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Review article

Social participation of students with autism spectrum disorder in general education settings

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ABSTRACT

This article presents a systematic review of the recent literature from 2005 onwards on the social participation of students with Autism Spectrum Disorder (ASD) in inclusive elementary and secondary schools. These students may experience particular challenges in social interaction and communication within mainstream settings, due to the specific characteristics associated with ASD. In the context of this review, social participation has been defined as a multidimensional concept including four key aspects: (1) friendships/relationships, (2) contacts/interactions, (3) ASD students' social self-perception, and (4) acceptance by classmates. This multidimensional framework has been adopted to examine how the inclusion of students with ASD in general K-12 settings shapes their social participation status. We reviewed 24 studies in relation to the four key aspects of social participation for the students with ASD. Overall, the results are mixed. On the whole, students with ASD have been found to maintain a lower social participation status within their schools, but some encouraging findings have also been reported, especially at the elementary school level. In the secondary school level, students with ASD were found to face more challenges in regards to peer social participation and interactions. Implications for special and inclusive practice and research are being discussed.

As a result of international and national policy developments, there has been a growing momentum towards inclusion of students with special educational needs and disabilities (SEND) in inclusive general education settings (e.g., ESSA, 2015; IDEA, 2004; The United Nations, 2006; UNESCO, 1994), including students with Autism Spectrum Disorder (ASD). Inclusion is a highly contentious concept (Hansen, 2012), as past research has described a variety of definitions for the concept of inclusion. Overall, inclusion has been broadly defined as an ongoing process of educational provision, ranging from providing access to and educating students with SEND in mainstream education classrooms (Rafferty, Boettcher, & Griffin, 2001) to an endless equitable process of developing the school for all (Booth & Ainscow, 2011; Florian, Black-Hawkins, & Rouse, 2017). Despite the unclear conceptual framing of inclusion, the number of students with ASD attending inclusive education settings has been steadily increasing in the last couple of decades (CDC, 2020; Freitag & Dunsmuir, 2015; Humphrey and Symes, 2010a, b; Jones & Frederickson, 2010; U.S. Department of Education, 2005; Wainscot, Naylor, Sutcliffe, Tantam, & Williams, 2008; Wong et al., 2015). However, concerns remain about the quality of their experiences in these settings (Humphrey & Lewis, 2008) and, particularly with regards to their social participation experiences.

In the context of this review, social participation has been defined as a multidimensional concept including four key aspects: (1) friendships/relationships, (2) contacts/interactions, (3) students' social self-perception, and (4) acceptance by classmates (Koster,

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Table 1

Social participation overview of key themes and their aspects.
(Adapted from Koster et al., 2009).

Key themes	Aspects of key themes
1. Level of friendships/relationships	– Friendship network
	– Mutual friendship
2. Type of contacts/interactions	– Playing together
	– Working together on tasks
	– Participation in group activities
	– (Un)acknowledged initiations
	– Social isolation
3. ASD students' social self-perception	– Self-perception of peer acceptance
	– Satisfaction at school
	– Social self-concept
	– Self-perception of social competence
	– Loneliness
4. Acceptance by classmates	– Social preference
	– Social support (behaviors)
	– Bullying
	– Social rejection

Pijl, Nakken, & Van Houten, 2010). Koster, Nakken, Pijl, and van Houten (2009) reviewed 62 studies examining the social aspects of inclusion for students with special needs and recommended using the term social participation as opposed to social inclusion or social integration. In their review, social participation was defined as 'the presence of positive social contact/interaction between students with special needs and their classmates; acceptance of them by their classmates; social relationships/friendships between them and their classmates, and the students' perception that they are accepted by their classmates (Koster et al., 2009, p. 135). Each theme has its own sub-themes, as outlined in Table 1. Therefore, in order to have a balanced view of the social participation of students with ASD in inclusive settings, we have applied the definition of social participation proposed by Koster et al. (2010) as a framework for reviewing the studies included in this review.

Social participation is generally seen as an integral element of inclusion of students with SEND in general education settings. Inclusion has been gaining momentum internationally since the Salamanca Statement (UNESCO, 1994). However, defining inclusion can be challenging and ambiguous, as it has been used to describe processes of access, integration, and active participation. For many educators, integration has a different meaning to inclusion, claiming that 'inclusion' has replaced 'integration' or that inclusion represents a movement away from integration and mere access to general education settings (Ainscow, 1999; Evans & Lunt, 2002). Ainscow (1999) suggested that integration is about making a limited number of additional arrangements for students identified as having SEND, whereas inclusion requires the introduction of a more radical set of changes through which schools restructure themselves to embrace the needs of all students and reduce the barriers to their education. Florian (2008) defined inclusion in terms of a philosophy of education that promotes the education of all students in mainstream schools, and as a policy which is generally understood around the world as part of a human rights agenda that demands access to, and equity in, education (Florian et al., 2017).

One of the main justifications for including students with ASD in general education settings is for the opportunities to engage in social interactions with peers. As outlined above, a diagnosis of ASD includes challenges with social interaction, such as being aware of other people's feelings, and verbal and nonverbal communication (APA, 2020). In school, students with ASD have been found to be twenty times more likely to be socially excluded from peer interactions than their typically developing peers (Barnard, Prior, & Potter, 2000) and at least three times more likely to be bullied than other students (Humphrey & Symes, 2010a). Research has also shown that students with ASD who are included make positive social gains (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011; Locke, Rotheram-Fuller, & Kasari, 2012). In one study by Rotheram-Fuller, Kasari, Chamberlain, and Locke (2010), parents reported that their child's inclusive experience was characterized by peer acceptance and the ability to form meaningful friendships with their peers (Rotheram-Fuller et al., 2010). Previous studies have also found parents and professionals (e.g., teachers) prefer inclusion of students with ASD as it provides them with access to appropriate social behavioral models, responsive social partners and opportunities for participation in typical social experiences (Freitag & Dunsmuir, 2015; Kasari et al., 2011).

Overall, inclusive education aims to provide students with opportunities to experience meaningful social interactions and develop peer relationships (Freitag & Dunsmuir, 2015) and it has long been argued that the most significant indicator of the success of inclusion is the extent to which these students are accepted by their mainstream peers (Lewis, 1995). Therefore, it is essential to study the social participation of these students in light of recent educational inclusive policy and practice to begin unraveling whether and inclusion may promote or hinder the social participation of students with ASD in mainstream schools.

The aim of this paper is to review the social participation of students with ASD in elementary and secondary schools. Despite the momentum towards inclusion and the associated challenges in social interactions and communication for students with ASD, it is pertinent to systematically review the most recent research evidence with regards to the different dimensions of social participation of students with ASD. Findings from this review can inform policy and provide insights into practices that promote the social participation of students with ASD in general education settings. Research into the four themes of social participation of students with ASD in mainstream classrooms, as defined theoretically by Koster et al. (2010 — see Table 1), is relatively scarce. Studies have

predominantly focused on the assessment of academic outcomes (Humphrey & Lewis, 2008; Keen, Webster, & Ridley, 2016). Additionally, this review is timely given the increase in the number of students with ASD within the last decade (Wong et al., 2015). These students are now highly likely to be educated in inclusive settings (ESSA, 2015; IDEA, 2004; Keen & Ward, 2004; The United Nations, 2006). In a US context, it is worth noting that from 1997 to 2008 the prevalence of autism increased 289.5% and, in 2018, it was estimated that 1 in 59 children had a diagnosis for autism (CDC, 2020). In 2013, 9 out of 10 students with ASD in the US spent at least some of their time in a regular classroom (NCES, 2017). In the UK, by 2010, 6 out of 10 students with ASD were included in mainstream schools (Wilkinson & Twist, 2010). Several reasons have been speculated, as to why the number of students with ASD being identified has been increasing. For example, the diagnostic tools available today can detect ASD earlier (CDC, 2020). According to CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network latest report, the increasing prevalence of ASD has more to do with better monitoring and diagnosis of the disorder, rather than a de facto rise in the number of children who have ASD (CDC, 2020). Additionally, the diagnostic gap between white, Hispanic, and black children has shrunk significantly, indicating that more diagnoses are occurring among typically underdiagnosed ethnic populations (CDC, 2018).

Two main questions guided this critical review:

1. How does inclusion shape the four themes of social participation of students with ASD in schools?
2. What are the implications for including students with ASD in general education settings?

1. Students with Autism Spectrum Disorder (ASD)

Students with ASD constitute a very specific group of students with SEND, therefore it would be important to convey a definition for this group of learners. Even within this specific group of students, there is heterogeneity in the presentation and severity of ASD symptoms, as well as in the skills and level of functioning of individuals who have ASD (APA, 2020), hence the use of the term 'spectrum'. According to the American Psychological Association (APA, 2020), ASD refers to a neurodevelopmental disorder that is characterized by difficulties with social communication and social interaction and restricted and repetitive patterns in behaviors, interests, and activities. ASD, as defined by IDEA (2004), constitutes a developmental disability significantly affecting verbal and nonverbal communication and social interaction, that adversely affects a child's educational performance. A diagnosis of ASD generally includes challenges with social interaction and communication, such as being aware of other people's feelings (APA, 2020) and is often performed by a team that typically includes a clinical psychologist and a physician, or a psychiatrist, and/or other highly qualified professionals (IDEA, 2004). According to the Centers for Disease Control and Prevention (CDC, 2020), ASD occurs in all racial, ethnic, and socioeconomic groups, but is about 4 times more common among boys than among girls. The associated challenges of these students with social interaction and communication call for pedagogical tools and interventions to enhance their social participation and inclusion.

2. Method

To provide an overview of how inclusion of students with ASD in general education classrooms shapes their social participation, we conducted a systematic literature search that aimed to identify available published journal articles reporting on empirical studies on this topic from 2005 onward. We selected this time period since inclusion in education has started to gain momentum internationally and also we wanted to include recent literature in order to discuss relevant practical and policy implications. In doing so, we focused exclusively on studies published in blind peer-reviewed journals obtained from the following electronic databases and research journals: ERIC, Web of Science, PsycINFO, 'Journal for Autism and Developmental Disorders' (JADD) and 'Research in Autism Spectrum Disorders'. The criteria for selection began with a search command that identified 'ASD inclusion' and 'ASD inclusive education' as the first two key phrases. Two subsequent search commands included 'ASD social participation' and 'ASD social outcomes' as the key phrases. We compiled and reviewed all relevant studies relating to social participation of students with ASD in inclusive settings. A total of 24 empirical studies (see Fig. 1) published in peer-reviewed academic journals that were relevant to elementary and secondary educational settings were included in this review (See Table 2).

2.1. Inclusion criteria

To be selected for the review, each study had to meet the following criteria for inclusion: (1) state that it was conducted in an inclusive general education setting; (2) included primary empirical data collected through quantitative, qualitative or mixed-methods approaches (intervention studies were eligible for inclusion); (3) contained self-reported aspects of social participation of students with ASD (e.g., friendship, social contacts and other) and (4) published in a blind peer-reviewed English language journal.

We have intentionally allowed for inclusion of intervention studies, despite the known phenomenon of publication bias. The inclusion of intervention studies was permitted in order to allow for more in-depth insights into pedagogical and research strategies that can be put into practice from practitioners or help policy makers shape policy in regards to enhancing the social participation of students with ASD in mainstream schools. Put simply, publication bias is defined as the publication or non-publication of studies depending on the direction and statistical significance of the results (Rothstein, Sutton, & Borenstein, 2005). This can be particularly problematic for systematic reviews as intervention studies that did not produce significant effect sizes may not be published and, in extent, may not be included in the review. However, we still see value in including intervention studies that produced statistically significant results as they may provide practitioners and policy makers with some direction of what works well in research that may
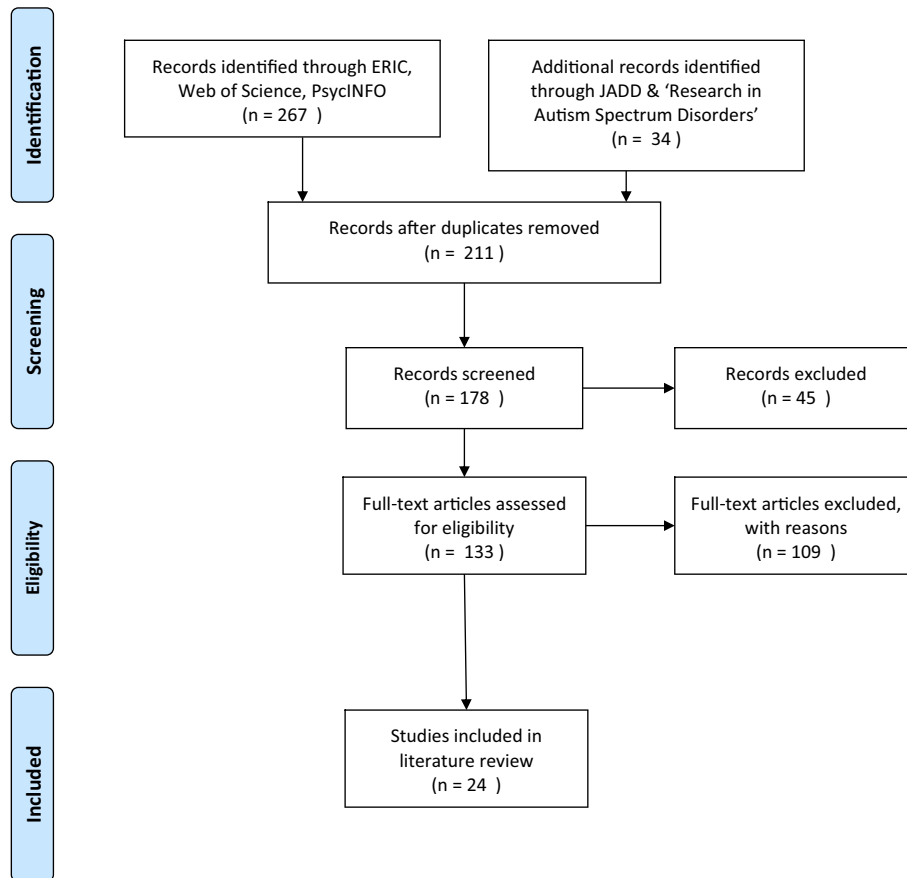
Fig. 1. PRISMA flow diagram.
Adapted from: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:https://doi.org/10.1371/journal.pmed1000097.

then be translated into practice.

3. Results

The results of the study are organized and presented based on the four social participation themes proposed by Koster et al. (2010), as outlined in Table 1. Inevitably, there is overlap among the four themes as most studies examined more than one aspect of social participation. To avoid repetition, studies are being discussed in more detail in the first theme that they appear, and less detail is provided in subsequent themes that the same study appears again. Overall, there is balance across the four themes; eleven of the studies discussed friendships/relationships, twelve of the studies elaborated on contacts/interactions, eleven of the studies examined ASD students' social self-perception and ten of the studies touched on acceptance by classmates. In the following sections, we provide details for each study and discuss its findings in relation to each social participation theme, aiming to provide research-informed insights into how inclusion of students with ASD shapes their social participation.

Of all 24 studies, 14 were conducted in an elementary setting, 9 in secondary schools and 1 in both elementary and secondary schools. As shown on Table 2, results are classified in three main categories; positive, negative and mixed social participation outcomes, within the four themes that our analysis is structured under. For a study to receive a positive (+) or negative (−) assessment, all results across any social participation themes examined, should have been reported by the researchers of the study as positive or negative respectively. If any of the results were mixed, according to the study's researchers, they would have received a mixed symbol (±) on Table 2.

3.1. Types of friendships/relationships

Eleven studies examined aspects of friendships and relationships of students with ASD in inclusive settings, including friendship networks and mutual friendships (Boutot & Bryant, 2005; Chamberlain et al., 2007; Jones & Frederickson, 2010; Kasari et al., 2011; Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012; Kasari et al., 2015; Locke, Ishijima, Kasari, & London, 2010; Locke et al., 2012;

Table 2
Overview of the selected studies (n = 24).

Reference	Level	Research design & methods	n	Key theme(s) of social participation examined				Main findings
				Friendships/ relationships	Contacts/ interactions	Students' social self-perception	Acceptance by classmates	
Banda et al. (2010)	Elementary	Intervention/multiple baseline design/ observation	2		x			+
Boutot and Bryant (2005)	Elementary	Paper pencil SNA survey/peer nomination/ quan	177	x			x	+
Chamberlain et al. (2007)	Elementary	Paper pencil SNA survey/quan	398	x		x	x	±
Conn (2013)	Elementary	Mosaic approach/qual	n/a		x			+
Harper et al. (2008)	Elementary	Intervention/concurrent multiple baseline design	2		x			+
Hochman et al. (2015)	Secondary/high	Intervention/multiple baseline design/ observation	4		x			+
Humphrey and Symes (2010a)	Secondary	Phenomenological approach/semi-structured interviews/qual	36			x	x	–
Humphrey and Symes (2010b)	Secondary	Quasi-experimental design/paper pencil survey/quan	120			x	x	–
Humphrey and Symes (2011)	Secondary	Quasi-experimental design/observation/ quan	111		x			–
Jones and Frederickson (2010)	Elementary/secondary	Paper pencil survey/quan	43	x				–
Kasari et al. (2011)	Elementary	Paper pencil (SNA) surveys/observation/ quan	875	x		x		±
Kasari et al. (2012)	Elementary	Intervention/self, peer, teacher reports/ observation/quan	60	x	x	x		+
Kasari et al. (2015)	Kindergarten/ elementary	Intervention/survey/observation/quan	137	x	x			+
Locke et al. (2010)	Secondary/high	Paper pencil (SNA) survey/quan	20	x		x		–
Locke et al. (2012)	Elementary	Paper pencil SNA survey/quan	274	x		x		+
Owen-Deschryver et al. (2008)	Elementary	Intervention/multiple baseline design/ observation/quan	3		x			+
Rotheram-Fuller et al. (2010)	Kindergarten/ elementary	SNA surveys/quan	158	x			x	–
Rowley et al. (2012)	Elementary	Self-reports/quan	180	x		x	x	–
Sreckovic et al. (2017)	Secondary	Intervention/multiple baseline design/ observation/survey/quan	3		x		x	+
Symes and Humphrey (2010)	Secondary	Paper pencil survey/quan	120			x	x	–
Symes and Humphrey (2012)	Secondary	Structured & qualitative observations/ mixed methods	120		x			–
Wainscot et al. (2008)	Secondary	Case-control design/structured interviews/ quan	57	x	x	x	x	–
Wolfberg et al. (2014)	Elementary	Intervention/observation/quan	192		x			+
Zeedyk et al. (2016)	Kindergarten/ elementary	Paper pencil surveys/quan	127			x		±

Rotheram-Fuller et al., 2010; Rowley et al., 2012; Wainscot et al., 2008). The majority of these studies were conducted in elementary schools, as shown on Table 2. Four of those studies reported positive (Boutot & Bryant, 2005; Kasari et al. (2012, 2015); Locke et al., 2012), five reported negative (Jones & Frederickson, 2010; Locke et al., 2010; Rotheram-Fuller et al., 2010; Rowley et al., 2012; Wainscot et al., 2008) and two reported mixed social participation outcomes (Chamberlain et al., 2007; Kasari et al., 2011).

All four studies that reported positive aspects of friendships and relationships were conducted in elementary school settings, with one study including a sub-sample from kindergarten (Kasari et al., 2015). The first study conducted by Boutot and Bryant (2005) examined three social integration constructs, namely social preference – the level of social acceptance a student has relative to other members of the classroom; social impact – how well a student is known by his or her peers; and social network affiliation – the number and quality of connections that an individual had to a group of people. They surveyed 177 students from nine classrooms in grades two through five (including 10 students with ASD or Pervasive Developmental Disorders and 26 with a disability other than autism) in central Texas. Researchers found no differences between students with autism and students without disabilities. Findings showed that students with ASD were as accepted, visible, and connected to peer groups, as students without disabilities or students with other disabilities. In terms of social preference, the study showed that these students were as likely as their peers to be chosen for an activity (e.g. playing at recess). However, classmates appeared to prefer their peer with autism as a playmate rather than as a partner on work related tasks (Boutot & Bryant, 2005). Similar results were noted for measures of social impact suggesting that students with autism in these inclusive classrooms had the same amount of visibility as their peers without disabilities. No differences were found in terms of social network affiliation. One possible reason for the positive findings may be that these children participated in a course to learn more about autism, suggesting that peers can develop positive attitudes about students with autism if they learn more about the symptoms that may be associated with autism. The self-reported measures used in the study seemed robust in describing the three social integration constructs but were limited in explaining the process of how they were formed.

The second study, drawing on a sample of 60 students, by Kasari et al. (2012), compared two interventions for improving the social skills of students with ASD. The first intervention involved a peer-mediated approach and the second a child-assisted approach. The two interventions were crossed in a 2 × 2 factorial design yielding control and involved 12 sessions over 6 weeks, with a 3-month follow-up. Outcome measures included self, peer and teacher reports of social skills and independent weekly observations of students on their school playground. Significant improvements were found in social network salience, number of friendship nominations, teacher report of social skills in the classroom, and decreased isolation on the playground for students who received peer-mediated interventions (Kasari et al., 2012). This study represents one of the largest intervention samples for students with ASD at school but still the sample was too small to test mediators and moderators of treatment effects. Another limitation was that many of the students changed classrooms or schools by the time of the follow-up which may have comparability implications.

In a similar manner, the third study by Kasari et al. (2015) compared student outcomes of two social skills 8-week interventions conducted in schools with students in Kindergarten through fifth grade. In total, 137 students with ASD across four sites participated. Students with ASD were randomized to one of two interventions that varied on group composition; mixed typical and ASD vs. all ASD or social difficulties, and intervention approach; didactic skills based vs. activity-based engage groups (Kasari et al., 2015). Measures included peer nomination and playground peer engagement techniques, as well as teacher reports of child behavior problems and teacher–child relationships. The authors found no main effect of treatment on social network connections from the peer nomination measure, but there were only moderator effects. Students with low teacher–child closeness or high conflict improved more in their social connections if they received the skills intervention, whereas students with higher teacher–child closeness improved more if they received the intervention (Kasari et al., 2015). These findings suggest that social skills groups conducted at school may impact peer engagement during recess as well as peer acceptance. According to the authors, a main finding from this study was that an adult-led didactic social skills approach with ASD students from different grades and classes was found to be more effective for improving peer acceptance and engagement on the school playground than an inclusive, interest-based social skills groups for children with ASD and their classmates.

The fourth study by Locke et al. (2012) examined the social impact of being a typical peer model as part of a social skills intervention for students with ASD. Participants were drawn from a randomized-controlled-treatment trial conducted in 56 classrooms across 30 public schools in a large urban school district in Los Angeles that looked into the effects of targeted interventions on the social networks of 60 elementary-aged students with ASD. In the context of this study, 107 typically developing students were nominated by their teachers to be peer models for students with ASD. Specific social characteristics were examined, such as social network centrality, friendship reciprocity and connectedness, friendship quality, and loneliness, as well as the stability of social behavior of typically developing peer models in comparison to a matched cohort of non-peer models at the end of treatment. Results demonstrated that typical peer models had higher social network centrality, received friendships, friendship quality, and less loneliness than non-peer models (Locke et al., 2012). These results suggested that typical peers can be socially connected to students with ASD, as well as other classmates, and maintain a strong and positive role within the classroom. Typically developing peers may act as peer buddies/models to classmates with ASD, resulting in enhanced social participation. The authors also found that the social status of peer models remains stable and consistently positive over time and does not appear to be affected by participating in a social skills intervention (Locke et al., 2012). However, a common limitation of self-report measures within social network studies is a potential discrepancy between who participants nominate and who they actually engage with in activities. The findings of this study could have been strengthened further if independent playground observations had been conducted on peer and non-peer models. This would have allowed for cross-validation of students' reports of social network connectivity (e.g. do they indeed "hang out" with students with ASD on the playground as reported on the survey instruments?).

Within this theme, five studies reported negative aspects of social participation for students with ASD (Jones & Frederickson, 2010; Locke et al., 2010; Rotheram-Fuller et al., 2010; Rowley et al., 2012; Wainscot et al., 2008). Jones and Frederickson (2010)

studied the social inclusion of 43 students with ASD in elementary and secondary inclusive settings in England. They found that these students were more likely to be socially rejected in comparison to their peers. Multiple regression analyses using behavioral ratings from parents, teachers and peers found some evidence for differential profiles predicting peer acceptance and rejection (Jones & Frederickson, 2010). In particular, this study suggested that low levels of prosocial behavior predicted social acceptance for students with ASD. These students were rated by their classmates significantly less often as being someone with whom they would be happy to work and significantly more often as being someone with whom they would rather not work. Students with ASD were also less likely to be described as being 'co-operative' and more likely to be described as 'helpseeking', 'shy', 'hyperactive' and being 'less prosocial'. The authors argued that these findings should encourage schools to embrace traditional social skills programs to raise awareness about ASD among mainstream pupils (Jones & Frederickson, 2010).

Another study in a high school context, set out to examine the social–emotional relationships of 7 adolescents with autism and their 13 typically developing classmates within a drama class (Locke et al., 2010) by looking at their friendship quality and social networks. In order to capture friendship quality and related social network concepts, the researchers employed a loneliness scale, a friendship qualities scale, a friendship survey and a school activity questionnaire. The results of this study indicated that students with ASD experienced significantly more loneliness than their classmates, had significantly poorer friendship quality in companionship and helpfulness, and had significantly lower social network status than their typically developing classmates. Locke et al. (2010) argued that inclusion may allow students with ASD to be involved in the social structure of their classroom but they were found to experience more loneliness, poorer friendship quality and social network status as compared with their classmates. As noted in the social network studies above, similar limitations may apply here. For example, all participants came from one classroom which inevitably limits the generalizability of the study as well as the cross-sectionality of the design does not allow for change in social relationships to be captured.

A study by Rotheram-Fuller et al. (2010) employed social network surveys to cross-sectionally examine reciprocal friendships, peer rejection, acceptance, and social involvement in 79 students with ASD and 79 randomly selected, gender-matched peers (88.6% male) in 75 early (K-1), middle (2nd–3rd), and late (4th–5th) elementary classrooms across 30 schools, in the greater Los Angeles County. Across grade levels, peers less frequently reciprocated friendships with students with ASD than students in the matched sample. Additionally, students with ASD were less accepted and had fewer reciprocal friendships than matched peers and were also more likely to be isolated or peripheral to social relationships within the classroom across all grade levels (Rotheram-Fuller et al., 2010). As a result, reciprocal relationships can be a considerable challenge for students with ASD within inclusive classrooms across grade groups. It is worth noting that these differences were even greater in later elementary grades. Overall, the involvement of students with ASD in classrooms is comparable to typically developing peers in early elementary grades, but lower than peers in older elementary grades. Despite the rigor of this study, the rather small sample, especially female students with ASD, should be noted. In sum, the cross-sectional design is limited in capturing changes that might occur across grades within the same group of students with ASD.

Measuring the friendship, bullying and victimization experiences of 100 10–12-year-old students with ASD, matched with 80 students with special educational needs without ASD, and by using parent, teacher and child self-report, Rowley et al.'s (2012) study in a UK context produced some important findings. First, they found that parents and teachers reported a lower prevalence of friendships compared to population norms and to students with special educational needs without an ASD. Parents also reported higher levels of victimization than the SEN group whereas teachers reported that students with ASD who were having less social challenges in mainstream school experienced higher levels of victimization and vice versa. The authors concluded that strategies are required to support and improve the social interaction skills of students with ASD, so to enable them develop and maintain peer friendships and avoid victimization (Rowley et al., 2012).

Last, another study in the UK by Wainscot et al. (2008) employed a case-control design to examine the in-school social relationships with peers of 30 students with Asperger syndrome/high-functioning autism and of 27 matched controls in mainstream secondary schools. The controls consisted of a group of students with dyslexia and a group with no identified special educational needs. By comparison with controls, students with ASD and Asperger syndrome engaged in fewer social interactions during the school day, both in and out of lessons, spent break and lunch times inside in quieter more closely adult supervised areas of the school, reported having fewer friends, were less physically active, were more likely to be the targets of bullying but had equally good school attendance records (Wainscot et al., 2008). These findings should be approached carefully as the study relied exclusively on self-report measures (structured interview) that present the risk of respondents giving socially desirable answers that cannot be verified independently or complemented with other data sources.

Two studies within this theme produced mixed results (Chamberlain et al., 2007; Kasari et al., 2011). The first one by Chamberlain et al. (2007) examined the social networks of 398 elementary students in regular 2nd through 5th grade classes, including 17 students with high functioning autism or Asperger's syndrome. Despite involvement in networks, students with ASD were found to experience lower centrality, acceptance, companionship, and reciprocity but they did not report greater loneliness. In particular, they scored significantly lower in social network centrality than the matched group of typical peers, indicating that the students with ASD tended to be less centrally involved in the social structure of the classroom. However, some students with ASD managed to avoid social isolation, had only a few weak ties and no reciprocal friendships, while others were centrally involved and enjoyed considerable reciprocity. Another interesting finding is the way students with ASD perceive themselves in the social milieu who they see themselves as more socially involved than their peers report. Methodologically, the use of social network methods can be particularly useful and rigorous, however it may be somewhat descriptive. Social network data can primarily tell us about the quantity of social relationships rather than the quality and the process of their formation. This can be seen as a limitation of this study. It can be enriching and methodologically sound to include qualitative methods in such studies, such as interviews and

observation, to be able to go more in-depth in examining social network concepts.

In a US elementary school context, the second study examined and compared friendships of students with and without ASD (Kasari et al., 2011). The participants were 60 high-functioning children with ASD and 815 typically developing students, in 56 classrooms across 30 schools. To allow for direct comparisons to the students with ASD, a subsample of typical students was randomly selected that matched the students with ASD on gender, age, grade and classroom (Kasari et al., 2011). Self, peer and teacher reports of social relationships were examined. Students with ASD were found to be more often on the periphery of their social networks, reported poorer quality friendships and had fewer reciprocal friendships. However, these students did not differ from typically developing peers in the number of rejection nominations they received which may suggest that students with ASD have enhanced potential for fitting into their general school classrooms. The authors concluded that, while most high-functioning children with ASD struggle with peer relationships in general education classrooms, a small percentage of them appear to have social success (Kasari et al., 2011), which may be a positive sign towards their inclusion in general education settings.

3.2. Contacts/interactions

In the second theme, 12 studies examined various aspects of contacts and interactions between students with ASD and their peers. Some of the aspects within this theme include playing and working on tasks together, participating in group activities, initiations and social isolation. The majority (9 studies) of these studies reported positive social participation results (Banda, Hart, & Liu-Gitz, 2010; Conn, 2013; Harper, Symon, & Frea, 2008; Hochman, Carter, Bottema-Beutel, Harvey, & Gustafson, 2015; Kasari et al. (2012, 2015); Owen-Deschryver et al., 2008; Sreckovic, Hume, & Able, 2017; Wolfberg et al., 2014) and three of them negative (Humphrey & Symes, 2011; Symes & Humphrey, 2012; Wainscot et al., 2008).

Beginning with the positive social contacts and interactions, Banda et al. (2010) used direct instruction and peer training to increase peer-to-peer social skills in two students with ASD. The two students and their non-disabled peers were trained to initiate and respond to each other during center time, academic activities. A multiple-baseline design across participants was employed to determine the effects of the intervention. Findings indicated that the social skills intervention provided immediate and robust improvements of social initiations and responses in both groups of participants. The authors argued that there is an emerging need to provide multiple opportunities for social interactions not only in non-academic social groups but also in group settings with academic activities (Banda et al., 2010). These findings are reiterated by Jones and Frederickson (2010) in this review, who argued that schools may seek to augment traditional social skills programs to raise awareness about ASD and its symptoms. However, the study is not without limitations. As the authors note, maintenance and generalization data were not collected due to time constraints and the sample size (two students) was inevitably too small for drawing wider conclusions outside of the context of the study (Banda et al., 2010). Additionally, the social engagement of a child with ASD was examined by employing a case study design (Conn, 2013). The study took place in an elementary school in England and included one student with a diagnosis of autism within the 'severe' range. A comparative approach was used to study different social contexts, including the wider class group, the peer group which included the child with ASD, and the individual participation of the child with autism compared with this smaller group. Conn (2013) concluded that the child with ASD demonstrated a number of competencies in relation to his own social group and that social difficulties were not necessarily seen as a weakness within the peer culture. Despite the encouraging findings from this study, generalizability is limited due to sample size.

A third intervention study by Harper et al. (2008) incorporated the motivational techniques of Pivotal Response Training through peer-mediated practice to improve social interactions for two third grade students with ASD. A multiple baseline design across subjects was used to assess social skills gains from activities implemented both inside a classroom and on the recess playground. The results demonstrated an increase in important social skills, such as social initiations and turn taking. Both participants improved their social peer interactions during recess following the peer mediated, naturalistic intervention program. Therefore, peers were found to be effective at increasing social interactions for students with ASD (Harper et al., 2008). Despite the encouraging results from these two cases, it is obvious that the ability to generalize the findings to a wide population is limited due to the small sample size of only two participants. Additionally, this research was conducted in a natural setting which has many external variables that are difficult to control, making it challenging to attribute all positive change to the intervention.

In a US high school context, Hochman et al. (2015) examined the effects of a lunchtime peer network intervention on the social engagement and peer interactions of four adolescent students with ASD. In total, four adolescents with ASD, ranging in age from 15 to 17, took part in this study. The introduction of the peer networks generated substantial increases in the percentage of intervals containing peer interactions and social engagement across all participants. In addition, students with ASD, peer partners, and school personnel all considered the intervention to be acceptable and feasible (Hochman et al., 2015). The authors concluded that peer-mediated interventions can be an effective avenue for promoting peer interactions and improving academic and social outcomes for students with ASD at the secondary school level. This is the only intervention study to have taken place in a high school and the results were encouraging in terms of the social participation for students with ASD, despite the small number of participants. Two studies by Kasari et al. (2012, 2015) also reported positive results in terms of students with ASD social contacts and interactions. These studies are discussed in more detail in the first theme as they have also examined friendships and social relationships. Kasari et al. (2012, 2015) concluded that significant improvements can be made in peer social connections for students with ASD in general education classrooms with a brief intervention, and that these gains persist over time.

Another two similar but smaller-scale peer training intervention studies on social interactions were conducted by Owen-Deschryver et al. (2008) and Sreckovic et al. (2017). In the first study, the participants were three elementary school students and for each one of them, two to four typically developing peers participated in training sessions that targeted increased social interactions.

In terms of the design, baseline data collection occurred for 3 to 6 weeks, followed by approximately two weeks during which the peer training intervention occurred. After completion of peer training, data were again collected for all three students with ASD during lunchtime and recess for up to 14 weeks to determine the effects of the intervention (Owen-Deschryver et al., 2008). Results revealed that the intervention generated increased initiations by trained peers as well as increased initiations and responses by students with ASD, which is in line with previous research on peer training. Perhaps unexpectedly, untrained peers also showed increased initiations, however the specific variables accounting for this were not directly explored in the study. As with other studies in this review, generalizability of the findings is particularly problematic as there were only three participants. Nonetheless, the authors argued that their results provided evidence for the effectiveness of peer-mediated interventions in building social interactions between students with ASD and their classmates (Owen-Deschryver et al., 2008). In the second study, Sreckovic et al. (2017) examined the effects of a peer network intervention implemented with three high school students with ASD. A multiple-baseline across participants design was employed to evaluate the intervention on initiations and responses to and from students with ASD. This intervention was also found to be effective at increasing social interactions and reducing rates of bullying victimization.

The final study in this theme that reported positive social participation results was conducted by Wolfberg et al. (2014). They explored the effects of a 12-week Integrated Play Groups (IPG) intervention on the symbolic and social play of 48 students with ASD across two public elementary schools, using a repeated measures design. The IPG model provided intensive guidance for students with ASD to participate with typically developing peers in engaging experiences in natural settings. As part of this study, the implementation of the IPG model revealed significant gains in symbolic and social play. The authors concluded that the positive outcomes of their investigation provide robust evidence for validating the efficacy of the therapeutic benefit of the integrated play groups model for students with ASD (Wolfberg et al., 2014). However, due to restrictions with timing it was not possible for each participant with ASD to engage in all the conditions, which can be a considerable limitation in a repeated-measures design. Additionally, only change in frequencies in play behaviors were considered instead of duration of play behaviors and long-term maintenance and generalization of treatment effects were not assessed.

Despite the many studies reporting positive results, three studies reported negative social participation results in terms of contacts and interactions between students with ASD and their peers (Humphrey & Symes, 2011; Symes & Humphrey, 2012; Wainscot et al., 2008). Humphrey and Symes (2011) studied the peer interaction patterns of 38 students with ASD by employing structured observations within a quasi-experimental design. In total, the target participants were 111 students (38 in the ASD group, 35 in the dyslexia group, and 38 in the group with no identified special educational needs). A matched-triad process was employed to ensure that the groups were matched as closely as possible by age and gender. Findings revealed that included students with ASD spent more time engaged in solitary behaviors, less time engaged in co-operative interaction with peers, and more time engaging in reactive aggression towards peers than either comparison group (Humphrey & Symes, 2011). In terms of frequency, participants with ASD engaged in less instances of rough/vigorous play, and were subject to more instances of social initiation and instrumental verbal aggression by peers than either comparison group. Despite that observation was used in natural settings, which may present a methodological strength of the study, a couple of limitations should also be noted. For example, the presence of observers may have altered the behavior of participants as well as the absence of 'blind' observations meaning that observers knew in advance which one of the three groups they were observing.

The same authors (Symes & Humphrey, 2012) have also examined the role of teaching assistants (TA) within a social participation context. Their study employed a mixed methods approach, including a quasi-experimental design and observation. Participants included 40 students with ASD, compared with 40 students with dyslexia and 40 students with no Special Educational Needs drawn from 12 secondary schools. Additionally, the classroom inclusion of 21 students with ASD was examined through qualitative observation across four of the original 12 schools. These four schools had been selected because they were considered 'good practice case-study schools'. Their analysis indicated that these students were less effectively included in lessons than students in the other two groups and they were less likely to work independently and be socially included, particularly when a TA was present (Symes & Humphrey, 2012). The presence of a TA was found to reduce the opportunities for students with ASD to interact with their peers than enhancing them which has immediate implications for co-teaching in inclusive settings. The third study by Wainscot et al. (2008), as discussed in detail in the first key theme, found that students with ASD engaged in fewer social interactions during the school day, both in and out of lessons and spent break and lunch times inside in quieter more closely adult supervised areas of the school.

3.3. Students' social self-perception

The third social participation key theme concerns students' with ASD self-perception of peer acceptance, satisfaction at school, social self-concept, self-perception of social competence and loneliness. Eleven of the studies examined aspects of social participation that relate to this key theme (Chamberlain et al., 2007; Humphrey & Symes, 2010a, 2010b; Kasari et al., 2011; Kasari et al., 2012; Locke et al., 2010; Locke et al., 2012; Rowley et al., 2012; Symes & Humphrey, 2010; Wainscot et al., 2008; Zeedyk, Cohen, Eisenhower, & Blacher, 2016). Two of the studies yielded positive (Kasari et al., 2012; Locke et al., 2012), six negative (Humphrey & Symes, 2010a, 2010b; Locke et al., 2010; Rowley et al., 2012; Symes & Humphrey, 2010; Wainscot et al., 2008) and three mixed social participation outcomes (Chamberlain et al., 2007; Kasari et al., 2011; Zeedyk et al., 2016).

The first study that yielded positive social self-perception outcomes was an intervention study conducted by Kasari et al. (2012). The student outcome measures included self-reports of social skills. Among others, Kasari et al. (2012) found significant improvements in social network salience and decreased isolation on the playground for students who received peer-mediated interventions (Kasari et al., 2012). Similarly, Locke et al. (2012) examined the social impact of being a typical peer model as part of a social skills intervention for students with ASD. Specific social characteristics were examined, such as loneliness, which is a key aspect within the

third social participation theme. Results showed that typical peer models had less loneliness than non-peer models (Locke et al., 2012).

The majority of the studies within this key theme resulted in negative social participation findings (Humphrey & Symes, 2010a, 2010b; Locke et al., 2010; Rowley et al., 2012; Symes & Humphrey, 2010; Wainscot et al., 2008). For example, three studies conducted in a UK context by Humphrey and Symes (2010a, 2010b) and Symes and Humphrey (2010) examined, among other aspects of social participation, students' social self-perceptions on bullying, social interaction patterns and isolation. All three studies drew on the same sample of secondary school students (40 students with ASD, 40 students with dyslexia, and a reference group of 40 students with no identified special educational needs). Their analyses indicated that these students experienced higher frequency and level of bullying and lower levels of social support from parents, classmates and friends, but not from teachers, than either students with dyslexia or those without special educational needs. They also reported lower levels of peer social support and higher levels of bullying. Additionally, students with ASD experienced higher levels of rejection and lower levels of acceptance than either reference group (Humphrey & Symes, 2010b; Symes & Humphrey, 2010).

Another study that examined loneliness in secondary and high school by Locke et al. (2010) found that students with ASD experienced significantly more loneliness than their classmates. In contrast, Locke et al. (2012) found that typical peer models in elementary had less loneliness than non-peer models. In an elementary school setting, Rowley et al.'s (2012) study showed that three-quarters of students with ASD reported some experience of teasing, being bullied, exclusion or conflict with other children, with 40% having feelings of exclusion and rejection. Although 95% of children with an ASD in this study described having some degree of individual or group friendship with their peers at school, in only about half of the sample did these involve reported clear mutuality. Last, the study by Wainscot et al. (2008) found that students with ASD reported having fewer friends. The majority of studies that reported negative social participation results for students with ASD, as shown on Table 2, were conducted in a secondary school setting. This may suggest that some aspects of social participation in secondary schools may be more challenging for those students.

Three of the studies produced mixed findings as far as the students' social self-perception is concerned (Chamberlain et al., 2007; Kasari et al., 2011; Zeedyk et al., 2016). Chamberlain et al. (2007) found that students with ASD experience lower acceptance, companionship, and reciprocity but they did not report greater loneliness. They also found that students with ASD perceive themselves as more socially involved than their peers report. Kasari et al. (2011) also employed self-reports of social relationships. Students with ASD reported poorer quality friendships and had fewer reciprocal friendships. However, they did not differ from typically developing peers in the number of rejection nominations they received which may suggest that they may have enhanced potential for fitting into their general school classrooms.

The third study by Zeedyk et al. (2016) set out to assess perceived loneliness and social competence of 127 students with ASD, 4–7 years old, through child self-report. Children were in preschool (39%), kindergarten (22%), first grade (28%), second grade (6%), and combined grade (5%) classrooms. It should be noted that these children were involved in a larger study examining the transition to early schooling for children with ASD and their families. The study utilized the Loneliness and Social Dissatisfaction Questionnaire to examine the participants' social relationships at school and was conducted in a large Northeastern metropolitan area and urban Southern California. The findings revealed a mixed picture with regards to the perceived rates of loneliness and social competence among the participants. The majority of the children perceived themselves to have friends, other children to play with, and children who liked them at school. However, nearly 40% of the children reported difficulties making friends at school and a quarter reported feeling lonely and left out of things at school (Zeedyk et al., 2016). These findings should be interpreted with caution as only high-functioning ASD children were included in the study. The results may indeed differ in low-functioning children.

3.4. Acceptance by classmates

Acceptance by classmates is the fourth social participation key theme and consists of the following aspects: social preference, social support (behaviors), bullying, and social rejection. Of the 24 studies included in this review, 10 of them have examined one or more of these main aspects. Two of the studies identified positive (Boutot & Bryant, 2005; Sreckovic et al., 2017), seven negative (Humphrey & Symes, 2010a, 2010b; Jones & Frederickson, 2010; Rotheram-Fuller et al., 2010; Rowley et al., 2012; Symes & Humphrey, 2010; Wainscot et al., 2008) and one mixed (Chamberlain et al., 2007) social participation results in relation to peer acceptance.

In terms of the positive social participation findings, the study by Boutot and Bryant (2005) found that students with ASD were as accepted, visible, and connected to peer groups, as students without disabilities or students with other disabilities and had the same amount of visibility as their peers without disabilities. Sreckovic et al. (2017) implemented a peer network intervention, as described earlier, and found that students with ASD increased their social interactions and received reducing rates of bullying and victimization.

Even though, two studies have shown some positive peer social acceptance, the bulk of the studies in this key theme have resulted in non-positive acceptance by classmates. Humphrey and Symes (2010a, 2010b) and Symes and Humphrey (2010) studies showed that students with ASD experienced higher frequency and level of bullying and lower levels of social support from parents, classmates and friends than students with dyslexia or those without special educational needs. Similarly, Jones and Frederickson (2010) found that students with ASD were more likely to be socially rejected in comparison to their peers. The study by Rotheram-Fuller et al. (2010) found that students with ASD were less socially accepted than matched peers. In terms of bullying and victimization experiences of students with ASD, Rowley et al. (2012) found that parents reported higher levels of victimization of these students than the SEN group whereas teachers reported that students with ASD who were having less social challenges in mainstream school experienced higher levels of victimization and vice versa. Similarly, the study by Wainscot et al. (2008) presented evidence to suggest

that students with ASD and Asperger syndrome were more likely to be the targets of bullying. Last, one study by Chamberlain et al. (2007) produced mixed findings. This study examined the social networks of students with ASD and peers and found that the former experience lower acceptance, companionship, and reciprocity but they did not report greater loneliness.

Overall, most studies within the fourth key theme yielded negative social participation findings for ASD students. It is worth noting that most studies with negative results were conducted in secondary school settings. This may suggest that inclusion and social participation of students with ASD is more problematic in these settings. We will now turn into discussing the results of this review in relation to the research questions and elaborate on implications for practice.

4. Discussion

As scholars and educational researchers, it is imperative to study the different dimensions or themes of social participation of students with ASD in order to understand, transform and enhance their inclusion in general education settings. These students may be particularly prone to social isolation, exclusion and marginalization given the challenges that are characteristic of an ASD diagnosis. This does not mean that is should be assumed that successful inclusive education can be measured exclusively by whether and to what extend students with ASD are socially integrated. However, social participation can be one of the factors of successful inclusion of these students in mainstream settings. This review has highlighted four main themes of social participation as proposed by Koster et al. (2010). The studies in this review provide a rich understanding of how students with ASD socially participate in inclusive settings. Most studies examined multiple aspects of social participation and varied in terms of sample. Now, we turn to the two research questions that this review set out to address.

4.1. How does inclusion shape the four themes of social participation of students with ASD in schools?

Based on the study review findings, inclusion of students with ASD in schools seems to both enhance and/or hinder their social participation. As shown in Table 2, eleven of the twenty-four studies showed that inclusion of students with ASD promoted their social participation, especially in terms of their friendships/relationships and contacts/interactions (Banda et al., 2010; Boutot & Bryant, 2005; Conn, 2013; Harper et al., 2008; Hochman et al., 2015; Kasari et al., 2012, 2015; Locke et al., 2012; Owen-Deschryver et al., 2008; Sreckovic et al., 2017; Wolfberg et al., 2014). Ten studies yielded negative social participation outcomes for these students, especially in terms of their acceptance by classmates and their social self-perception (Humphrey & Symes, 2010a; Humphrey & Symes, 2010b; Humphrey & Symes, 2011; Jones & Frederickson, 2010; Locke et al., 2010; Rotheram-Fuller et al., 2010; Rowley et al., 2012; Symes & Humphrey, 2010; Symes & Humphrey, 2012; Wainscot et al., 2008) and three studies produced mixed results (Chamberlain et al., 2007; Kasari et al., 2011; Zeedyk et al., 2016). This is rather not a surprising finding, as other reviews looking at the social participation of students with special educational needs and disabilities in mainstream settings produced similar findings (Garrote, Dessemontet, & Opitz, 2017; Koster et al., 2009; Koster et al., 2010). Our review shows that students with ASD fare similarly to other students with developmental disabilities and special educational needs.

What is perhaps more important is to examine closely those studies that yielded positive and negative results and identify the reasons behind these results. On the one hand, nearly half of the studies revealed that inclusion of students with ASD is conducive towards promoting their social participation, especially their friendships/relationships and contacts/interactions. A closer look at these studies reveals that nine of the eleven studies were conducted in elementary schools and only two in secondary schools. On the other hand, ten studies resulted in non-positive social participation outcomes, especially with regards to peer social acceptance and students with ASD social self-perception. Seven of these studies took place in secondary schools, two in elementary and one in elementary and secondary school settings. This may show that inclusion in elementary schools 'works better' therefore the enhanced social participation results, whereas inclusion in secondary schools may be more challenging for students with ASD and their subsequent social participation. This important finding is in agreement with other studies in the field of inclusive education (De Vroey, Struyf, & Petry, 2016; Graham & Harwood, 2011). De Vroey et al. (2016) have argued that secondary education represents both an interesting and a challenging context for inclusive school development. Graham and Harwood (2011) noted secondary education's transition function towards higher education or the labor market. As a result, schools narrowly define school effectiveness in terms of strictly learning outcomes of their students (Graham & Harwood, 2011). Additionally, despite the benefits of inclusive education, at the secondary level inclusive practices remained scarce for a long time (Pearce, Gray, & Campbell-Evans, 2010). It could also be the case that these differential outcomes in elementary and secondary education be attributed to the research designs employed in the identified studies. For example, some studies utilized traditional sociometric techniques (i.e. peer nomination, rating scales, etc.). Others, however, utilized the more sophisticated Social Cognitive Mapping (SCM) approach which has been found to produce more positive results (see the recent review by Avramidis, Strogilos, Aroni, & Kantaraki, 2017).

Another important emergent observation from the studies with positive social participation results is that nine out of the eleven of these studies were intervention studies. Seven were conducted in elementary school settings (Banda et al., 2010; Harper et al., 2008; Kasari et al., 2012, 2015; Locke et al., 2012; Owen-Deschryver et al., 2008; Wolfberg et al., 2014) and two in secondary schools (Hochman et al., 2015; Sreckovic et al., 2017). We interpret this in two ways. First, it could be a case of intervention publication bias, meaning that studies with favorable intervention results are more likely to be reported than studies with null findings. Sham and Smith (2014) conducted an initial test of bias by comparing effect sizes in published studies and unpublished dissertations on one well-established intervention for children with autism and provided evidence that such bias exists.

Second, it could be the case that 'inclusion works' and social participation is enhanced when actually inclusive practices are thoughtfully devised or interventions are being implemented. For example, in the intervention studies students with ASD were overall

found to improve their social interactions, social skills and socially competent behaviors. Furthermore, peer models were shown to be conducive towards friendship development. A significant take-away point here could be that when an intervention takes place the likelihood of success is high. Therefore, mere access and placement of students with ASD in general education settings will likely not be as successful, unless practice and policies are transformed to embrace the particular needs of these students (Ainscow, 1999; Evans & Lunt, 2002; Humphrey & Symes, 2010a; Locke et al., 2010; Mavropoulou & Sideridis, 2014). As Florian (2008) and Ainscow (1999) have argued, inclusion requires equity in education and the introduction of a more radical set of changes through which schools restructure themselves to embrace the needs of all students and reduce the barriers to their education.

4.2. What are the implications for including students with ASD in general education settings?

The studies reviewed in this article illustrate that inclusion of students with ASD in general education settings may both enhance and impede their social participation. These results have implications for inclusive practice. The results of this review have shown that the inclusion of these students in secondary schools is more challenging, suggesting that students with ASD are more likely to be socially isolated, marginalized and even bullied rather than in elementary schools. Additionally, interventions have been found to be effective in enhancing the social participation of these students but we have to be, at the same time, aware of potential publication bias and generalizability, particularly due to small sample sizes.

Intervention studies included elements of inclusive pedagogical practices being implemented, such as peer models, peer-mediated practice, social skills training, peer network interventions and other. This is a significant implication for inclusive practice. In other words, social participation of students with ASD can be majorly influenced by the pedagogical practices and climate as opposed to being a sole individual characteristic of these students. We know that students with ASD may particularly struggle with social interactions and communication, however changing the pedagogy, instructional practices and climate may help those students improve their social skills and acceptance by peers. Florian and Black-Hawkins (2011) argue that a key element to enhancing social participation and inclusion in general is implementing inclusive pedagogy. Diverse students, especially students who have been identified as having ASD, may be particularly vulnerable to exclusion from the culture, curriculum and community of general education schools, especially secondary schools, because of the deterministic beliefs that may underpin them (Florian, 2013; Hart, 2004) and therefore may benefit substantially from inclusive pedagogical practices. Florian and Black-Hawkins (2011, p. 818) propose three main principles that are required for successful inclusive pedagogy:

1. A shift in focus from one that is concerned with only those individuals who have been identified as having 'additional needs', to learning for all—the idea of everybody (not most and some);
2. Rejection of deterministic beliefs about ability; and
3. Ways of working with and through other adults that respect the dignity of learners as full members of the community of the classroom.

A study by Ainscow, Booth, and Dyson (2006) examined what needs to happen in order to develop inclusive practices in schools. They concluded that the development of inclusive practice involves social learning processes within a given workplace that influence people's actions and, indeed, the thinking that informs these actions. Therefore, developing inclusive practices must take account of such social processes of learning that go on within particular contexts (Ainscow & Sandill, 2010).

As more and more students with ASD are included in elementary and secondary general education settings (NCES, 2017; Wilkinson & Twist, 2010), it is imperative to ensure that these students are actively participating in social interactions and networks as well as in learning. Our review has shown that 'locational' inclusion or mere access to a general education setting does not necessarily imply enhanced social participation for students with ASD. Therefore, school culture, pedagogical thinking and action, leadership styles and organizational structures of schools need to be adjusted to ensure enhanced social participation, not only for students with ASD but for all students, particularly those who are at higher risk of exclusion and are traditionally marginalized and underserved (Ainscow et al., 2006; Ainscow & Sandill, 2010; Florian & Black-Hawkins, 2011).

5. Conclusion

In sum, this systematic review of the literature provides important insights into the different aspects of social participation of student with ASD in general education settings. The results from reviewing the 24 studies have shown that inclusion of these students in mainstream schools both enhances and inhibits their social participation. Studies conducted in inclusive elementary schools yielded more positive results, however these results could also partly be attributed to intervention publication bias, which is an inherent limitation of intervention studies. As noted earlier, Sham and Smith (2014) provided evidence that such bias exists. Statistically significant intervention results are more likely to be published than studies with null findings. This may be true for the intervention studies reported in this review as the reviewed intervention studies produced almost exclusively positive social participation results.

As discussed in the previous section, these findings have important implications for transforming inclusive practice. Moving forward, it is imperative to critically reflect and act upon improving social participation, particularly in secondary schools. This may be enhanced by investing more in enhancing inclusive pedagogical practices and culture, as well as training educators to better cater for the particular needs of students with ASD. In terms of future research directions, we would argue for intervention studies to include a more representative set of participants as the small sample sizes across the majority of the reviewed intervention studies

restrict their generalizability. Longitudinal research designs would also be beneficial in tracking the social participation and evolution of social relationships for students with ASD. Last but not least, more research is needed to elicit these students' voices and understand their perspectives.

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References

Ainscow, M. (1999). *Understanding the development of inclusive schools.* London: Falmer Press.

Ainscow, M., Booth, T., & Dyson, A. (2006). *Improving schools, developing inclusion.* London: Routledge.

Ainscow, M., & Sandill, A. (2010). Developing inclusive education systems: The role of organisational cultures and leadership. *International Journal of Inclusive Education, 14*(4), 401–416.

APA (2020). Autism. Retrieved September 22, 2020, from http://www.apa.org/topics/autism.

Avramidis, E., Strogilos, V., Aroni, K., & Kantaraki, C. T. (2017). Using sociometric techniques to assess the social impacts of inclusion: Some methodological considerations. *Educational Research Review, 20,* 68–80.

Banda, D. R., Hart, S. L., & Liu-Gitz, L. (2010). Impact of training peers and children with autism on social skills during center time activities in inclusive classrooms. *Research in Autism Spectrum Disorders, 4*(4), 619–625.

Barnard, J., Prior, A., & Potter, D. (2000). *Inclusion and autism: Is it working?: 1,000 examples of inclusion in education and adult life from the National Autistic Society's members.* London: National Autistic Society.

Booth, T., & Ainscow, M. (2011). *Index for inclusion: Developing learning and participation in schools.* Bristol: CSIE.

Boutot, A. E., & Bryant, D. P. (2005). Social integration of students with autism in inclusive settings. *Education and Training in Developmental Disabilities, 40*(1), 14–23.

Centers for Disease Control and Prevention (2018). *Community report on autism 2018.*

Centers for Disease Control and Prevention (2020). What is autism spectrum disorder. Retrieved September 22, 2020, from https://www.cdc.gov/ncbddd/autism/index.html.

Chamberlain, B., Kasari, C., & Rotheram-Fuller, E. (2007). Involvement or isolation? The social networks of children with autism in regular classrooms. *Journal of Autism and Developmental Disorders, 37*(2), 230–242.

Conn, C. (2013). Investigating the social engagement of children with autism in mainstream schools for the purpose of identifying learning targets. *Journal of Research in Special Educational Needs, 14*(3), 153–159.

De Vroey, A., Struyf, E., & Petry, K. (2016). Secondary schools included: A literature review. *International Journal of Inclusive Education, 20*(2), 109–135.

ESSA (2015). *Every Student Succeeds Act of 2015, Pub. L. No. 114-95 § 114 Stat. 1177.*

Evans, J., & Lunt, I. (2002). Inclusive education: Are there limits? *European Journal of Special Needs Education, 17*(1), 1–14.

Florian, L. (2008). Inclusion: Special or inclusive education: Future trends. *British Journal of Special Education, 35*(4), 202–208.

Florian, L. (2013). *The Sage handbook of special education: Two volume set.* Sage.

Florian, L., & Black-Hawkins, K. (2011). Exploring inclusive pedagogy. *British Educational Research Journal, 37*(5), 813–828.

Florian, L., Black-Hawkins, K., & Rouse, M. (2017). *Achievement and inclusion in schools.* London: Routledge.

Freitag, S., & Dunsmuir, S. (2015). The inclusion of children with ASD: Using the theory of planned behaviour as a theoretical framework to explore peer attitudes. *International Journal of Disability, Development and Education, 62*(4), 405–421.

Garrote, A., Dessemontet, R. S., & Opitz, E. M. (2017). Facilitating the social participation of pupils with special educational needs in mainstream schools: A review of school-based interventions. *Educational Research Review, 20,* 12–23.

Graham, L. J., & Harwood, V. (2011). Developing capabilities for social inclusion: Engaging diversity through inclusive school communities. *International Journal of Inclusive Education, 15*(1), 135–152.

Hansen, J. H. (2012). Limits to inclusion. *International Journal of Inclusive Education, 16*(1), 89–98.

Harper, C. B., Symon, J. B., & Frea, W. D. (2008). Recess is time-in: Using peers to improve social skills of children with autism. *Journal of Autism and Developmental Disorders, 38*(5), 815–826.

Hart, S. (2004). *Learning without limits.* UK: McGraw-Hill Education.

Hochman, J. M., Carter, E. W., Bottema-Beutel, K., Harvey, M. N., & Gustafson, J. R. (2015). Efficacy of peer networks to increase social connections among high school students with and without autism spectrum disorder. *Exceptional Children, 82*(1), 96–116.

Humphrey, N., & Lewis, S. (2008). 'Make me normal': The views and experiences of pupils on the autistic spectrum in mainstream secondary schools. *Autism, 12*(1),

23–46.

Humphrey, N., & Symes, W. (2010a). Responses to bullying and use of social support among pupils with autism spectrum disorders (ASDs) in mainstream schools: A qualitative study. *Journal of Research in Special Educational Needs, 10*(2), 82–90.

Humphrey, N., & Symes, W. (2010b). Perceptions of social support and experience of bullying among pupils with autistic spectrum disorders in mainstream secondary schools. *European Journal of Special Needs Education, 25*(1), 77–91.

Humphrey, N., & Symes, W. (2011). Peer interaction patterns among adolescents with autistic spectrum disorders (ASDs) in mainstream school settings. *Autism, 15*(4), 397–419.

IDEA (2004). *Individuals with Disabilities Education Act, 20 U.S.C. § 1400.*

Jones, A. P., & Frederickson, N. (2010). Multi-informant predictors of social inclusion for students with autism spectrum disorders attending mainstream school. *Journal of Autism and Developmental Disorders, 40*(9), 1094–1103.

Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., ... King, B. (2015). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology and Psychiatry, 57*(2), 171–179.

Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and friendships at school: Comparing children with and without ASD. *Journal of Autism and Developmental Disorders, 41*(5).

Kasari, C., Rotheram-Fuller, E., Locke, J., & Gulsrud, A. (2012). Making the connection: Randomized controlled trial of social skills at school for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry, 53*(4), 431–439.

Keen, D., & Ward, S. (2004). Autistic spectrum disorder: A child population profile. *Autism, 8*(1), 39–48.

Keen, D., Webster, A., & Ridley, G. (2016). How well are children with autism spectrum disorder doing academically at school? An overview of the literature. *Autism, 20*(3), 276–294.

Koster, M., Nakken, H., Pijl, S. J., & van Houten, E. (2009). Being part of the peer group: A literature study focusing on the social dimension of inclusion in education. *International Journal of Inclusive Education, 13*(2), 117–140.

Koster, M., Pijl, S. J., Nakken, H., & Van Houten, E. (2010). Social participation of students with special needs in regular primary education in the Netherlands. *International Journal of Disability, Development and Education, 57*(1), 59–75.

Lewis, A. (1995). *Children's understanding of disability.* London: Routledge.

Locke, J., Ishijima, E. H., Kasari, C., & London, N. (2010). Loneliness, friendship quality and the social networks of adolescents with high-functioning autism in an inclusive school setting. *Journal of Research in Special Educational Needs, 10*(2), 74–81.

Locke, J., Rotheram-Fuller, E., & Kasari, C. (2012). Exploring the social impact of being a typical peer model for included children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 42*(9), 1895–1905.

Mavropoulou, S., & Sideridis, G. D. (2014). Knowledge of autism and attitudes of children towards their partially integrated peers with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 44*(8), 1867–1885.

NCES - National Center for Education Statistics (2017). *Percentage distribution of students 6 to 21 years old served under Individuals with Disabilities Education Act (IDEA), Part B, by educational environment and type of disability: Selected years, fall 1989 through fall 2013, Table 204.60.*

Owen-Deschryver, J. S., Carr, E. G., Cale, S. I., & Blakeley-Smith, A. (2008). Promoting social interactions between students with autism spectrum disorders and their peers in inclusive school settings. *Focus on Autism and Other Developmental Disabilities, 23*(1), 15–28.

Pearce, M., Gray, J., & Campbell-Evans, G. (2010). Challenges of the secondary school context for inclusive teaching. *Issues in Educational Research, 20*(3), 294–313.

Rafferty, Y., Boettcher, C., & Griffin, K. W. (2001). Benefits and risks of reverse inclusion for preschoolers with and without disabilities: Parents' perspectives. *Journal of Early Intervention, 24*(4), 266–286.

Rotheram-Fuller, E., Kasari, C., Chamberlain, B., & Locke, J. (2010). Social involvement of children with autism spectrum disorders in elementary school classrooms. *Journal of Child Psychology and Psychiatry, 51*(11), 1227–1234.

Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2005). Publication bias in meta-analysis. *Publication bias in meta-analysis: Prevention, assessment and adjustments* (pp. 1–7). .

Rowley, E., Chandler, S., Baird, G., Simonoff, E., Pickles, A., Loucas, T., & Charman, T. (2012). The experience of friendship, victimization and bullying in children with an autism spectrum disorder: Associations with child characteristics and school placement. *Research in Autism Spectrum Disorders, 6*(3), 1126–1134.

Sham, E., & Smith, T. (2014). Publication bias in studies of an applied behavior-analytic intervention: An initial analysis. *Journal of Applied Behavior Analysis, 47*(3), 663–678.

Sreckovic, M. A., Hume, K., & Able, H. (2017). Examining the efficacy of peer network interventions on the social interactions of high school students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 47*(8), 2556–2574.

Symes, W., & Humphrey, N. (2010). Peer-group indicators of social inclusion among pupils with autistic spectrum disorders (ASD) in mainstream secondary schools: A comparative study. *School Psychology International, 31*(5), 478–494.

Symes, W., & Humphrey, N. (2012). Including pupils with autistic spectrum disorders in the classroom: The role of teaching assistants. *European Journal of Special Needs Education, 27*(4), 517–532.

The United Nations (2006). *Convention on the rights of persons with disabilities. Treaty series. 2515*, 3.

U.S. Department of Education (2005). Twenty-seventh annual report to Congress on the implementation of the individuals with Disabilities Education Act, parts B and C. Retrieved from https://www.ed.gov/about/reports/annual/osep/2005/parts-b-c/index.html.

UNESCO (1994). *Salamanca statement and framework for action on special needs education.*

Wainscot, J. J., Naylor, P., Sutcliffe, P., Tantam, D., & Williams, J. V. (2008). Relationships with peers and use of the school environment of mainstream secondary school pupils with Asperger syndrome (high-functioning autism): A case-control study. *International Journal of Psychology and Psychological Therapy, 8*(1), 25–38 (ISSN 1577-7057).

Wilkinson, K., & Twist, L. (2010). *Autism and educational assessment: UK policy and practice.* Slough: NFER.

Wolfberg, P., Dewitt, M., Young, G. S., & Nguyen, T. (2014). Integrated play groups: Promoting symbolic play and social engagement with typical peers in children with ASD across settings. *Journal of Autism and Developmental Disorders, 45*(3), 830–845.

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., ... Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders, 45*(7), 1951–1966.

Zeedyk, S. M., Cohen, S. R., Eisenhower, A., & Blacher, J. (2016). Perceived social competence and loneliness among young children with ASD: Child, parent and teacher reports. *Journal of Autism and Developmental Disorders, 46*(2), 436–449.