing prejudice between the so-called ingroup (i.e., the social group with which someone identifies) and the outgroup (i.e., the social group with which someone does not identify). In order to obtain beneficial effects, the contact should allow for true acquaintance and chances to exchange knowledge. This kind of contact will allow members of the ingroup and outgroup to learn about each other and see how similar they really are (Pettigrew and Tropp, 2008). Contact that is only casual or superficial may achieve the opposite and reinforces stereotypes instead of breaking them down (Allport, 1954; Aberson, 2015). Without further acquaintance, people are more sensitive to only perceive signs that will confirm their already existing negative attitudes (e.g., confirmation bias). Allport's Contact Theory has been investigated to great extent, and direct contact has proven to be effective in reducing prejudice and promoting attitudes toward several "outgroups" (see meta-analysis by Pettigrew and Tropp, 2006). The effect of contact has also been established with regard to students' attitudes toward peers with disabilities. Positive associations between contact and students' attitudes toward peers with disabilities have been found in systematic reviews regarding both natural contact (MacMillan et al., 2014) and manipulated contact (Lindsay and Edwards, 2013). Furthermore, the meta-analysis of Armstrong et al. (2017) indicated that interventions utilizing direct contact have a moderate effect on attitudes ($d = 0.55$). Second, Allport believed that providing *information* was a valuable addition to the contact opportunities. New and reliable information can correct existing stereotypes and enables the adjustment of thoughts and beliefs, whereby positive attitudes will be promoted (Allport, 1954; see also Theory of Planned Behavior: Fishbein and Ajzen, 1975). In order to break down negative generalizations, it is important to provide information originating from different and creditable sources and to repeat

this information. Otherwise new information can be distorted or forgotten when it does not match the already existing knowledge, stereotype or attitude a students has (Allport, 1954; Bigler and Liben, 2006). Data from the systematic review by Lindsay and Edwards (2013) indicates that interventions utilizing information successfully improve knowledge about disabilities. With regard to attitudes, their findings were mostly positive as well, though, limited to studies with low causal inference.

Considering the negative consequences of the difficulties students with disabilities experience in their social participation, it is important to establish how this situation can be improved. Based on the aforementioned literature, the question arises whether the Contact Theory (1954) can be applied in inclusive education, and thus whether direct contact and information about disabilities can also promote the social participation in a direct way and/or in a mediated way via attitude. Following Allport's Contact Theory, contact and information might not only be beneficial in promoting attitudes but can also positively impact negative behavior such as rejection and avoidance (i.e., negative subthemes of social participation). However, to the best of our knowledge, no studies have applied the Contact Theory in the inclusive-education setting, both by investigating the impact of contact and information, and by relating to the social participation of students with disabilities as well as the attitudes of their typically developing peers. Until now, it seems that researchers have chosen only attitudes as their area of focus. Several reviews and meta-analyses confirm the importance of the contact component in promoting the attitudes toward students with disabilities (e.g., Lindsay and Edwards, 2013; MacMillan et al., 2014; Armstrong et al., 2017), yet no attention has been paid to its impact on the four aforementioned themes of social participation. Inversely, one review about educational interventions indicated that group activities and support groups for students with disabilities can successfully promote the social participation of students with disabilities (Garrote et al., 2017). However, it remains unclear whether the effects could be due to contact and/or information, since this review has no clear theoretical framework. Moreover, the authors consider the typically developing peers predominantly as co-interveners rather than co-target students, thereby ignoring the important mediating role their attitudes may play in the process of change. Clear knowledge on how the social participation of students with disabilities can be promoted, while acknowledging the influence their typically developing peers may have, is still lacking.

Accordingly, this study was set up to bridge these gaps in knowledge by applying the Contact Theory to the primary inclusive-education setting and to use it as a conceptual model for promoting the social participation of students with disabilities with direct contact and information (see **Figure 1**). The aim is to test this model systematically using the existing literature, and thereby the applicability of Contact Theory in inclusive education, by answering the following research questions:

(1) To what extent are contact with, and information about (students with) disabilities related to the attitudes of typically developing peers, and are these relationships different according to background variables?

(2) To what extent are contact with, and information about (students with) disabilities related to the social participation of students with disabilities, and are these relationships different according to background variables?

(3) To what extent are the attitudes of typically developing students toward peers with disabilities mediating between contact and information and the social participation of students with disabilities?

METHOD

Search Procedure

This systematic review was conducted following the PRISMA guidelines (Moher et al., 2009). A systematic search was conducted in August 2018 using the browsers ERIC, MEDLINE, PsychINFO, SocINDEX, and Web of Science. Limits were set for publication date (onset January 1990) and source type [international scientific (peer-reviewed) journals]. The limit for publication date was driven by the ratification of the Salamanca Statement and the Framework for Action (UNESCO, 1994) and preceding educational changes. Articles written in any language other than English were manually removed.

To be included in this review, a study had to investigate the association between an intervention utilizing contact with and/or information about (students with) disabilities (*intervention*) and one or more outcome measures related to attitudes toward (the inclusion of students with) disabilities and/or the social participation of students with disabilities (*outcome*) in a primary regular or inclusive education setting (*population*). A detailed PICOS model of the eligibility criteria as well as the utilized search term can be found in **Table 1**.

Selection Procedure

The search via the databases yielded 12,805 unique articles, after duplicates and non-English articles were removed. The selection procedure was carried out in two phases. First, the records were screened by reading titles and abstracts. A record was excluded in this phase when the title and/or abstract contradicted the inclusion criteria (e.g., investigation of adults' attitudes). When the title provided sufficient information for exclusion (e.g., the title mentioned the effect of medication on bowel problems), the abstract of that record was not read. After screening the titles and abstracts, 103 full-text articles were assessed for eligibility. Second, the full-text articles were retrieved and reviewed for eligibility. A total of 55 articles was included in this review (see **Figure 2** for a flowchart of the selection process).

The first author (FR) carried out both phases of the selection procedure. To ascertain reliability, a second reviewer (EK) also reviewed a random sample of the records (10% in phase 1 and 20% in phase 2). Reviewers agreed on 99% of the records ($\kappa = 0.73$) in phase 1 and on 95% of the full-text articles ($\kappa = 0.89$) in phase 2. Any discrepancies that arose during the process were resolved through discussion among the authors.

Data Extraction

The first author extracted all relevant data from the included full-text articles using a data extraction form. First, the descriptive
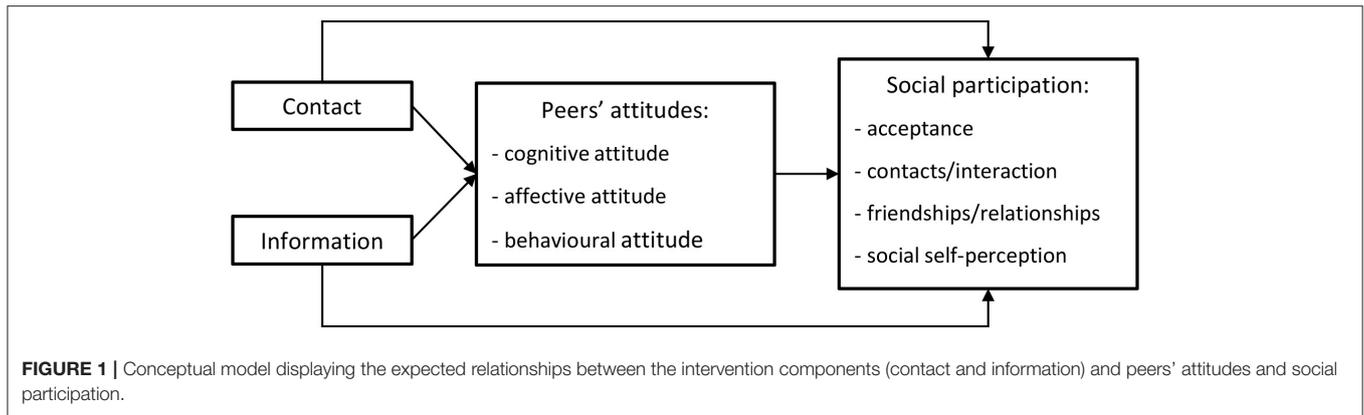
FIGURE 1 | Conceptual model displaying the expected relationships between the intervention components (contact and information) and peers' attitudes and social participation.

TABLE 1 | PICOS model of eligibility criteria.

|	Inclusion criteria	Exclusion criteria	Search
Population	- Primary education students (3–12 years old)[a] - Regular/inclusive education	- Special education	*Population*: preschool OR kindergarten OR mainstream OR inclusive education OR regular education OR general education OR inclusion AND
Intervention	- Intervention program - Contact with and/or information about (students) with disabilities core of intervention	- Contact via enrollment only - Contact and/or information were subordinate to a different main component	*Intervention:* contact OR information OR knowledge OR awareness OR intervention OR program* AND
Outcome	1) Peer attitudes toward 　a. disability[b] 　b. inclusion of persons with a disability 2) Social participation of students with disabilities 　a. acceptance by classmates 　b. contact/interactions 　c. friendships/relationships 　d. social self-perception		*Outcome measures*: attitudes OR opinions OR beliefs OR stereotypes OR prejudice OR social inclusion OR social integration OR social participation OR friendships* OR social network OR peer interactions OR social interactions OR play interactions OR social self-perception OR social self-concept OR acceptance OR rejection AND *Outcome focus*: disability* OR disabled OR handicap* OR disorder OR impairment* OR special needs OR special educational needs OR SEN
Study	- Quantitative empirical data - Studies association between contact with and/or information about disabilities and one or more of the outcome measures.		

[a] *Studies were included if at least 75% of the participants' ages fell within the age range of 3 - 12 years old, or if the mean age plus/minus one standard deviation fell within that range.*
[b] *In accordance with the definition used in the Convention on the Rights of Persons with a Disability (United Nations, 2006), all long-term physical, mental, intellectual and/or sensory impairments were considered disabilities. *is the truncation symbol used.*

characteristics of the study [e.g., authors, date, country, research design, and sample (both typically developing participants and participants with disabilities)] were extracted. When applicable, data on sub studies or on different interventions were extracted separately. If studies reported on different age groups separately, only data on relevant age groups were extracted.

Second, a description of the intervention components contact and information was extracted. Something was considered contact when typically developing students were in direct contact with a person with a disability as part of the intervention (either a classmate, or someone they did not know before, such as a co-presenter with a disability). Something was considered as information when students had been provided with information about disabilities as part of the curriculum or intervention, or when the topic was formally being discussed within the school context. Indirect or extended contact (e.g., the use

of storybooks about a character with a disability) was also considered as information.

Third, data on the associations between the intervention components and the outcome variables were extracted. The outcome variables fell into two categories: attitudes and social participation. With regard to attitude, a measure was classified as *cognitive attitude* when it reflected opinions or beliefs, as *affective attitude* when it reflected feelings, as *behavioral attitude* when a predisposition to act in a certain way was measured, or as *general attitude* in case the measure comprised more than one attitude component and data were not reported separately. The outcome variables were classified as social participation, when the measure reflected real behavior (e.g., *interactions* between students with and without a disability via observations), sociometric data about *acceptance* and *friendships* or self-reports of the *social self-concept* of participants with a disability. Data collected from

FIGURE 2 | Flowchart of the selection process.
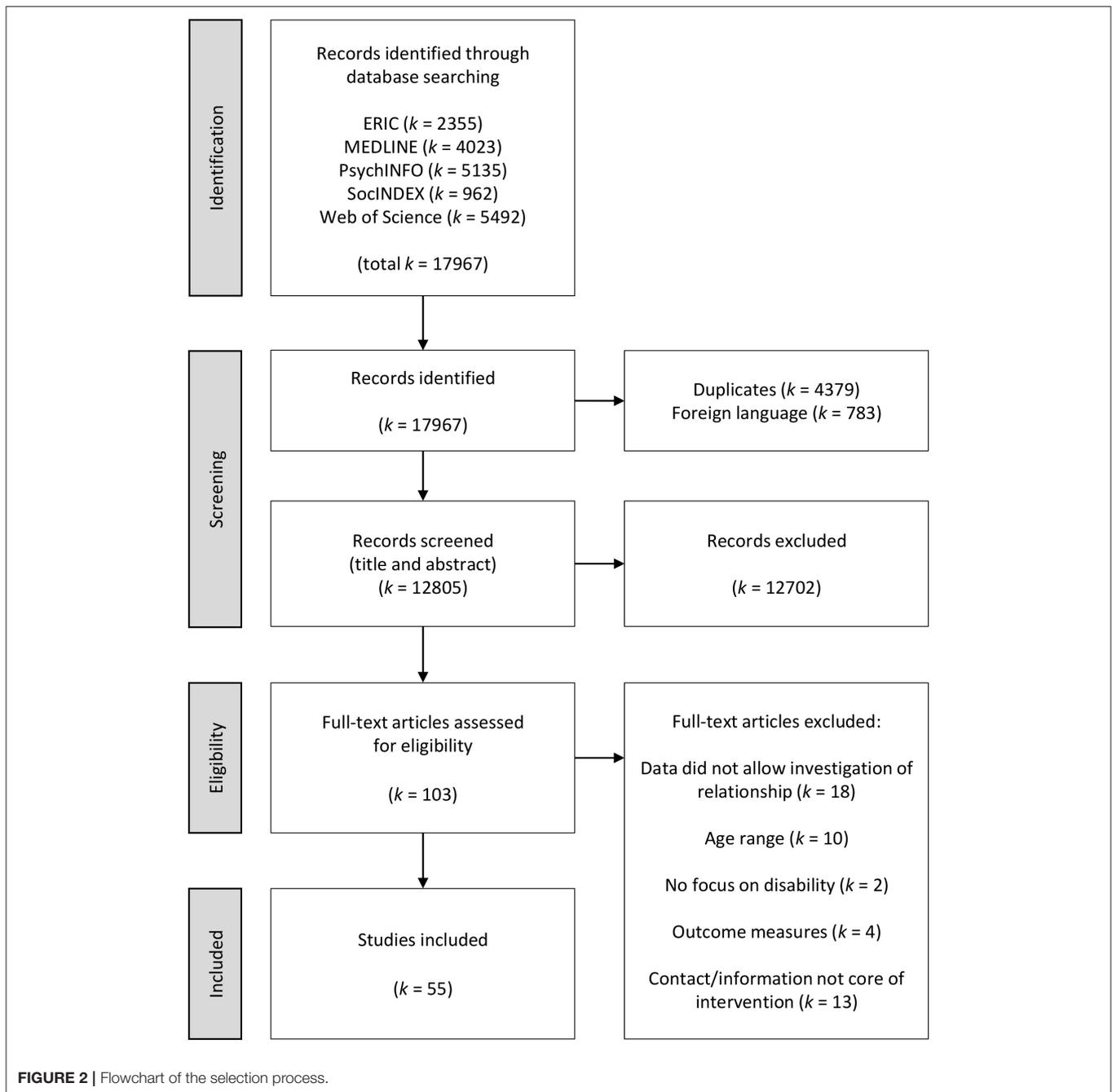
other informants than focus students or classmates (e.g., parents and teachers) were not included in this review. In cases where more indicators of one outcome variable were present (e.g., two questionnaires measuring behavioral intentions), all indicators were extracted as separate associations.

Data on the association between contact and/or information and the outcome measure(s) was extracted via both statistical evidence and effect size (see **Table 2**). When the effect size was not reported, it was calculated via the online calculator of Lenhard and Lenhard (2016), if the data in the full-text article allowed to. In order to get an estimate of the evidence

from single and/or multiple case study designs, the value for the non-overlap of all pairs effect size (NAP) was calculated (Parker and Vannest, 2009; Parker et al., 2011). Data on both post-intervention associations as well as follow-up associations was extracted. In cases differential associations were investigated (i.e., differences due to background variables, for example age or gender), this data was extracted also. No prior selection was made with regard to these background variables; all investigated background variables were included.

Lastly, the level of evidence of each study was determined using the model of Dunst et al. (1989). In this model a distinction

TABLE 2 | Classification statistical evidence and effect sizes.

Statistical evidence			Effect size				
Code	Meaning	p-values	Code	Meaning[a]	Cohen's d	Partial η²	NAP$_{50-100}$
−	Significant negative results	$p \leq 0.05$	A	Adverse effect	≤ -0.20		
Ns	Non-significant results	$p > 0.05$	N	No effect	$-0.19 - 0.19$	<0.01	<0.50
+	Significant positive results	$p \leq 0.05$	S	Small effect	$0.20 - 0.49$	$0.01 - 0.05$	$0.50 - 0.65$
++	Very significant positive results	$p \leq 0.01$	M	Moderate effect	$0.50 - 0.79$	$0.06 - 0.13$	$0.66 - 0.92$
			L	Large effect	≥ 0.80	≥ 0.14	$0.93 - 1.0$

[a]Based on *Cohen (1992)* and *Parker and Vannest (2009)*.

is made between three levels of causal inference based on study design and study characteristics: (1) low (e.g., pre-experimental designs), (2) low to moderate (e.g., quasi- and true experimental designs), and (3) moderate to high (e.g., mixed designs and multiple baseline designs). The level of evidence was assigned in correspondence with the data and the conducted analyses that covered the association(s) of interest.

RESULTS

General Description of the Selected Studies

Sample sizes differed between studies and ranged from 46 to 576 typically developing participants in studies focusing on attitudes and from 1 to 98 participants with a disability in studies focusing on social participation. The majority of studies focused on one type of disability only, whereas 12 studies focused on multiple types of disability. The most common disability types studied were autism spectrum disorder (24%), intellectual disability (18%), and physical disability (14%). In addition, some studies did not specify which disabilities had their focus, but used general wordings like disability/special needs (5%). Several studies focused on one particular age, whereas others included a broader range of ages. Overall, all ages in the target range (3–12 years) were represented proportionally. The level of evidence (i.e., causal inference) differed between studies; 40% had low causal inference, 22% low to moderate causal inference, and 38% moderate to high causal inference.

Associations Between Contact and Information and Attitudes

Overall, a differential relationship was found between the extent to which the variables contact with and information about (students with) disabilities are related to the attitudes of typically developing peers. This relationship differed according to the utilized intervention components. In total, 26 interventions—reported in 20 articles—were aimed at promoting the attitudes of typically developing peers by means of contact, information or both components. Five interventions had solely a contact component, sixteen had solely an information component and the remaining five utilized both contact and information. The outcomes concentrated on either general attitudes ($k = 12$) or one

or more of the three attitude components: cognitive attitude ($k = 14$), affective attitude ($k = 3$), and behavioral intentions ($k = 14$). For a more detailed overview of the interventions, see **Table 3**.

A total of 67 associations[1] were derived from the studies examining the immediate effect of the interventions (see **Table 4**). Overall, 39% of the associations indicated a significant improvement of attitude after the intervention was implemented, 1% a significant deterioration and 55% of the associations indicated non-significant results. For the remaining associations, the p-value was not reported. In more than half of the cases, the effect size was not calculable and the remainder showed a mixed picture. The majority of the effect sizes indicated some effect of the included interventions (19% small effect, 6% medium effect, and 6% large effect), but in contrast 9% of the effect sizes indicated no effect, and 4% indicated small adverse effects.

Interventions that included solely a contact component produced mainly non-significant results and no to medium effects. The associations involving solely an information component showed a mixed picture: 43% indicated positive results and 53% produced non-significant results. Effect sizes varied from small adverse to large positive effects. Interventions that utilized both contact and information produced merely positive results and small to large effects.

A total of six associations were derived from the studies examining the long-term effectiveness (**Table 5**). Only data on associations with general attitudes was available in the included articles. All available p-values indicated non-significant results. The available and calculated effect sizes showed a mixed picture: three effect sizes indicated no long-term effectiveness whereas one indicated moderate long-term effects, and another one indicated small adverse effects.

Moreover, 11 studies investigated whether the impact of contact and information on attitude differed according to background variables. The results indicate that the effect of interventions could be different according to age ($k = 2$), gender ($k = 3$), sociometric status ($k = 1$), and disability type ($k = 1$). Previous contact experiences were found not to impact the intervention effect ($k = 1$). However, the results regarding gender and disability type were mixed (see **Table 6**). With

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[1]In several studies, more than one indicator was used to measure the outcome variable. Therefore, the total number of associations deviates from the number of investigated interventions and the aggregated numbers of investigated outcome variables.

TABLE 3 | Summary of studies and interventions focusing on promoting the attitudes of typically developing peers.

Authors, year, and country	Participant details	Dis.	Intervention components		Associations per attitude component								LoE
					G		C		A		B		
			Contact	Information	p	ES	p	ES	p	ES	p	ES	
Adibsereshki et al. (2010) Iran	n_{td} = 221 grade 3–5	PD		Videos, stories, and group discussions about physical disabilities	++	NA							1
Cameron and Rutland (2006) United Kingdom	n_{td} = 25 5–10 yrs	LD		Storybook reading and group discussions with focus on individual characteristics			ns	NA			+	NA	1
	n_{td} = 22 5–10 yrs	LD		Storybook reading and group discussions with focus on disability vs. typically developing characters			++	NA			++	NA	1
	n_{td} = 20 5–10 yrs	LD		Storybook reading and group discussions			ns	NA			ns	NA	1
Cameron et al. (2007) United Kingdom	n_{td} = 49 6–9 yrs	LD		Storybook reading and group discussions			++	L			ns	S	1
Campbell et al. (2004) United States	n_{td} = 576 grade 3–5	ASD		Video with extra information about autism			++	M			++	S	1
Campbell et al. (2005) United States	n_{td} = 576 8–12 yrs	ASD		Video with extra information about autism			ns	NA			ns	NA	1
De Boer et al. (2014) The Netherlands	n_{td} = 53 5–7 yrs	PD, ID, PIMD		Storybook reading, group discussions, and experiential activities	+	L							2
	n_{td} = 218 7–12 yrs	PD, ID, PIMD		Videos, real life stories, group discussions, and experiential activities	ns	A							2
Favazza and Odom (1997) United States	n_{td} = 46 n_{dis} = 15 60–107 months	NS	Structured play groups	Storybook reading and guided discussions	++	NA							2
Favazza et al. (2000) United States	n_{td} = 64 48–70 months	NS	Structured play groups	Storybook reading and guided discussions at school and at home	NR	L							2
			Structured play groups		NR	S							2
				Storybook reading and guided discussions at school and at home	NR	L							2
Gannon and McGilloway (2009) Ireland	n_{td} = 118 8–11 yrs	ID		Video about including children with Down Syndrome at school			ns	NA			ns	NA	1
Hurst et al. (2012) United States	n_{td} = 231 7–9 yrs	PD, ID, HI, VI		Experiential activities to simulate physical, visual, auditory and learning disability	-/+	A/S							1
Ison et al. (2010) Australia	n_{td} = 147 9–11 yrs	NS	Presenter with cerebral palsy and Q&A session with person with a disability	Group discussion and experiential activities	++	NA							1
Law et al. (2017) China	n_{td} = 86 8 yrs	LD		Storybook reading about learning disability and group discussion via drama techniques					+	S	ns	N	3
Laws and Kelly (2005) United Kingdom	n_{td} = 202 9–12 yrs	PD, ID, HI, VI, BD		Short written description of Down Syndrome or cerebral Palsy			ns	N			ns	NA	1
Maras and Brown (1996) United Kingdom	n_{td} = 50 8–10 yrs	PD, ID	Collaborative work in integrated sessions				ns/ ++ (ns)	NA	ns	NA			2

(Continued)

TABLE 3 | Continued

Authors, year, and country	Participant details	Dis.	Intervention components		Associations per attitude component								LoE
					G		C		A		B		
			Contact	Information	p	ES	p	ES	p	ES	p	ES	
Maras and Brown (2000) United Kingdom	n_{td} = 256 5–11 yrs	HI		Group discussion and information on communication with a hearing impairment			ns/ ++ (++)		+	NA	ns	NA	1
Marom et al. (2007) Israel	n_{td} = 170 n_{dis} = 36 10–12 yrs	PD, ID	Integrated activities (e.g., sports, music, social games)	Student-specific and general information on disabilities	++	M							2
McKay et al. (2015) United States	n_{td} = 143 grade 6	PD	Paralympians as co-presenters	Paralympic sports activities (experiential learning), reflection, and life story of two paralympians	+/++	S/S	+	S			+	S	3
Slininger et al. (2000) United States	n_{td} = 131 9–10 yrs	PIMD	Structured contact via peer aids in physical education class for full lesson				ns	S			ns	S	2
			Unstructured contact via peer aids during physical education class only first 5 min of lesson				ns	N			ns	M	2
Swaim and Morgan (2001) United States	n_{td} = 233 9 and 12 yrs	ASD		Video with extra information about autism			ns	A			ns	NA	1
Xin (1999) United States	n_{td} = 93 n_{dis} = 25 grade 3	LD	Computer-assisted cooperative learning with math assignments		ns	N/M							2

Dis., Type of disability; ASD, Autism Spectrum Disorder; (E)BD, (Emotional) Behavioral Difficulties; DD, Developmental Disability/Delay; ID, Intellectual Disability; HI, Hearing Impairment; LD, Learning Disability; NS, Not Specified; PD, Physical Disability; PIMD, Profound Intellectual and Multiple Disabilities; SLD, Speech and Language Deficits; and VI, Visual Impairment. The results are specified per attitude component: G, General attitude; C, Cognitive attitude; A, Affective attitude; and B, Behavioral attitude. The reported results include an indicator for statistical evidence [NR, not reported; ns, non-significant results; +, significant increase (p <0.05); and ++, significant increase (p < 0.01)] and effect size (A, Adverse effect; N, No effect; S, Small effect; M, Moderate effect; and L, Large effect; NA was reported when the effect size was not available, and the available data did not allow for the calculation of the effect size). When two or more indicators (e.g., questionnaires or subscales) were used to measure the same attitude component, the range of p-values and effect sizes is given (median in brackets). LoE, Level of evidence: 1, low; 2, low to moderate; and 3, moderate to high.

regard to gender, six studies indicated no impact by gender, two studies indicated girls benefit more from interventions utilizing solely information, and one indicated boys benefit more from interventions utilizing solely contact. With regard to disability type, two studies indicated no impact by disability type, and one indicated that best results were achieved toward hearing impairment.

Associations Between Contact and Information and Social Participation

Overall, a differential relationship was found between the extent to which the variables contact with and information about (students with) disabilities are related to the social participation of students with disabilities. This relationship differed according to the utilized intervention components. In total, 48 interventions—reported in 36 articles—were aimed at promoting the social participation of students with disabilities. Of the investigated interventions, 32 had solely a contact component, five had solely an information component and the remaining 11 utilized both contact and information. The outcomes concentrated on one or more of the four themes

of social participations: acceptance by classmates ($k = 13$), contact/interactions ($k = 37$), friendships/relationships ($k = 3$), and social self-perception ($k = 3$). For a more detailed overview of the interventions we refer the interested reader to consult (**Table 7**).

A total of 223 associations were derived from the studies examining the immediate effect of an intervention on one or more aspects of social participation studies (see **Table 8**). A distinction is made between group design studies (50 associations) and single or multiple case studies (173 associations). From the group design studies, overall, 48% of the associations indicated a significant improvement of social participation, 2% a significant deterioration, and 44% of the associations indicated non-significant results. The majority of the available and calculated effect sizes indicated clear effects of the included interventions (10% small effect, 6% medium effect and 40% large effect), but in contrast 6% of the effect sizes indicated small adverse effects. From the single and multiple case design studies, the great majority of the available effect sizes indicated clear effects of the included interventions (8% small effect, 27% medium effect,

TABLE 4 | Associations by intervention component and by attitude component.

Attitude	Ass.	Statistical evidence				Effect size					
		−	ns	+	NR	A	N	S	M	L	NA
Contact component (5 Interventions)											
General	k = 5		4 (80%)	1 (20%)			2 (40%)	2 (40%)	1 (20%)		
Cognitive	k = 10		9 (90%)	1 (10%)			1 (10%)	1 (10%)			8 (80%)
Affective	k = 1		1 (100%)								1 (100%)
Behavioral	k = 2		2 (100%)					1 (50%)	1 (50%)		
Total			16 (89%)	1 (6%)	1 (6%)		3 (17%)	4 (22%)	2 (11%)		9 (50%)
Information component (16 Interventions)											
General	k = 12	1 (8%)	5 (42%)	5 (42%)	1 (8%)	2 (17%)	2 (17%)	2 (17%)		2 (17%)	4 (33%)
Cognitive	k = 15		8 (53%)	7 (47%)		1 (7%)	1 (7%)		1 (7%)	1 (7%)	11 (73%)
Affective	k = 2			2 (100%)				1 (50%)			1 (50%)
Behavioral	k = 11		8 (73%)	3 (27%)			1 (9%)	2 (18%)			8 (73%)
Total		1 (3%)	21 (53%)	17 (43%)	1 (3%)	3 (8%)	4 (10%)	5 (13%)	1 (3%)	3 (8%)	24 (60%)
Contact and information component (5 Interventions)											
General	k = 7		6 (86%)	1 (14%)				2 (29%)	1 (14%)	1 (14%)	3 (43%)
Cognitive	k = 1		1 (100%)					1 (100%)			
Affective											
Behavioral	k = 1		1 (100%)					1 (100%)			
Total			8 (89%)	1 (11%)				4 (44%)	1 (11%)	1 (11%)	3 (33%)

Percentages may deviate due to rounding of numbers.

and 57% large effect). Only 9% of the studies indicated no effects.

The statistical evidence derived from group design studies for interventions that included solely a contact component, solely an information component, or both components, showed a mixed picture: about half indicated positive results and the other half non-significant results. Looking at the effect sizes, however, differences were found. For interventions that used solely contact or both contact and information, the majority of associations had a large effect size, even though effects varied from small adverse to large effects. Effect sizes varied from medium to large effects for interventions with solely an information component. Nonetheless, effect sizes were not calculable in about half of the group design studies. The effect sizes that could be derived from single and multiple case studies indicated mainly large effects for interventions with a contact component (both exclusive as well as combined with information), but almost an even spread between no, small, medium and large effect for interventions with only an information component.

A total of 17 associations were derived from the studies examining the long-term effectiveness (**Table 9**). The outcomes focused on acceptance by classmates (seven associations) and contact/interactions (10 associations). The long-term effectiveness on friendships/relationships and social self-perception was not investigated in any of the included articles. Overall, 82% of the associations indicated non-significant results and 18% of the associations still indicated a significant improvement of social participation. The majority of the available and calculated effect sizes indicated clear long-term effects (20% medium effect and 40% large effect), but in contrast 30% of the effect sizes indicated no long-term effectiveness, and 10% indicated even small adverse effects.

TABLE 5 | Summary of studies examining long-term effects on the attitudes of typically developing peers.

Authors and year	Length of follow-up period	Components		Associations per attitude component							
				G		C		A		B	
		C	I	p	ES	p	ES	p	ES	p	ES
De Boer et al. (2014)	12 months		X	ns	N						
			X	ns	N						
Favazza and Odom (1997)	5 months	X	X	ns	NA						
Favazza et al. (2000)	5 months	X	X	NR	M						
		X		NR	A						
			X	NR	N						

Components: C, Contact, and I, Information. The results are specified per attitude component: G, General attitude; C, Cognitive attitude; A, Affective attitude; and B, Behavioral attitude. The reported results include an indicator for statistical evidence [NR, not reported; ns, non-significant results] and effect size (A, Adverse effect; N, No effect; S, Small effect; M, Moderate effect; and L, Large effect; NA was reported when the effect size was not available, and the available data did not allow for the calculation of the effect size).

TABLE 6 | Differential associations according to background variable.

Variable	Study
Age	
Younger students profit	Swaim and Morgan, 2001; Campbell et al., 2004
Gender	
Girls profit	Adibsereshki et al., 2010; Laws and Kelly, 2005
Boys profit	Slininger et al., 2000
No differential association	Favazza and Odom, 1997; Swaim and Morgan, 2001; Campbell et al., 2004; Cameron et al., 2007; Hurst et al., 2012; De Boer et al., 2014
Sociometric group	
Popular and rejected group profit	Campbell et al., 2005
Disability type	
Most positive results regarding hearing impairment	Hurst et al., 2012
No differential association	Laws and Kelly, 2005; De Boer et al., 2014
Previous contact	
No differential association	Laws and Kelly, 2005

Only main differential associations were included [i.e., main effects or two-way effects including the intervention component(s)].

No studies investigated whether the impact of contact and information on social participation differed according to background variables.

The Mediating Role of Peers' Attitudes

No studies were found that investigated the mediating role of peers' attitudes in the relationship between contact/information and the social participation of students with disabilities.

DISCUSSION

Conclusions

Considering the global trend toward inclusive education, and that the social participation of students with disabilities is lagging behind, it is important to know how this can be improved. This study was set up to elucidate whether or not the Contact Theory can be applied in inclusive education by serving as a theoretical framework in promoting the social participation of students with disabilities. The proposed conceptual model was tested via a systematic review study to analyze if contact with and information about (people with) disabilities can promote the social participation of students with disabilities in regular education in a direct and/or mediated way via peers' attitudes. First, it can be concluded that that interventions utilizing solely contact generally do not promote peers' attitudes. Interventions utilizing solely information perform slightly better, but the best results are achieved when contact and information are combined. Second, it can be concluded that the outcomes of interventions utilizing solely contact or solely information on the social participation of students with disabilities are similar. Yet, the evidence base for the contact interventions is larger (i.e., more studies investigated this). Again, it can be concluded that interventions that combined contact and information achieved the best results. Third, we conclude that there are no studies examining the mediating effect of attitudes between contact and information and the social participation of students with disabilities. We therefore cannot answer the question whether this mediating effect holds or not.

Discussion

Rather than being a quick fix, interventions ideally establish solid and long-term improvements. Nevertheless, the endurance of the intervention effects was not often investigated. This study showed that long-term effects were only investigated in about 20% of the interventions, and while the effects in some studies lasted up to 2 months (Jacques et al., 1998; Kalyva and Avramidis, 2005), nearly all studies indicated that the positive impact of the intervention did not sustain with regard to both peer attitudes (Favazza and Odom, 1997; Favazza et al., 2000; De Boer et al., 2014) and the social participation of students with disabilities (Odom et al., 1999; Frederickson et al., 2005). This might be because both the formation of attitudes and the social participation can also be impacted by factors outside of the intervention. Although interventions aim to provide only positive contact and

TABLE 7 | Summary of studies and interventions focusing on promoting the social participation of students with a disability.

Authors, year and country	Participant details	Dis.	Intervention components		Associations per theme of social participation								LoE
					A		I		F		S		
			Contact	Information	p	ES	p	ES	p	ES	p	ES	
Group Designs													
André et al. (2011) France	$n_{dis} = 32$; $n_{td} = 185$ 11–12 yrs	LD	Cooperative learning in physical education		ns/+	S/L							2
Antia et al. (1993) United States	$n_{dis} = 25$; $n_{td} = 26$ 3–7 yrs	HI	Cooperative tasks and games to learn social skills				ns	NA					1
	$n_{dis} = 24$; $n_{td} = 30$ 3–7 yrs	HI	Integrated activities				++	NA					1
Frederickson and Turner (2003) United Kingdom	$n_{dis} = 10$; $n_{td} = 61$ 6–12 yrs	EBD	Circle of Friends meetings	Class discussion about strengths and difficulties of focus student with disability	NR	L					NR	S	1
	$n_{dis} = 10$; $n_{td} = 61$ 6–12 yrs	EBD	Circle of Friends meetings	Class discussion about strengths and difficulties of focus student with disability	+	L					ns	M	1
	$n_{dis} = 10$; $n_{td} = 61$ 6–12 yrs	EBD	Small group reading of story with friendship theme		ns	S					ns	A	1
Frederickson et al. (2005) United Kingdom	$n_{dis} = 14$ (+ peers) 6–11 yrs	EBD, ASD, LD		Group discussions with links to behavior of focus student with disabilities	++/ ++	NA							1
			Circle of Friends meetings		ns/ns	NA							1
Guralnick et al. (1996) United States	$n_{dis} = 32$; $n_{td} = 42$ 4–5 yrs	ID	Integrated play groups		ns	NA	NR	N					1
Humpal (1991) United States	$n_{dis} = 12$; $n_{td} = 15$ 3–5 yrs	ID	Integrated music sessions	Disability awareness session; experiential activities			+	L					1
Jacques et al. (1998) New Zealand	$n_{dis} = 24$ (+ peers) 9–11 yrs	ID	Cooperative learning of social studies material		++	L							2
Kalyva and Avramidis (2005) United Kingdom	$n_{dis} = 5$; $n_{td} = 25$ 3–4 yrs	ASD	Circle of Friends meetings				ns/+	S/ L					1
Kamps et al. (2015) United States	$n_{dis} = 95$ (+ peers) 62–82 months	ASD	Teacher led peer mediation of social skills				ns/++	NA					2
Keller and Honig (1993) United States	$n_{dis} = 1$; $n_{td} = 24$ 4–5 yrs	DD		Video, books, group discussions and experiential activities about the concept of disability			ns/+	M /L					1
Maras and Brown (2000) United Kingdom	$n_{dis+td} = 256$; 5–7 yrs	HI		Discussion of hearing impairment and information on communication	ns	NA							1
Meyer and Ostrosky (2016) United States	$n_{dis} = 26$; $n_{td} = 84$ 65–80 months	NS	Play based cooperate learning groups	Storybook reading and guided discussions about disability at school and home					ns	NA			1
			Outcome oriented cooperative learning groups						+	NA			1

(Continued)

TABLE 7 | Continued

Authors, year and country	Participant details	Dis.	Intervention components		Associations per theme of social participation								LoE
					A		I		F		S		
			Contact	Information	p	ES	p	ES	p	ES	p	ES	
Odom et al. (1999) United States	$n_{dis} = 98$ 58.5 months	ID, DD, BD, HI, SLD	Structured play groups		++	L	ns/+	NA/ L					1
			Structured play groups with teacher prompts		ns	A	ns/+	NA/ L					1
			Peer mediation of social skills	Social skills training to learn strategies to initiate social interaction with disabled peer	ns	S	ns/+	NA/ L					1
			Structured play groups with teacher prompts and peer mediation of social skills	Social skills training to learn strategies to initiate social interaction with disabled peer	-	A	ns/ns	NA/ L					1
Roeyers (1996) Belgium	$n_{dis} = 85$; $n_{td} = 48$ 5–13 yrs	ASD	Integrative play sessions	Video and information about autism and role-play sessions			ns/ ++ (++)	S/ L (L)					2
Wolfberg et al. (2015) United States	$n_{dis} = 48$; $n_{td} = 144$ 5–10 yrs	ASD	Integrated play groups				++/ ++	M/ L					1
Single and Multiple Case Designs													
Batchelor and Taylor (2005) Australia	$n_{dis} = 1$ (+ peers) 4 yrs	DD	Social integration activities with Stay-Play-Talk procedures	Puppetry scenarios on augmentative communication used by student with disability			NR	M/ L (M)					1
Carter and Maxwell (1998) Australia	$n_{dis} = 4$ (+ peers) 5 and 9 yrs	PD		Group instruction for peers on cerebral palsy and associated communication problems			NR	M/ L (M)					3
Dugan et al. (1995) United States	$n_{dis} = 2$; $n_{td} = 16$ 9–10 yrs	ASD	Cooperative learning groups / peer tutoring on social studies material				NR	L/ L (L)					3
English et al. (1997) United States	$n_{dis} = 4$; $n_{td} = 5$ 43–60 months	DD	Buddy days with Stay-Play-Talk procedures	Preparatory training on unconventional communicative behavior of children with a developmental disability			NR	L/ L (L)					3
Frea et al. (1999) United States	$n_{dis} = 2$ (+ peers) 3–4 yrs	DD	Social integration activities: structured play groups				NR	S/ L (M)					3
			Group friendship activities: traditional preschool activities with focus on social behaviors				NR	N/ L (M)					3
			A combination of social integration activities and group friendship activities				NR	L/ L (L)					3
Goldstein and Cisar (1992) United States	$n_{dis} = 5$; $n_{td} = 10$ 3–5 yrs	ASD	Sociodramatic script training in small integrated groups				NR	N/ L (M)					3
Goldstein et al. (1997) United States	$n_{dis} = 4$; $n_{td} = 4$ 42–61 months	ID, SLD	Buddy system Stay-Play-Talk procedures				NR	M/ L (L)					3
	$n_{dis} = 4$; $n_{td} = 4$ 42–61 months	ID, SLD		Sensitivity training to increase awareness of unconventional communicative behavior of children with a developmental disability			NR	N/ M (S)					3

(Continued)

TABLE 7 | Continued

Authors, year and country	Participant details	Dis.	Intervention components		Associations per theme of social participation								LoE
					A		**I**		**F**		**S**		
			Contact	Information	*p*	ES	*p*	ES	*p*	ES	*p*	ES	
Hunt et al. (1997) United States	$n_{dis} = 3$ 5 and 10 yrs	PD, ID, VI, ASD	Buddy system	Class meetings; information on alternative communication via a "conversation book"			NR	M/L (L)					3
Kamps et al. (1994) United States	$n_{dis} = 3$; $n_{td} = 55$ 8–9 yrs	ASD	Class wide peer tutoring in reading education				NR	M/L (M)					3
Kamps et al. (1999) United States	$n_{dis} = 2$; $n_{td} = 6$ 9 yrs	ASD	Cross-age peer tutoring activities (tutees were from grade 1) together with typically developing peers				NR	S/M (M)					3
	$n_{dis} = 3$; $n_{td} = 6$ 10–12 yrs	ASD	Cross-age peer tutoring activities (tutees were from grade 1) together with typically developing peers				NR	S/M (M)					3
Katz and Girolametto (2013) Canada	$n_{dis} = 3$; $n_{td} = 6$ 4–5 yrs	ASD	Integrated play groups				NR	L/L (L)					3
Kennedy et al. (1997) United States	$n_{dis} = 1$ 11 yrs	PD, ID	Peer tutoring	Information on alternative communication			NR	M/L (L)	NR	N/L (M)			3
Klavina and Block (2008) United States	$n_{dis} = 3$; $n_{td} = 9$ 8–9 yrs	PIMD	Peer tutoring in physical education				NR	M/L (L)					3
Koegel et al. (2012) United States	$n_{dis} = 3$ (+ peers) 9–12 yrs	ASD	Club activities during lunch breaks (e.g., games and crafts)				NR	L/L (L)					3
Kohler et al. (2007) United States	$n_{dis} = 1$; $n_{td} = 6$ 4 yrs	ASD	Play groups with Stay-Play-Talk procedures				NR	L/L (L)					3
Lee and Lee (2015) Malaysia	$n_{dis} = 3$; $n_{td} = 9$ 3–4 yrs	ASD	Peer mediation of social skills during snack time				NR	L/L (L)					3
Miller et al. (2003) United States	$n_{dis} = 3$; $n_{td} = 12$ 11 yrs	PD, DD, HI, EBD	Friendship circles with group discussions, games and cooperative activities				NR	N/L (M)					3
Nelson et al. (2007) United States	$n_{dis} = 4$ (+ peers) 45–53 months	ASD	Peer mediation of social skills				NR	M/M (M)					3
Pedersen-Bayus et al. (1991) Canada	$n_{dis} = 4$; $n_{td} = 12$ (+ peers) 5–6 yrs	PD, ID, SLD	Sociodramatic integrative activities with focus on teaching social skills				NR	N/M (M)					3
Storey et al. (1993) United States	$n_{dis} = 8$; $n_{td} = 16$ 37–58 months	DD	Peer mediation of social skills				NR	N/L (M)					3
Tan and Cheung (2008) Singapore	$n_{dis} = 1$; $n_{td} = 2$ 7 yrs	ADHD	Computer collaborative group work with adventure game		ns/ns (ns)	N/L (L)							1

Dis., Type of disability: ASD, Autism Spectrum Disorder; (E)BD, (Emotional) Behavioral Difficulties; DD, Developmental Disability/Delay; ID, Intellectual Disability; HI, Hearing Impairment; LD, Learning Disability; NS, Not Specified; PD, Physical Disability; PIMD, Profound Intellectual and Multiple Disabilities; SLD, Speech and Language Deficits; and VI, Visual Impairment. The results are specified per social participation theme: A, acceptance by classmates; I, contacts/interactions; F, friendships/relationships; and S, social self-concept. The reported results include an indicator for statistical evidence [NR, not reported; ns, non-significant results; +, significant increase ($p < 0.05$); and ++, significant increase ($p < 0.01$)] and effect size (A, Adverse effect; N, No effect; S, Small effect; M, Moderate effect; and L, Large effect; NA was reported when the effect size was not available, and the available data did not allow for the calculation of the effect size). When two or more indicators (e.g., questionnaires or subscales) were used to measure the theme of social participation, the range of p-values and effect sizes is given (median in brackets). LoE, Level of evidence: 1, low; 2, low to moderate; and 3, moderate to high.

TABLE 8A | Number of associations by intervention component and by social participation theme from group design studies.

Theme SP	Ass.	Statistical evidence				Effect size					
		−	ns	+	NR	A	N	S	M	L	NA
Contact component (13 Interventions)											
Acceptance	k = 7	4 (57%)	3 (43%)			1 (14%)		2 (29%)		3 (43%)	1 (14%)
Interactions	k = 17	8 (47%)	8 (47%)	1 (6%)			1 (6%)	1 (6%)	1 (6%)	4 (24%)	10 (59%)
Friendships	k = 1		1 (100%)								1 (100%)
Social self-perception	k = 1	1 (100%)				1 (100%)					
Total		13 (50%)	12 (46%)	1 (4%)		2 (8%)	1 (4%)	3 (12%)	1 (4%)	7 (27%)	12 (46%)
Information component (3 Interventions)											
Acceptance	k = 2	1 (50%)	1 (50%)								2 (100%)
Interactions	k = 2	1 (50%)	1 (50%)						1 (50%)	1 (50%)	
Friendships											
Social self-perception											
Total		2 (50%)	2 (50%)						1 (25%)	1 (25%)	2 (50%)
Contact and information component (7 Interventions)											
Acceptance	k = 4	1 (25%)	1 (25%)	1 (25%)	1 (25%)	1 (25%)		1 (25%)		2 (50%)	
Interactions	k = 13		4 (31%)	9 (69%)				1 (8%)		10 (77%)	2 (15%)
Friendships	k = 1		1 (100%)								1 (100%)
Social self-perception	k = 2		1 (50%)	1 (50%)				1 (50%)	1 (50%)		
Total		1 (5%)	7 (35%)	10 (50%)	2 (10%)	1 (5%)		3 (15%)	1 (5%)	12 (60%)	3 (15%)

Percentages may deviate due to rounding of numbers.

information, they cannot avert all unintended negative contact and information that can be present alongside or after the intervention (e.g., quarrels with somebody with a disability). This is detrimental because negative experiences are known to have a bigger impact on attitudes and social participation than do positive experiences (Barlow et al., 2012); many more positive experiences are needed to establish improvement, than negative experiences are needed to deterioration. To establish long-term and solid improvements, interventions that can be implemented over a long period, or even become part of the curriculum permanently are advised.

Furthermore, it can be questioned to what extent the findings of this review can be generalized, since not all types of disabilities have been equally studied. In line with previous findings (e.g., Garrote et al., 2017), most studies have focused on autism spectrum disorder, whereas other types of disabilities, such as sensory impairments, have been investigated to a lesser extent. This unbalanced representation of disabilities is especially evident in studies focusing on promoting social participation. Since it is known from the literature that some types of disabilities are more prone to both negative peer attitudes and difficulties regarding social participation (see Van Mieghem et al., 2018), it is unrealistic to generalize the results to the whole group of students with disabilities. More research is needed, particularly into attitudes toward and the social participation of students with sensory impairments, as well as comparisons between disability types, to be able to draw a complete picture of the effects of contact and information.

Promoting Attitudes

Different types of contact and information were utilized to promote peer attitudes, and it can be concluded that not all types were equally effective. Most positive associations between contact and attitudes were found in interventions using integrated

TABLE 8B | Number of associations by intervention component and by social participation theme from single/multiple case design studies.

Theme SP	Ass.	Statistical evidence				Effect size					
		−	ns	+	NR	A	N	S	M	L	NA
Contact component (19 Interventions)											
Acceptance	$k = 4$	4					1			3	
		(100%)					(25%)			(75%)	
Interactions	$k = 123$				123		12	9	32	70	
					(100%)		(10%)	(7%)	(26%)	(57%)	
Friendships											
Social self-perception											
Total		4			123		13	9	32	73	
		(3%)			(97%)		(10%)	(7%)	(25%)	(57%)	
Information component (2 Interventions)											
Acceptance											
Interactions	$k = 12$				12		2	4	4	2	
					(100%)		(17%)	(33%)	(33%)	(17%)	
Friendships											
Social self-perception											
Total					12		2	4	4	2	
					(100%)		(17%)	(33%)	(33%)	(17%)	
Contact and information component (4 Interventions)											
Acceptance											
Interactions	$k = 30$				30				8	22	
					(100%)				(27%)	(73%)	
Friendships	$k = 4$				4		1		2	1	
					(100%)		(25%)		(50%)	(25%)	
Social self-perception											
Total					34		1		10	23	
					(100%)		(3%)		(29%)	(68%)	

Percentages may deviate due to rounding of numbers.

activities and playgroups. Also introducing somebody with a disability as the co-presenter of the intervention was associated with small positive effects. Both cooperative learning/play groups and peer assistance were not associated with improved attitudes. Regarding the information component, the picture is somewhat mixed. The most important source of information appeared to be guided group discussions, as they were associated with more positive attitudes than interventions that did not include discussions. In addition, storybooks about disabilities and experiential learning (e.g., disability simulation) were positively associated with peer attitudes. For videos the results were mixed, probably due to differences in content (cf. De Boer et al., 2012; Leigers and Myers, 2015). Based on these results, it seems that integrated activities, story books and experiential learning are good ingredients when aiming to promote more positive attitudes. Furthermore, including guided group discussions is recommended to assure that the information comes across to students in the way it was intended.

The findings of the current study do not align fully with the Contact Theory. Allport proposed conditions for optimal contact: equal status, common goals, intergroup cooperation, and support of authorities (Allport, 1954; Dovidio et al., 2003; Schofield et al., 2003) and numerous studies have indicated that

the beneficial effect of contact was greater when Allport's criteria were met (Brown and Hewstone, 2005; Pettigrew and Tropp, 2005, 2006). Nevertheless, in the current review, cooperative learning was not associated with positive peer attitudes. This is a counterintuitive finding, as cooperative learning is in essence ideally suited to meet the four proposed conditions. Regular integrated activities and play groups, however, were associated with positive attitudes, despite the absence of arranged cooperation. It might be that additional criteria for optimal contact are needed in performance-oriented contexts like schools where disabilities may become more apparent to certain subjects (e.g., math or competitive sports) (Odom et al., 2006). Contact forms that were associated with more positive attitudes were all more social and fun in nature (e.g., playing games). Therefore, we would like to add fun as an important condition, as it can serve as an equalizer that points out similarities between students, regardless of different abilities (Siperstein et al., 2009).

Furthermore, affective aspects have been mostly ignored in the included studies. This is remarkable since research has shown that affective processes are more predictive of actual intergroup behavior than are cognitive processes (for an overview see Brown and Hewstone, 2005). None of the included studies addressed the underlying affective mechanisms that mediate

TABLE 9 | Summary of studies examining long-term effects on the social participation of students with disabilities.

Author and year	Length of follow-up period	Components		Associations per theme of social participation							
				A		I		F		S	
		C	I	p	ES	p	ES	p	ES	P	ES
Frederickson et al. (2005)	4 months	X		ns/ ns	NA/NA						
Jacques et al. (1998)	5 weeks	X		++	L						
Kalyva and Avramidis (2005)	2 months	X				ns/+	A/L				
Odom et al. (1999)	Unknown-next schoolyear	X		++	L	ns/ns	NA/N				
		X		ns	A	ns/ns	NA/M				
		X	X	ns	M	ns/ns	NA/L				
		X	X	ns	N	ns/ns	NA/N				

Components: C, Contact, and I, Information. The results are specified per social participation theme: A, acceptance by classmates; I, contacts/interactions; F, friendships/relationships; and S, social self-concept. The reported results include an indicator for statistical evidence [NR, not reported; ns, non-significant results; +, significant increase (p < 0.05); and ++, significant increase (p < 0.01)] and effect size (A, Adverse effect; N, No effect; S, Small effect; M, Moderate effect; and L, Large effect; NA was reported when the effect size was not available, and the available data did not allow for the calculation of the effect size).

the contact-attitude relationship (i.e., intergroup anxiety and empathy: Brown and Hewstone, 2005; Aberson and Haag, 2007; Pettigrew and Tropp, 2008). While the mediating role of intergroup anxiety and empathy has also been confirmed for students' contact and attitudes toward peers with a disability in a natural context (Armstrong et al., 2016), it remains unknown whether these mediating effects also hold in interventions that aim to promote students' attitudes toward peers with a disability, utilizing contact and information. Considering the affective mediators can transfer both positive and negative affect to the attitude object (Clore and Schnall, 2005), most effect of contact would be expected in the affective component of attitude. Though, surprisingly, little attention has been given to the affective component of attitude in the included studies. Both cognitive attitude and behavioral attitude, as well as general attitudes were investigated much more often than was affective attitude. Evidently, there is a need for studies investigating intervention effects on all three components of attitudes, while also addressing the mediating affective processes, and preferably linking to social participation as well.

Promoting Social Participation

Different types of contact were utilized to promote the social participation of students with disabilities, such as cooperative learning, peer support groups (e.g., friendship circles), integrated activities and peer mediation or peer tutoring, buddy systems. All contact types were equally able to promote social participation, with the exception of sociodramatic script training. However, while contact was positively associated with interactions, the associations with acceptance, friendship and social self-perception were miscellaneous and sometimes even negative. Similarly, the provided information, which mainly focused on alternative ways of communicating with a (specific) student with a disability, was also positively related to interactions but not with acceptance and self-perception.

Although interactions are one of the four themes in the definition of social participation as described by Koster et al. (2009), they are very different in nature from the other themes. Interactions are short-term processes, which may or may not lead

to the long-term emergence of the more complex themes of social participation, namely acceptance, friendships and the social self-perception of a student (Van Geert and Steenbeek, 2005; Fabes et al., 2009); in other words, interactions can be considered as the building blocks for the other themes. Given the relatively short length of most interventions it seems only logical that the most positive results were established within the interactions theme of social participation. However, we have real concerns about the predictive validity of interactions, considering how they were commonly operationalized. The majority of studies in our review focused on the more mechanical aspects of interactions, such as frequency, duration, initiations and responses, whereas other aspects of interactions are more indicative for establishing acceptance and friendships (e.g., reciprocity, intimacy, emotional expression) (e.g., Van Geert and Steenbeek, 2005; Bukowski et al., 2009). There is still a lack of research investigating the pathways from interactions to acceptance and friendships and subsequently the social self-perception of students with disabilities.

Whereas, social acceptance and friendship are voluntary in character and cannot be enforced (Howe and Leach, 2018), interactions can also be involuntary. Many interventions enforced interactions by utilizing extrinsic motivation, such as praises or rewards, to initiate and pursue social interaction with a peer with a disability (e.g., English et al., 1997; Goldstein et al., 1997; Kohler et al., 2007; Lee and Lee, 2015). While these methods produce immediate effects, they will also erode the intrinsic motivation of students to communicate with their peers with disabilities and will probably result in less interaction after de extrinsic motivation is taken away. Stimulating contact by making use of students' intrinsic motivation to interact will result is more permanent effects. Moreover, in several interventions typically developing students were prompted by teachers or assistants when no interaction took place for a predefined amount of time (e.g., Goldstein and Cisar, 1992; Antia et al., 1993; Storey et al., 1993; Frea et al., 1999; Odom et al., 1999; Nelson et al., 2007; Kamps et al., 2015; Lee and Lee, 2015). This might be a good way to start up interactions between students with and without disabilities, however, since the interaction data were often collected during intervention

sessions, the positive results are most likely an overestimation of the real voluntary social interactions that took place in day to day classroom activities outside of the intervention (e.g., at the playground). When operationalizing the themes of social participation, one should keep in mind the voluntary character of its themes.

The Mediating Role of Peer Attitudes

Surprisingly, not any studies were found investigating the mediating role of peer attitudes. Many authors have suggested that negative peer attitudes are the main barrier for the social participation of students with disabilities, and, moreover, several empirical studies confirmed this relationship. Nevertheless, evidence for this mediating role of attitudes in interventions is lacking. Since attitudes and behavior are related to each other in a complex way (Ajzen and Fishbein, 2005), it remains unknown whether the social participation of students with disabilities can be enhanced via the promotion of the attitudes of their typically developing peers. Educational professionals therefore best pick interventions that include both contact and information, to strive for the best outcomes for students with and without disabilities.

Reflection on the Conceptual Model

Based on the Contact Theory, this review proposed a conceptual model (**Figure 1**) for promoting the social participation of students with disabilities, through direct contact and information, via peers' attitudes. Evidently, the reality is far more complex than was proposed in this model. Several theoretical frameworks provide insight into the complexity of behavior change, such as the Theory of Planned Behavior (Ajzen, 1991). The Theory of Planned Behavior is an effective framework for predicting and explaining behavior (Armitage and Conner, 2001), also in the field of inclusive education (e.g., Obrusnikova et al., 2011; MacFarlane and Woolfson, 2013). According to the Theory of Planned Behavior, subjective norms and perceived behavioral control also play an important role in predicting both behavioral intentions and actual behavior (see also Ajzen et al., 2019). Furthermore, the later modifications of the Contact Theory (Brown and Hewstone, 2005) nuance the impact of contact and information by acknowledging the role of underlying cognitive and affective processes. Lastly, several background factors also play a role in attitude development, such as gender (Nowicki and Sandieson, 2002; Barr and Bracchitta, 2012), personality (Sibley and Duckitt, 2008; Akrami et al., 2011; Page and Islam, 2015), culture (Sheridan and Scior, 2013; Benomir et al., 2016), knowledge about disabilities (Vignes et al., 2009; De Boer et al., 2012), and (in)direct experiences with disabilities (McManus et al., 2011; Keith et al., 2015). Rather than presenting a comprehensive model, we aimed to present a model to guide interventions aimed at promoting the social participation of students with disabilities. Therefore, a focus on malleable factors was needed. Although, it can be argued that the focus on solely contact, information, and peer attitudes is too simplistic, they are, however, malleable factors that can easily be manipulated through interventions.

Limitations

This review focused solely on the relationship between contact and information on the one hand and attitudes and social participation on the other hand. As a consequence, only the content and format of the interventions was investigated, and other factors that might have impacted the results were left out of the investigation, such as program duration, frequency and intensity (Leigers and Myers, 2015), the implementation agent (Flay et al., 2005), or the fidelity of implementation (see Carroll et al., 2007). Therefore, it is not possible to ascertain that the effects we derived from the studies were not affected by such factors. Second, in this review all data covering the relationship between contact and information and attitudes and social participation were considered as separate associations. This could have instigated an unbalanced representation of the data as the separate associations might not have been unique associations because of overlap due to multicollinearity or due to a lack of correction for disattenuation. Third, due to vague, brief and rather incomplete descriptions of the interventions, we were occasionally unable to judge whether contact and/or information were part of the interventions. Therefore, we had to exclude several, possibly relevant, studies.

Can the Contact Theory Be Applied in the Context of Inclusive Education?

Allport (1954) was convinced that both contact opportunities and information were needed to achieve attitude change and thereby intergroup social relations. As hypothesized, this review concludes that interventions combining contact and information can promote peer attitudes as well as the social participation of students with disabilities. These findings demonstrate the applicability for the Contact Theory in primary inclusive education, especially concerning the promotion of typically developing peers' attitudes. With regard to the promotion of social participation, it appears that the Contact Theory can only be partially validated, as the evidence is currently limited to its interaction theme only. Further research is needed that investigates its applicability pertaining to social acceptance, friendships and social self-perception of students with disabilities.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

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