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A Systematic Review of How Peer-Mediated Interventions Impact Students Without Disabilities

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Abstract

Peer-mediated interventions (PMIs) offer substantial academic and social benefits to adolescents served under the special education categories of intellectual disability, autism, and multiple disabilities (i.e., intellectual and developmental disabilities [IDD]). However, limited attention has focused on the impact of PMI on participating peers without disabilities. This systematic review identified all experimental (e.g., single case, group experimental) and descriptive (e.g., qualitative, survey) studies addressing PMIs implemented at the secondary level with students with IDD. Among the 98 PMI studies that we identified in this review, 66 (67.3%) studies included some qualitative or quantitative measure of peer impact. Across these studies, the impact on peers was addressed in 10 different areas. This review provides new insights into the ways peer impact has been evaluated and how peers have been impacted by their PMI experience. Recommendations for research and practice aimed at addressing the benefits of involving peers without disabilities in these interventions are provided.

Keywords

peer-mediated intervention, peers, intellectual and developmental disabilities, systematic review

Responsibility for the education of students served under the special education categories of intellectual disability, autism, and multiple disabilities is assumed by a host of different educational professionals (e.g., special and general educators, related service providers, paraprofessionals). Each brings expertise and experience that can be critical to the learning and personal development of students with intellectual and developmental disabilities (IDD).[1] At the same time, peers can also play a prominent role in supporting the social and academic participation of students with IDD. There are multiple reasons for involving peers in providing support or assistance to their schoolmates with IDD (Carter, 2018). Peers are a natural and ubiquitous source of support. They are available in abundance across classrooms and noninstructional school activities (e.g., lunch, extracurriculars, field trips). Peers can also be excellent social mediators given their familiarity with local peer culture, school norms, and the nuanced ways in which adolescents socialize. Finally, peer-delivered support may reduce the inadvertent stigma of receiving one-to-one support from a special educator or paraprofessional.

Peer-mediated interventions (PMIs) are an effective approach for involving peers in the education and support of students with IDD. For the purpose of this article, a PMI refers to a formal and sustained experience in which peers without disabilities are taught or directed by an adult to implement instructional programs, behavioral interventions, and/or facilitate social interactions in support of students with disabilities (Chan et al., 2009). For example, peers have been involved in promoting general education participation (peer support arrangements; Brock & Huber, 2017), providing instruction on academic content (peer tutoring; Jimenez et al., 2012), fostering social connections outside of the classroom (peer networks; Carter, in press), promoting communicative competence (communication device interventions; Biggs et al., 2017), and expanding social opportunities at school (peer partner programs; Copeland et al., 2004). An extensive series of reviews have demonstrated that PMIs can positively impact the social and academic outcomes of students with IDD using a range of approaches (e.g., Brock & Huber, 2017; Chan et al., 2009). Indeed, PMIs are firmly considered an evidence-based practice. PMIs have been particularly advocated for in secondary schools, as supporting the academic and social participation of adolescents with IDD can be especially challenging (Carter, 2018).

In contrast, the impact of these interventions on participating peers has received far less attention in the literature.

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Understanding the specific ways that peers are impacted as a result of their participation in a PMI is important for many reasons. First, peers make up more than half of all the participating students in a PMI. Therefore, it is important to know whether and how they may be affected by their involvement. Second, PMIs are often advocated as a way of enhancing the relationships among students with and without IDD. Thus, it is important to know whether those relationships are mutually beneficial or reciprocal. Third, understanding the impact on peers—if indeed it is positive—could help advance the use of PMIs more widely in schools.

To date, only one review has addressed how peers are affected by their experiences in PMIs. Schaefer et al. (2016) identified 53 studies involving PMIs across grade levels. They summarized various changes in the social and academic behaviors of peers as they participated in interventions, as well as reviewed findings from social validity assessments. Overall, their findings suggested peers can be positively impacted by involvement in these interventions. However, their review was limited to published intervention studies and focused only on PMIs involving students with intellectual disability. In the current review, we expand upon the work of Schaefer et al. in three primary ways. First, our review includes both published (journal articles) and unpublished (i.e., dissertations, theses) studies. Second, we expand beyond experimental studies to also include descriptive studies that speak to areas of peer impact. Third, we incorporate studies that include students with autism and multiple disabilities, along with students who have an intellectual disability, to understand the impact on peers who support students under the broad umbrella of IDD. Such students are often served on the caseloads of special educators who serve students with "low-incidence" or "severe" disabilities.

The purpose of this systematic review is to examine the impact of involvement on peers without disabilities who have participated in a formal and sustained PMI experience alongside secondary students with IDD. We address the following research questions:

Research Question 1 (RQ1): To what extent has the PMI literature examined the impact on middle and high school peers?
Research Question 2 (RQ2): In what ways has the impact on peers been evaluated?
Research Question 3 (RQ3): How are peers affected by their involvement in PMIs?

Method

Inclusion Criteria

Studies had to meet five inclusion criteria. The first four criteria identified all peer-mediated studies; the fifth criterion identified the subset of articles examining the impact on peers. First, studies were published in English prior to May 2020. We set no lower limit on the year of publication. Second, the study involved delivery of some form of PMI, defined as a formal and sustained experience among students with and without disabilities, whereby peers are taught or directed by an adult to implement instructional programs and behavioral interventions, and/or facilitate social interactions (Chan et al., 2009). Studies could involve experimental examinations of a PMI using single-case (e.g., Arceneaux & Murdock, 1997) or group-experimental designs (e.g., Carter et al., 2016). Likewise, they could involve descriptive examinations of a PMI using qualitative (e.g., Schlieder, 2013) or survey (e.g., Hunsaker, 2014) methods. Third, the PMI focused primarily on students with IDD as indicated by special education category (i.e., intellectual disability, autism, multiple disabilities), IQ score, or other testing (e.g., Autism Diagnostic Observation Schedule [ADOS] score) or related labels (e.g., severe disabilities, profound disabilities). For studies with mixed samples, more than 50% of students must have had an IDD or their results must have been disaggregated. Fourth, participating peers without IDD were enrolled in middle or high school (i.e., Grades 6–12). Fifth, studies reported data addressing the impact of involvement on participating peers without disabilities. We defined peer impact broadly as any reported effect or influence on peers resulting from their time spent alongside the students with IDD during the PMI. Peer impact did not include general feelings about their role as a peer or views of the PMI procedures or goals.

Search Procedures

We searched the entire electronic ProQuest database, inclusive of dissertations and theses; ERIC; and PsycInfo. We used a combination of terms for PMIs, including the names of common intervention approaches, the targeted age level, and disability category (see Figure 1). The search was inclusive of peer-reviewed journal articles, dissertations, and theses. We reviewed all article references (i.e., ancestral search) and conducted an electronic search to locate studies citing each of the articles (i.e., forward search) to locate any additional articles.

Screening of Articles

The initial search was conducted in October 2018 and yielded 808 unique records. We used three rounds of screening and review to identify articles meeting all inclusion criteria. First, we screened all titles and abstracts, retaining articles that could not easily be excluded based on the first four inclusion criteria. The second author screened 20% of the initial search results ($n = 162$). Agreement was 97.0%. We then reviewed the full text of retained articles ($n = 118$) to determine alignment with the first four inclusion criteria.

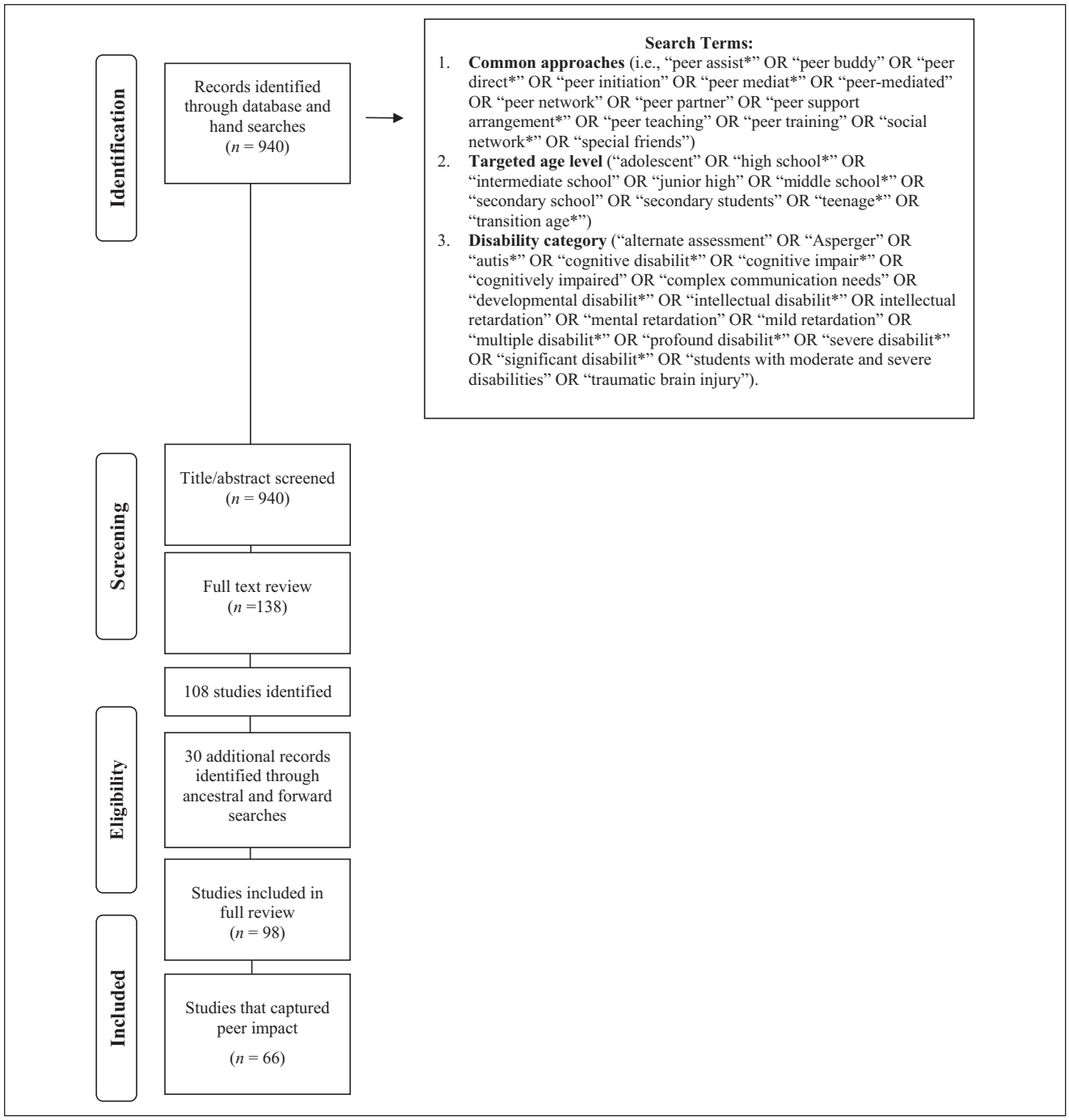

Figure 1. PRISMA diagram.

All relevant articles identified through ancestral and forward searches ($n = 30$) were screened using the same procedures. We retained 88 studies. Two graduate students reviewed the full text of 28 articles (31.5% of articles). Agreement was 100%. Finally, the second author reviewed all articles meeting all five inclusion criteria ($n = 60$). Agreement was 100%. We updated the search in May 2020 using the same search terms, criteria, and processes. This search yielded an additional 132 unique records. The first author screened all new titles and abstracts and again retained articles that could not be easily excluded based on the first four inclusion criteria. This yielded 20 potentially relevant articles. The second author independently screened 20% of the initial search results ($n = 27$); reliability was 96.3%. We retained 10 studies. A graduate student reviewed the full text of four articles (40.0% of articles). Agreement

was 100%. Finally, the same graduate student reviewed all articles meeting all five inclusion criteria ($n = 66$). Agreement was 100%.

Coding Procedures

This article examines peer impact—how it was documented and what was found. Information on the characteristics and recruitment of peers, the students peers supported, and features of the PMIs are reported elsewhere in a companion review of all PMIs (Travers & Carter, 2021). We coded information related to how peer impact was assessed. Specifically, we coded (a) *who collected the information about peer impact* (i.e., researcher, school staff, other, unknown), (b) *the measurement approaches used to collect peer impact data* (i.e., interview, focus group, survey with open-ended questions, survey with Likert-type questions, direct observation, other), (c) *who provided information about peer impact* (i.e., peers involved in the intervention, students with disabilities, parents of students with disabilities, parents of peers, peers not directly involved in the intervention, general educators, special educators, paraprofessionals, other), and (d) *when peer impact was measured* (i.e., postintervention only, pre- and postintervention, throughout the study).

To synthesize how peers were impacted, we used a constant comparative method to develop categories reflecting distinct areas of impact (Corbin & Strauss, 2008). Although the constant comparative method is most frequently used to develop themes from qualitative data, we applied the principles of this method to organize all of our peer impact data—including both quantitative and qualitative data. In reading through studies, continuously creating open codes from interview and survey responses, as well as findings from experimental evaluations of peer impact, themes began to emerge. We continued to open code each study, focusing on both social validity findings and study results. Open coding for all 66 studies resulted in an initial set of 292 codes. Following the open coding, we went through multiple rounds of analyses to create axial codes from the open codes using thematic mapping while also noting code frequencies and representativeness. This process went through several more rounds until the themes that emerged were best supported by the data. Throughout the coding process, we employed peer debriefing. First, the second author was presented with all of the open codes created by the first author to confirm the validity of the initial findings. Then, each author independently created axial codes from the set of open codes to provide strong evidence of credibility. Emergent themes were discussed and narrowed down to 10 major themes related to how peers are impacted as a result of their involvement in PMIs (see "Findings" section).

To determine the interrater reliability on the coding of the 66 articles, two graduate students in special education were trained on the coding and independently coded a total of 21 randomly selected studies (31.2%). Interrater reliability averaged 90.0% (range = 82.5%–98.2%). Following the coding of each article, discrepancies were discussed until consensus was reached.

Findings

To What Extent Has the PMI Literature Examined the Impact on Peers?

Ninety-eight studies have examined PMIs at the secondary level (i.e., middle and high school) involving students with and without IDD (i.e., intellectual disabilities, autism, multiple disabilities). Only 66 (67.3%) of these studies also examined how the peers were impacted as a result of their involvement (i.e., studies meeting all five inclusion criteria). Forty-six studies were from peer-reviewed journals, whereas the remaining 20 studies were a combination of theses and dissertations. Because the focus of this review is on studies examining peer impact, we first describe findings related to how impact was measured for the 66 studies and then we describe how peers were impacted.

In What Ways Has the Impact on Peers Been Evaluated?

In this section, we address (a) who collected the information related to peer impact, (b) the measurement tools that were used, (c) who provided information about how peers were impacted, and (d) when peer impact was measured. Before doing so, we briefly summarize the characteristics of the peers involved in this subset of impact studies. Within the 66 included studies, 3,224 peers met the inclusion criteria. This reflects a conservative estimate as four studies did not report the specific number of participating peers (i.e., Koegel et al., 2013; Leigers et al., 2017; Scheef et al., 2018; Schlieder, 2013). Most peers were female (50.6%) and 56.9% were White, non-Hispanic. Most studies (56.1%) did not report the ages of some or all of the peers involved in the PMI. However, all peers attended the same schools as the focus students, suggesting similar ages. In terms of school level, 38 studies took place in high schools, 28 took place in middle schools, one study took place in a sixth-grade classroom in a primary school (i.e., Bensted, 2000), and school level was not reported for one study (Tekin-Iftar, 2003). Two studies (i.e., Carter et al., 2005; Leigers et al., 2017) took place at both middle and high schools. Only 5.1% of peers across 21 studies were reported to have had prior disability experience.

Who collected peer impact data and what measurement tools were used? A member of the research team collected peer impact data (e.g., conducted the interview, distributed the

survey) in 95.5% of the studies. In contrast, two studies had school staff collect peer data, one study had someone naïve to the study interview peers, and three studies analyzed student written material from a class assignment. A diverse range of measurement tools was used. Most common were surveys with one or more Likert-type questions ($n = 31$). Other tools included surveys with open-ended questions ($n = 21$), individual interviews ($n = 12$), focus groups ($n = 6$), direct observations ($n = 14$), and direct measures (i.e., test scores to assess academic gains; $n = 8$). Ten studies used other approaches: anecdotal conversations with the peers or school staff or informal observations ($n = 4$), informal follow-up surveys or discussions with the peers ($n = 3$), students' written reflections ($n = 2$), and individual interviews with the peer/target student dyads ($n = 1$). Thirty studies employed multiple tool types (see Table 1).

Ten studies collected experimental peer impact data that allowed for causal claims related to the outcomes for peers. These studies either (a) measured and reported a peer behavior over time such that visual analysis could be used to determine a functional relation (Bensted, 2000; Cushing & Kennedy, 1997; McDonnell et al., 2001; Shukla et al., 1998) or (b) compared pre- and postscores on a measurement tool between the peers and a control group of peers who did not participate in the PMI (Carter et al., 2001; Haring et al., 1987; Hunsaker, 2014; R. Johnson et al., 1983; Siperstein et al., 2019; Wilson, 1998). The majority of studies ($n = 61$) used researcher-designed measures to capture peer impact. In contrast, eight studies incorporated a published tool (e.g., the Social Connections and Relationships Assessment, the School Intervention Rating Form [SIRF], the Social Distance Questionnaire for Attitudes of High School Students Toward Handicapped Persons [SDQ], the Chedoke–McMaster Attitudes Toward Children with Handicaps [CATCH]).

Who provided information about how peers were impacted? Most studies collected information from the peers themselves ($n = 54$). Other peer impact data came from general educators ($n = 14$ studies), paraprofessionals ($n = 12$ studies), special educators ($n = 7$ studies), parents of peers ($n = 3$ studies), or others (e.g., guidance counselor, school psychologist, speech language pathologists, program manager/facilitator, coach, researcher; $n = 11$ studies). Twenty-seven studies collected information from multiple persons (e.g., peers and general education teachers). Eighteen studies relied on direct observation of peer behavior or examined potential changes in peer grades.

When was peer impact measured? Forty-eight studies used measurement tools post-PMI only, 14 studies included pre–post measures, and 12 studies used measurement tools throughout the PMI. A single study could use multiple measurement tools to collect peer impact data at multiple time points. For example, Cook (2017) provided peers with a closed-ended survey post-PMI only, collected student grades pre- and post-PMI, and collected descriptive observational data related to peers socialization with the students with disabilities throughout the PMI.

How Are Peers Affected by Their Involvement in PMI?

The reported impact on peers spanned 10 different areas (see Table 1 for a summary of studies by area, along with the measurement approaches used to document this impact). For each of the 10 thematic areas, we first discuss targeted responses followed by open-ended responses. Targeted responses indicate the researcher or measure specifically asked the peer or adult to address the thematic area in question or the researcher purposefully measured the thematic area. Open-ended responses indicate the peer or adult was not specifically asked about the thematic area; instead, their response to a general question or prompt aligned with the thematic area.

Social impact. Social impact on peers was found in more than half (56.7%) of studies. They addressed (a) the development or continuation of friendships, (b) new or maintained interactions with students, or (c) general references to an interpersonal impact.

Targeted responses. As shown in Table 1, 16 studies documented social impact through one or more closed-ended survey items. Thirteen of these studies used close variations of the same social validity survey (e.g., Carter et al., 2016) in which peers rated whether they considered their partner with disabilities to be a friend and/or whether they benefited socially from their role using a 4- or 5-point Likert-type scale (i.e., *strongly disagree* to *strongly agree*). Average ratings across studies indicated that peers considered their partners with disabilities to be their friends (M range across studies = 3–5) and most peers benefited socially (M range across studies = 3.3–5). Intervention facilitators similarly agreed that peers benefited socially. Likewise, peers from Bambara et al. (2016) indicated that the PMI produced positive social outcomes for themselves (i.e., $M = 6.1$ on a 7-point scale). Koegel et al. (2013) asked six peer network members whether they made new friends (response options were limited to yes or no); five responded yes and two named the student with disabilities as that new friend. Siperstein et al. (2019) asked peers who were part of a Unified Champion Schools (UCS) program to complete both a prosocialness and social inclusion survey before and after their participation. Results of the measures suggest participation in the UCS program significantly predicted increased social interactions with students with intellectual disability. Finally, using direct observations, three studies documented

Table 1. Summary of Peer Impact by Primary Intervention Approach, Study, Area, and Measurement Approach.

Study	Social	Views	Future	Academic	Knowledge	Personal qualities	Skills	Self-perception	Enjoyment	General benefits
Peer support arrangements										
Asmus et al. (2016)	C	C	C	C	—	—	—	—	C	—
Bensted (2000)	—	—	—	D/G	I	—	—	I	—	—
Biggs et al. (2017)	C/O	C	C	C	—	—	—	—	C	—
Brock et al. (2016)	O	—	O	—	—	O	—	—	O	—
Carter et al. (2016)	C	C	C	C	—	—	—	—	C	—
Carter et al. (2005)	—	—	—	D	—	—	—	—	—	—
Carter et al. (2017)	C/O	C	C	C	—	—	—	—	C	—
Carter et al. (2011)	I	I	I	—	—	—	—	—	—	—
Cook (2017)	I/D	—	I	G	I	I	—	—	I	—
Cushing & Kennedy (1997)	—	—	—	D/G	—	—	—	—	—	—
Huber et al. (2018)	C	C	C	C	—	—	—	—	C	—
Leigers et al. (2017)	I	—	I	—	—	—	—	—	—	I
Mahoney (2019)	C/O	—	—	C	—	—	—	—	C	—
Perales (2019)	—	O	O	—	O	—	O	—	O	—
Riesch (2013)	C/F/O	C/F	C/F	C/F	F	F	—	F	C	—
Schaefer et al. (2018)	—	O	C	—	—	—	—	—	O	—
Scheef et al. (2018)	—	—	—	—	—	—	—	—	W	—
Shukla et al. (1998)	—	—	—	D	—	—	—	—	—	—
Shukla et al. (1999)	—	—	—	D	—	—	—	—	—	—
Staub et al. (1996)	I	I	—	—	I	I	—	I	—	—
Peer network interventions										
Asmus et al. (2016)	C	C	C	C	—	—	—	—	C	—
Asmus et al. (2017)	C	C	C	C	—	—	—	—	C	
Bambara et al. (2018)	—	—	—	—	—	—	C/D	—	—	C
Bambara et al. (2016)	C	—	—	—	—	—	D	—	—	—
Born (2015)	C/O	C/O	C	C	O	O	O	—	C	—
Brain & Mirenda (2019)	C	—	C	—	—	—	—	—	C	—
Buzeta (2012)	D/I/F	I/F	I/F	—	F	I	I	F	—	I/F
Collet-Klingenberg et al. (2012)	—	F	—	—	F	—	—	F	—	—

(continued)

Table 1. (continued)

Study	Social	Views	Future	Academic	Knowledge	Personal qualities	Skills	Self-perception	Enjoyment	General benefits
Gardner et al. (2014)	C	C	C	—	O	—	O	—	C	C
Haring & Breen (1992)	O	O	—	—	—	—	—	—	—	A
Hochman et al. (2015)	C	C	C	—	—	O	—	—	C	C
Koegel et al. (2013)	C	—	—	—	—	—	—	—	—	—
Leigers et al. (2017)	I	—	I	—	—	—	—	I	—	I
Riesch (2013)	C/F/O	C/F	C/F	C/G	—	F	—	—	C	—
Sreckovic et al. (2017)	C/O	C	C	—	O	—	O	—	C	—
Peer tutoring										
Fetko et al. (2013)	A	—	—	—	—	—	—	—	—	—
Haring et al. (1987)	D	C	C	—	—	C	—	—	—	—
Heinrich et al. (2016)	—	O	—	—	—	—	—	—	—	—
Hughes et al. (2002)	I	—	—	—	—	—	—	—	O	—
Hunsaker (2014)	—	C	—	—	A	—	—	—	—	—
Jameson et al. (2008)	—	—	C	—	—	—	—	—	—	C
Jimenez et al. (2012)	F	—	F	F/G	—	—	—	—	—	—
K. L. Johnson (2016)	W	W	—	—	W	—	W	W	—	W
Ley Davis (2016)	—	C	C	—	—	—	—	—	—	—
Tekin-Iftar (2003)	—	—	I	—	—	—	—	—	I	—
Whitfield (2016)	—	—	—	—	—	—	—	—	—	C
Wilson (1998)	I	I	—	G	—	I	—	—	I	—
Peer partner programs										
Carter et al. (2001)	—	C	C	—	—	C	—	—	—	—
Copeland et al. (2004)	F	F	—	—	—	F	—	F	F	—
Haring et al. (1987)	D	C	C	—	—	C	—	—	—	—
Hughes et al. (2001)	O	O	O	—	O	O	O	—	—	—
Knickelbein (1999)	I	I	—	—	I	—	I	I	—	I
Schlieder (2013)	I	I	I	—	I	I	—	—	—	—
Siperstein et al. (2019)	C	C	—	—	—	—	—	—	—	—

(continued)

Table 1. (continued)

Study	Social	Views	Future	Academic	Knowledge	Personal qualities	Skills	Self-perception	Enjoyment	General benefits
Social skills intervention										
Hughes, Harvey, et al. (2013)	I	I	—	—	I	I	—	—	—	—
Leinert (2013)	—	—	C	—	—	—	C	—	—	—
Lopez (2016)	—	—	—	—	—	—	C	—	—	—
Ogilvie (2008)	—	—	—	—	—	—	—	—	F	—
Potter (2014)	—	—	—	—	—	—	—	—	—	A
Skipper (2011)	O	O	O	—	O	O	O	—	O	—
Cooperative learning groups										
Cushing et al. (1997)	—	—	—	D/G	—	—	—	—	—	—
R. Johnson et al. (1983)	—	—	—	G	—	—	—	—	—	—
McDonnell et al. (2001)	—	—	—	D/G	—	—	—	—	—	—
Stroman (2019)	W/O	O	—	G	—	W	—	—	—	—
PMI targeting behavior										
Arceneaux & Murdock (1997)	—	—	—	—	—	—	—	—	O	—
Brock et al. (2018)	—	—	C	—	—	—	—	—	O	—
Donder & Nietupski (1981)	O	A	—	—	—	A	—	—	—	—
Communication device intervention										
Chung & Carter (2013)	I	—	—	—	—	—	—	—	—	I
Hughes, Bernstein, et al. (2013)	—	—	—	—	—	—	—	—	C	—
Hughes et al. (2011)	—	—	—	—	—	—	—	—	C	

Note. A = anecdotal data; C= close-ended survey; D = direct observation (live or video-based); O = open-ended survey; I = interview; F = focus group; G = grade; W = written reflection; PMI = peer-mediated intervention.

a social impact on peers (Buzeta, 2012; Cook, 2017; Haring et al., 1987).

Open-ended responses. Through open-ended surveys, interviews, anecdotal data (i.e., unprompted response or informal observation), or through student written reflections/essays, 27 studies found peers were socially impacted. Twelve studies used open-ended surveys. For example, Hughes et al. (2001) used an open-ended survey to ask 178 peers about the benefits they gained from participating in a peer partner program; 25.8% responded that they "made new friends" (p. 348) and 11.8% responded they "had more opportunities to interact with students with disabilities" (p. 349). Skipper (2011) surveyed peers and adults involved in a social skills intervention; one adult facilitator responded on the open-ended question that "Neurotypical peers are slowly building real friendships with [the students with autism]" (p. 77). Finally, when asked what they liked about their PMI, one peer from Mahoney (2019) responded "I talked to people I wouldn't normally talk to and I made new friends" (p. 64).

Using interviews (individual or group), 14 studies found peers were socially impacted. Most interviews were with peers and conducted *after* their involvement in the PMI. Within many studies, individual quotes pulled from interviews were used to illustrate social benefits. Sample comments from peers included the following: "just to be able to go and talk with someone who's different and actually be friends with them, that's really cool" (Chung & Carter, 2013, p. 105); and "I really like hanging out and being with her. I look forward to being with her in class. It's nice to have a new friend" (Carter et al., 2011, p. 120). Likewise, a teacher from Staub et al. (1996) said during her interview that peer partners—some of whom were themselves isolated—increased their social networks as a result of participating in a peer support arrangement.

Two studies examined student written products and found peers benefited socially. Peers from K. L. Johnson (2016) who participated in a peer tutoring intervention were asked to write a personal essay in response to the prompt "What do you feel you have gained as a result of being a peer tutor?" More than one quarter of peers (28%) wrote about gaining a new friend. Similarly, one of the recurring themes in the written reflections of peers from Stroman (2019) was the enjoyment of the friendships that the peers felt they were building with the students with autism spectrum disorder (ASD).

One study informally documented evidence of friendship development and maintenance. Fetko et al. (2013) found that two peers independently chose to continue working with the students with disabilities during the next school year. Furthermore, all the peers continued to interact with the students with disabilities outside of the intervention context (i.e., school hallways, cafeteria).

Changes in views. Thirty-four studies (51.5%) addressed changes in views. Peers changed their affect toward, expectations of, perspectives of, or comfort around individuals with disabilities.

Targeted responses. Sixteen studies documented peer changes in views through the use of closed-ended survey items. Eleven studies used a similar closed-ended survey asking peers to rate their agreement with the statement, "My views about students with disabilities have changed for the better." Using a 5-point Likert-type scale (*strongly disagree* to *strongly agree*), average peer ratings ranged from 3.6 to 4.7 across studies. Using the same scale, Ley Davis (2016) asked peers to rate two statements: "Peers with disability are a lot like me" and "I feel anxious/nervous when I have to be alone with a peer with a disability." For the first statement, average peer ratings decreased slightly from pre- to postintervention (4.8–4.6). Ratings for the second statement also dropped (1.6–1.0), indicating greater comfort around students with disabilities.

Carter et al. (2001) and Haring et al. (1987) used the SDQ to assess changes in affect on an eight-item subscale (e.g., "I feel afraid of people with disabilities," "I like having students with disabilities at our school"). Carter et al. found that peers who participated in a peer partner program scored significantly higher on the affect subscale postintervention than students who did not participate. Haring et al. measured peer affect before and after intervention but did not report findings by subscale. However, total SDQ scores indicated that attitudes of peers remained positive after one semester and differed from those of students who did not participate in a PMI. Finally, both Hunsaker (2014) and Siperstein et al. (2019) administered the CATCH to peers pre- and post-PMI. Hunsaker found significant pre–post differences between peers who did and did not participate in a peer tutoring PMI, indicating peer tutors had a more positive change in attitude. Siperstein et al. found that participation in the UCS program significantly predicted more positive attitudes at the end of the school year toward students with intellectual disability.

Open-ended responses. Through the use of open-ended surveys, interviews, and informal conversations, 20 studies found peers changed their views. Eight studies used open-ended surveys to document changes in views—only two did so before and after intervention. Responses to open-ended survey questions included the following: "They can learn new things, just like me" (Hughes et al., 2001, p. 347); "People with autism don't always mean what they do and they are just like everyone else" (Skipper, 2011, p. 77); and "It opened my eyes to how it's [intellectual disability] more of a spectrum not a clumped group" (Perales, 2019, p. 55).

Ten studies conducted interviews with peers post-PMI. Four of these studies (Buzeta, 2012; Carter et al., 2011;

Staub et al., 1996; Wilson, 1998) found that peers changed their views toward the student with disabilities from the PMI. The other six studies found that views of individuals with disabilities changed more generally. Sample comments by peers included the following: "there is much more to these kids than just the way they look or behave. They are regular kids like us" (Buzeta, 2012, p. 51); "I'm not a bad person, but before this project I wouldn't have been able to carry on a conversation with someone like my focus student. I think I had some misconceptions. By communicating with him, I have another view" (Carter et al., 2011, p. 120); and "I'm nicer to people who are different. I'm more comfortable when I see people outside of school now, I feel I understand them more" (Knickelbein, 1999, p. 74).

Peers from one study, Donder and Nietupski (1981), informally told their classroom teacher that they felt that students with disabilities "were not as different as they had originally thought" (p. 275) and were surprised at the "individual differences among the handicapped students themselves" (p. 275). Finally, in reviewing themes across end-of-semester student essays, K. L. Johnson (2016) found that nearly half (i.e., 75 of 151) of peers described changing their view of disabilities after participating as a peer tutor. Specific themes included "less fear for people with disabilities," "more respect," "amazed at achievements," "smarter than previously thought," and "recognition of individuality."

Future intentions. A total of 30 studies (45.5%) focused on peer intentions. The studies addressed how peers wanted to be involved with or support individuals with disabilities in the future.

Targeted responses. Nineteen studies used closed-ended surveys and found that peers wanted to continue supporting students with disabilities in the future. Many of these studies ($n = 16$) used variations of a single survey item—a 5-point scale (or 4-point; Biggs et al., 2017; or 6-point; Jameson et al., 2008) ranging from *strongly disagree* to *strongly agree*—to ask about the peers' desire to be a peer partner/peer support/peer tutor in the future. Average peer ratings across studies ranged from 3.8 to 5.0. Peers in Sreckovic et al. (2017) were the only ones who provided an average response less than 4. However, Sreckovic et al. also reported average peer ratings of 4.2 for the statement, "I would like to keep hanging out with the peers in my peer network." Using the same scale, Leinert (2013) reported average peer ratings of 3.7 (range = 3–5) in response to the statement, "I would like to do more activities with my peer buddy outside of the peer buddy program," and ratings of 3.8 (range = 3–5) for the statement, "I would like to eat lunch with my buddy again." Finally, two studies, Carter et al. (2001) and Haring et al. (1987), assessed future willingness to engage with individuals with intellectual disability outside of the PMI context. Both studies used the 20-item social willingness subscale of the SDQ (e.g., "I would talk to a person with intellectual disability during a break at school," "I would say hi to a student with intellectual disability if I knew who he was") to understand future intentions of peers. Carter et al. reported that peers in a semester-long peer partner program had significant increases in subscale scores and higher scores than students who did not participate. Haring et al. found that scores on the willingness subscale remained positive after one semester for all peers.

Open-ended responses. Twelve studies used open-ended surveys ($n = 4$) or interviews ($n = 8$) to document peers' future willingness to support and interact with students with disabilities. In particular, five of these studies found that peers were considering a vocation related to working with individuals with disabilities. During their interviews, several peers from Buzeta (2012) described their time as rewarding and said they hoped to work with individuals with disabilities in the future. Three peer mentors decided to become special education teachers and one wanted to work as a physical therapist. In interviewing peers, Schlieder (2013) found that several peers were interested in pursuing future careers in the areas of special education, speech language pathology, physical therapy, occupational therapy, and counseling after learning about their classmates with disabilities and the adults who worked with them. Several peers from Hughes et al. (2001) indicated that they were interested in a career in special education after being in a peer partner program. Two peers from Perales (2019) wrote in open-ended responses, "working with kids that do have disabilities made me realize I want to be a Physical Therapist and now that is what I am going to school to become, a Physical Therapist" (p. 54); and "being a peer support helped me decide that this [being a special education teacher] was a career that fit me" (p. 55). Finally, a special education teacher from Leigers et al. (2017) said during her interview that peer support and peer network members in her school may be exploring vocational roles involving work with diverse populations.

Academic impact. Almost one third (31.8%) of studies found that peers were impacted academically. This was through (a) increased academic engagement or responding or (b) change in grades.

Targeted responses. Nine studies used a single survey item to ask peers and/or adult facilitators whether peers "benefitted academically" from their involvement in a PMI. Postintervention ratings on a 5-point Likert-type scale (*strongly disagree* to *strongly agree*) ranged from 3.1 to 4.2 for peers and from 2.7 to 3.8 for adults.

Seven studies used direct observation to examine changes in engagement or responding, five of which compared a PMI

condition with a business-as-usual baseline condition (i.e., Bensted, 2000; Cushing & Kennedy, 1997; McDonnell et al., 2001; Shukla et al., 1998; Shukla et al., 1999). Baseline conditions varied across studies; however, none involved students with and without disabilities working together. All five studies found that peers had higher levels of academic engagement or responding when involved in a PMI. Furthermore, Cushing and Kennedy (1997) found that peers maintained high levels of engagement 1 month after being in a peer support arrangement. The other two studies compared PMI conditions. Carter et al. (2005) found that variations in the number of peers involved in peer support arrangements did not affect engagement positively or negatively. Cushing et al. (1997) found similar levels of academic engagement when peers worked individually versus in collaborative learning groups.

Ten studies examined changes in grades. Most peers in these studies were already high-achieving students and so ceiling effects meant no positive changes. Among lower achieving peers, however, academic gains were evident across time points. For example, one peer from Cook (2017) had an increase in test results from 25% preintervention to 75% postintervention. In contrast, three studies involved mixed or neutral findings. Cushing et al. (1997) documented greater academic growth for peers who worked independently than for peers involved in cooperative learning groups. One of nine peer tutors in Wilson (1998) had a lower grade average after the intervention, whereas the remaining eight students maintained or increased their grades from pre to post. Finally, one peer from Bensted (2000) had lower rates of homework completion while participating in a peer support arrangement. The designs of these studies make it impossible to clearly attribute changes in grades to serving as a peer partner within a PMI.

Increased knowledge about disabilities. Sixteen studies (24.2%) addressed changes in knowledge. Increases were found regarding (a) types of disabilities, (b) specific individuals with disabilities, or (c) how to interact with individuals with disabilities.

Targeted responses. Two studies used closed-ended surveys to document a change in peer knowledge. Both Carter et al. (2001) and Haring et al. (1987) examined changes in the 10-item knowledge subscale of the SDQ. Carter et al. found that peer partner program participants scored significantly higher on the knowledge subscale of the SDQ than peers who did not participate. Likewise, Haring et al. found that peers who participated in a peer tutoring intervention or a peer partner program scored higher on the entire SDQ measure than peers who did not participate.

Open-ended responses. Five studies used open-ended surveys to document a change in knowledge. For example, two peers from Brock et al. (2016) wrote that the best thing about being a peer partner was "getting to learn about and getting to know the student with a disability (p. 230). Born (2015) and Hughes et al. (2001) asked peers, "What has changed for you as a result of being in this project?" A peer in Born responded, "gaining awareness of disability" (p. 178). Similarly, several peers (i.e., 27 out of 169) in Hughes et al. addressed increased awareness of disability issues (e.g., "[I] realize that people don't want to be treated differently just because of a disability," "[I] now know that all students should be treated as equal and until this program did not know how excluded these students were," and "[I] gained more knowledge about students with disabilities and the day-to-day conflicts they encounter"; p. 348).

Seven studies used post-PMI interviews and found that peers developed new knowledge about people with disabilities. Sample peer responses included the following: "I got to learn so much about the kids" (Buzeta, 2012, p. 56) and "I learned a lot about working with children with disabilities" (Wilson, 1998, p. 146). Educators also affirmed this view. For example, Hughes, Harvey, et al. (2013) held interviews with general educators at the end of a social skills intervention. One teacher stated, "Quincy [the peer] was able to understand how different people interact" (p. 11).

Two other studies used less common measurement methods to learn how peers increased their knowledge. In analyzing themes from peers' written reflections, Stroman (2019) found peers had a new understanding of the nature of autism. Peers from Donder and Nietupski (1981) informally reported to the researchers that they felt the students with disabilities were not as "different" as they had originally thought.

Development of personal qualities. Sixteen studies (24.2%) addressed development of personal qualities. The qualities peers reported developing varied widely across studies.

Open-ended responses. Studies used open-ended surveys ($n = 6$), interviews ($n = 8$), collected anecdotal data ($n = 1$), and examined written reflections ($n = 1$) to document a change in the personal qualities of peers. These qualities varied by study: compassion (Buzeta, 2012; Gardner et al., 2014; Perales, 2019), outgoingness (Bensted, 2000; Cook, 2017; Knickelbein, 1999), responsibility (Staub et al., 1996), kindness (K. L. Johnson, 2016), empathy (Schlieder, 2013; Sreckovic et al., 2017), sensitivity to others (Hughes et al., 2001), and coping (Skipper, 2011). However, the most common reference was to patience. For example, peers in Born (2015) felt they had gained more patience and confidence, as well as an openness to try new activities. During a post-PMI focus group, a peer in Collet-Klingenberg et al. (2012) admitted she was now willing to give other students a chance when they were not behaving appropriately, as she had learned how to be more patient. Hughes, Harvey, et al.

(2013) reported that peers involved in a social skills intervention felt they had become more patient and understanding. Similarly, several peers interviewed in Knickelbein (1999) said that they learned to be more patient, understanding, and calm after working with a student during a peer partner program. More than half (52.3%) of all peer tutors in K. L. Johnson (2016) reported feeling they had increased their level of patience, both with themselves and others. Finally, teachers in Hunsaker (2014) said that peer tutors increased their patience and understanding.

Skill development. Thirteen studies (19.7%) found that peers developed skills. Mostly, this was in the form of communication or interpersonal skills.

Targeted responses. Three studies used closed-ended surveys to examine whether peers improved their conversational abilities. In response to, "I think the strategies and skills I learned helped me better interact with my Buddy," average rating of peers in Leinert (2013) was 4.5 on a 5-point scale. Ratings of peers in Lopez (2016) ranged from 3 to 5 on a 5-point scale in response to "Communication training in initiating and maintaining conversation has helped me support my peer in initiating and maintaining conversation." Average rating of peers in Bambara et al. (2018) was 4.8 on a 7-point scale, indicating that the peers felt the peer network intervention *somewhat* to *very much* helped them improve their conversational abilities.

Bambara et al. (2016, 2018) asked educators who were unaware of study conditions and intervention procedures to rate the quality of conversational interactions between the peers and the students with disabilities in short, randomly presented video clips. After viewing the clips, all educators noted substantial improvements from baseline to post–peer network intervention, suggesting peers learned new interaction skills.

Open-ended responses. Using open-ended surveys, six studies found peers developed their communication skills. When asked about what changed from being a peer partner, one peer in Born (2015) wrote, "I better understand how to interact with [my partner] and other students with similar disabilities" (p. 173). Twenty-six of 178 peers in Hughes et al. (2001) felt they had become more skilled at interacting with students with disabilities. A peer from Perales (2019) wrote "I think [the PMI] not only helped their communication and social skills but my own" (p. 54). One peer from Skipper (2011) wrote on her survey, "I think learning how to start a conversation and keep a conversation going has helped me and the people with autism" (p. 76). Sreckovic et al. (2017) found that "learning different ways to interact with people" (p. 2569) was a common response among peers. Finally, a peer in Gardner et al. (2014) wrote, "I've been able to communicate better with the [peer network group] but also with other people" (p. 112).

Two studies used interviews. A peer from Buzeta (2012) said she had learned to better interact with students with disabilities at school and at home. Peers from Knickelbein (1999) said they felt they had learned some specific communication skills. For example, one peer shared, "I've learned there are lots of ways to tell someone something besides talking" (p. 74).

One study, K. L. Johnson (2016), examined peer written reflections in response to the prompt "What do you feel you have gained as a result of being a peer tutor?" About half (49.7%) of the peers wrote that it helped them "learn skills for life and for the future" (p. 19). Peers cited skills such as "ability to deal with conflict with siblings," "the ability to deal with conflict with others," "improved communication skills," "feeling more prepared for parenthood," "increased problem-solving skills," "increased leadership skills," "teaching/mentoring skills," "learning to listen and pay attention," and "better general interactions with others" (pp. 17–19).

Changes in self-perception. Eight studies (12.1%) addressed changes in self-perceptions. Peers developed feelings of pride, a sense of accomplishment, self-worth, self-acceptance, and/or deeper appreciation of life.

Open-ended responses. Changes in self-perception were primarily addressed in interviews ($n = 7$). Peers in Collet-Klingenberg et al. (2012) talked about how the intervention made them more accepting of themselves. Some of the peers in Buzeta (2012) said that seeing schoolmates with disabilities struggle with daily tasks made them more appreciative of every moment. Staub et al. (1996) found that many peer aides were acknowledged and appreciated for helping others, leading to feelings of self-worth and self-esteem. Every peer in Knickelbein (1999) attributed their increases in self-esteem to participation in a peer partner program (e.g., "I stopped worrying about what other people think so much," "It makes you feel good about yourself for doing it," "You feel great when you help people out," and "I feel like I can help people with stuff and that makes me feel good about myself" [p. 75]). Peers in Copeland et al. (2004) said they experienced feelings of accomplishment as a result of their involvement in a high school peer partner program. Teachers from Bensted (2000) noted that the peers either had positive change or no change in their self-esteem. One PMI facilitator in Leigers et al. (2017) told the research team that "peers formed a sense of identity and gained 'social status'" (p. 80).

K. L. Johnson (2016) examined end-of-semester essays from peer tutors. More than one third (37.8%) of peers reported gaining some type of gratitude—for a healthy body, for life generally, and for their friendships. Furthermore, five peers addressed an increase in self-worth.

Enjoyment. Twenty-eight studies (42.4%) addressed peer enjoyment. All these studies found that peers were positive about their PMI experience.

Targeted responses. Thirteen studies used a similar survey item to ask how peers enjoyed their PMI. Peers responded using a 4- or 5-point scale ranging from *strongly disagree* to *strongly agree*. Average peer ratings ranged from 3.8 to 5.0. Using the same scale, teachers who supported a PMI targeting maladaptive behaviors (Brock et al., 2018) rated the statement "Peers enjoyed providing support to the student with autism" 4.8 on average. Hughes, Bernstein, et al. (2013) and Hughes et al. (2011) each used the same 5-point Likert-type scale to ask peers whether they enjoyed interacting with the students with disabilities during PMIs that targeted communication skills. In both studies, peers indicated they enjoyed their interactions (M range = 4.2–4.7).

Open-ended responses. Responses to open-ended surveys ($n = 6$), interviews ($n = 5$), and a writing prompt ($n = 1$) all indicated peers enjoyed their PMI experience. In particular, some peers connected their sense of enjoyment specifically to the act of helping others. In Brock et al. (2016), several peers wrote the best thing about being in a peer support arrangement was that they enjoyed helping other people. The only peer from Arceneaux and Murdock (1997) told researchers that working with a student with an intellectual disability "made her feel good" (p. 184). Three peer tutors interviewed in Wilson (1998) said that "helping was a good feeling" (p. 146). All peers in Schaefer et al. (2018) rated that they "very much" enjoyed helping students. Finally, one peer in Scheef et al. (2018) said "I am the one who gets to come alongside students and teach them to be high-schoolers. And there is little in my mind more rewarding than that" (p. 221).

General benefits. Twelve studies (18.2%) addressed benefits more generally. These studies lacked specific detail about the type of impact.

Targeted responses. Five studies used Likert-type scales. Bambara et al. (2018) asked a series of survey questions on a 7-point scale ranging from *unfavorable ratings* to *favorable ratings*. In response to one survey item, peers reported that they perceived positive outcomes for themselves (M = 5.6, range = 2–7) from their participation in a PMI. Using a 5-point scale, peer tutors in Whitfield (2016) all strongly agreed with the statement, "I learned something new." Gardner et al. (2014) and Hochman et al. (2015) asked peers and PMI facilitators about their agreement with the statement, "I [the peers without ASD] benefitted in other ways from being a peer group member." Average peer rating across studies was 4.5 (range = 3–5) and average facilitator rating was 4.7 (range = 4–5). Finally, Jameson et al. (2008) found that general educators and peers attributed benefits for the student with disabilities and the peer tutor. Average ratings were 5.6 for teachers and 6.0 for peers on a 6-point scale.

Open-ended responses. Other studies addressed an assortment of other benefits. For example, a peer interviewed in Chung and Carter (2013) described the peer support arrangement as a "very good experience for me" (p. 105). A special education director interviewed in Leigers et al. (2017) reported, "both kids have gotten out of it just a deeper more genuine respect for people" (p. 80). Peers and their parents from Haring and Breen (1992) said participation increased overall satisfaction with school life and feelings of school ownership. Peers from Knickelbein (1999) said their moods were boosted as a result of participating in a peer partner program (i.e., "being with them always cheers you up" [p. 75]). A peer from Buzeta (2012) described their time as "rewarding." More than half (55%) of peer tutors in K. L. Johnson (2016) addressed some type of daily benefit in their end-of-semester essays (e.g., a better or brightened day, sanctuary/relief/reprieve from daily stress). Finally, two peers in Potter (2014) were formally recognized as "Student of the Month" by teachers, suggesting the peers had changed in positive, recognizable ways.

Discussion

Peer-mediated interventions are widely recognized as an evidence-based practice for promoting the social and academic outcomes of students with IDD. Understanding the impact of these interventions on the peers without disabilities is similarly important. This review examined the extent to which peer impact has been addressed, the approaches used to examine this impact, and the ways in which peers have been impacted by their involvement. We highlight several important insights from this growing literature and provide suggestions for ways researchers and educators can move this work forward.

First, we found that a substantial proportion of studies have addressed impact on peers. Specifically, two thirds (67.3%) of PMI studies involving adolescents have documented peer impact in some way. Documentation of impact spanned a variety of PMI approaches. Social impact was a major focus across studies and the area of impact in which most studies reported benefits for peers. This finding aligns with previous work (Schaefer et al., 2016) and is not surprising given the intent of many PMIs is to increase opportunities for interactions between students with and without disabilities. Indeed, this finding affirms some degree of reciprocity within these interventions. Future research should work to document which PMI approaches are associated with which particular peer impacts. For example, do peers who participate in academic-focused PMIs (e.g., peer tutoring) have larger academic gains than peers who participate

in non–academic-focused PMIs (e.g., peer networks)? Answering these types of questions could provide valuable information to educators looking to implement PMIs in their schools.

Second, a wide range of measurement approaches were used to capture peer impact. In particular, we found that data related to peer impact were collected using two distinct questioning approaches. Peers and adults were asked to directly address an impact area or they were asked a generalized question related to peer impact to which they responded spontaneously. Although targeted response data are important, perhaps more interesting are data collected from open-ended responses. In asking open-ended questions, studies were able to document the less observable ways that peers benefited from their PMI experiences. For example, nine studies used open-ended measurement techniques and found that peers made a positive change in the ways they saw themselves after participating in a PMI. Peers gave themselves more grace, they saw more worth in themselves, and they started to appreciate their own lives more deeply. Sixteen studies used open-ended approaches to learn that peers developed personal qualities such as patience, compassion, outgoingness, kindness, and empathy. Targeting and measuring ways that peers are impacted are important but so is capturing the less noticeable ways peers are affected. Moving forward, educators and researchers should continue to invite peers to complete open-ended questionnaires, participate in individual interviews or focus groups, or complete reflection journals as ways of understanding the less visible changes that may result from their peer-mediated experiences.

Despite the abundance of impact data, there are still several substantial limitations to the way peer impact was measured. First, the areas of impact were often addressed in a narrow way within a single study. For example, several studies asked peers a single postintervention question (or a few questions). This provides an insufficient way of capturing the full impact on peers. Second, the strong psychometric properties of most measurement approaches were not reported. Indeed, there was almost no attention given to the reliability or validity of the measurement approaches used in many studies. In the future, use of multiple tools would provide more depth and richness of detail with regard to understanding impact. Furthermore, when two tools are used in conjunction (e.g., closed- and open-ended surveys), researchers should report the results of both measures (e.g., Riesch, 2013) to give a more holistic view.

Third, experimental evaluations of peer impact were limited. Only 10 studies included an experimental measure of peer impact that allowed for causal claims. The findings presented in this review suggest a range of important benefits for peers, but they are not enough to claim that PMIs are causally related to these benefits in most instances. Future research addressing PMIs should more fully examine the ways and extent to which peers are impacted as a result of their involvement. To do this would involve the use of an appropriate measurement framework. As suggested earlier, different measurement approaches should be used in conjunction with one another. Direct observation, surveys, and interviews are all viable options for exploring the range of ways that peers are impacted. As well, perspectives from multiple persons could help to strengthen the validity of the data and reduce the risk of a social desirability bias. For example, asking peers how they think they have been impacted is important. However, given the age of participants, it is possible that peers will feel social pressure to respond in a kind and responsive manner rather than speak about the negative parts of their experience or the negative ways in which they were affected. In addition, including perspectives from teachers or parents who know the peers well would help strengthen the data. Researchers should make measuring peer impact a priority and consider including primary research questions related to the peers. Finally, researchers should examine the extent to which the reported impact on peers maintains over time. Although it is important to identify impacts peers feel immediately after an intervention, stronger evidence of impact would involve maintained effects.

Limitations

Two primary limitations should be considered regarding this review. First, we analyzed peer impact findings qualitatively across these 66 studies. Given the nature of the constant comparative method of analysis, there are likely other ways of categorizing this impact beyond the 10 broad categories we identified. Furthermore, should additional experimental examinations of peer impact accrue, future reviews should incorporate meta-analytic approaches. Second, we narrowed our focus to PMIs conducted at a particular school level (i.e., secondary) and with a subset of students receiving special education services (i.e., those with IDD). Other dimensions of peer impact might be revealed by expanding this focus in future reviews.

Implications for Practice

Findings of this review have implications for practice. First, educators might view peer-mediated approaches more favorably knowing the potential benefits for all students who are involved. There is ample evidence to suggest peers can benefit in varied and numerous ways. Moreover, there has been little evidence of a negative or neutral impact on peers. Communicating these potential benefits to current and future teachers may support more widespread adoption of these evidence-based approaches to

supporting students with IDD across the school day. Second, given the potential benefits to students with and without disabilities, educators who implement PMIs should collect data on *all students* involved. Teachers could draw from data collection approaches described in this review to capture changes in the behaviors, perspectives, knowledge, intentions, and outcomes of peers. A combination of measurement tools is suggested to best understand the full impact on peers. Third, educators should share their experiences and findings with others in their school. Despite the abundance of research on PMI for supporting students with IDD, there may still be some resistance to adopting these interventions (Carter et al., 2016; Schaefer et al., 2016). For example, teachers may be worried that peers without disabilities may fall behind academically if asked to support their classmates with disabilities. Teachers can help further dismantle myths about negative effects on peers by sharing their lived experiences implementing PMIs in their classrooms. By focusing on the potential benefits for all students who participate in PMIs, we may see PMIs more readily adopted.

A growing number of studies examining PMIs address the impact on participating peers. Findings from this review suggest peers are positively impacted in numerous and varied ways from their involvement. This review highlights the many benefits peers receive from their participation while also recognizing the limitations of current measurement approaches used to understand this impact. With improved measurement techniques used to examine the impact of PMIs for all study participants, future studies could more fully speak to the impact on peers.

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Note

1. For the purpose of this article, we use the term *intellectual and developmental disabilities* (IDD) as an overarching term for these three lifelong disability categories (see Developmental Disabilities Act; American Association on Intellectual and Developmental Disabilities).

References

Studies with an * were included in this systematic review.

*Arceneaux, M. C., & Murdock, J. Y. (1997). Peer prompting reduces disruptive vocalizations of a student with developmental disabilities in a general eight-grade classroom. *Focus on Autism and Other Developmental Disabilities*, *12*(3), 182–186. https://doi.org/10.1177/108835769701200307

*Asmus, J. M., Carter, E. W., Moss, C. K., Biggs, E. E., Daniel, M., Born, T. L., Bottema-Beutel, K., Brock, M. E., Cattey, G. N., Cooney, M., Fesperman, E. S., Hochman, J. M., Huber, H. B., Lequia, J. L., Lyons, G. L., Vincent, L. B., & Weir, K. (2017). Efficacy and social validity of peer network interventions for high school students with severe disabilities. *American Journal on Intellectual and Developmental Disabilities*, *122*(2), 118–137. https://doi.org/10.1352/1944-7558-122.2.118

*Asmus, J. M., Carter, E. W., Moss, C. K., Born, T. L., Vincent, L. B., Lloyd, B. P., & Chung, Y. (2016). Social outcomes and acceptability of two peer-mediated interventions for high school students with severe disabilities: A pilot survey. *Inclusion*, *4*(4), 195–214. https://doi.org/10.1352/2326-6988-4.4.195

*Bambara, L. M., Cole, C. L., Chovanes, J., Telesford, A., Thomas, A., Tsai, S.-C., Ayad, E., & Bilgili, I. (2018). Improving the assertive conversational skills of adolescents with autism spectrum disorder in a natural context. *Research in Autism Spectrum Disorders*, *48*, 1–16. https://doi.org/10.1016/j.rasd.2018.01.002

*Bambara, L. M., Cole, C. L., Kunsch, C., Tsai, S., & Ayad, E. (2016). A peer-mediated intervention to improve the conversational skills of high school students with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *27*, 29–43. https://doi.org/10.1016/j.rasd.2016.03.003

*Bensted, E. A. (2000). *The academic effects of low achieving or inattentive students providing peer support to students with moderate to severe disabilities in general education classrooms* (Publication No. MQ52783, Master's thesis), University of Victoria. ProQuest Dissertations Publishing.

*Biggs, E. E., Carter, E. W., & Gustafson, J. (2017). Efficacy of peer support arrangements to increase peer interaction and AAC use. *American Journal on Intellectual and Developmental Disabilities*, *122*(1), 25–48. https://doi.org/10.1352/1944-7558-122.1.25

*Born, T. (2015). *Social skills instruction for students with autism spectrum disorders: Examining the impacts of social skills instruction delivered through a peer network* (Publication No. 10186926, Doctoral dissertation), The University of Wisconsin-Madison. ProQuest Dissertations Publishing.

*Brain, T., & Mirenda, P. (2019). Effectiveness of a low-intensity peer-mediated intervention for middle school students with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *62*, 26–38. https://doi.org/10.1016/j.rasd.2019.02.003

*Brock, M. E., Biggs, E. E., Carter, E. W., Cattey, G. N., & Raley, K. S. (2016). Implementation and generalization of peer support arrangements for students with significant disabilities in inclusive classrooms. *The Journal of Special Education*, *49*(4), 221–232. https://doi.org/10.1177/0022466915594368

*Brock, M. E., Bueker, S. A., & Barczak, M. A. (2018). Brief report: Improving social outcomes for students with autism at recess through peer-mediated pivotal response training.

Journal of Autism and Developmental Disorders, *48*(6), 2224–2230. https://doi.org/10.1007/s10803-017-3435-3

Brock, M. E., & Huber, H. B. (2017). Are peer support arrangements an evidence-based practice? A systematic review. *The Journal of Special Education*, *51*(3), 150–163. https://doi.org/10.1177/0022466917708184

*Buzeta, M. (2012). *Social experiences of peer relationships between teenagers of diverse cognitive statuses* (Publication No. 3538862, Doctoral dissertation), Aurora University. ProQuest Dissertations Publishing.

Carter, E. W. (2018). Supporting the social lives of secondary students with severe disabilities: Critical elements for effective intervention. *Journal of Emotional and Behavioral Disorders*, *26*(1), 52–61. https://doi.org/10.1177/1063426617739253

Carter, E. W. (in press). Peer-mediated support interventions for students with autism spectrum disorders. In P. A. Prelock & R. McCauley (Eds.), *Treatment of autism spectrum disorders: Evidence-based intervention strategies for communication and social interactions* (2nd ed.). Brookes.

*Carter, E. W., Asmus, J., Moss, C. K., Biggs, E. E., Bolt, D. M., Born, T. L., Brock, M. E., Cattey, G. N., Chen, R., Cooney, M., Fesperman, E., Hohcman, J. M., Huber, H. B., Lequia, J. L., Lyon, G., Moyseenko, K. A., Riesch, L. M., Shalev, R. A., Vincent, L. B., & Weir, K. (2016). Randomized evaluation of peer support arrangements to support the inclusion of high school students with severe disabilities. *Exceptional Children*, *82*(2), 209–233. https://doi.org/10.1177/0014402915598780

*Carter, E. W., Cushing, L. S., Clark, N. M., & Kennedy, C. H. (2005). Effects of peer support interventions on students' access to the general curriculum and social interactions. *Research and Practice for Persons with Severe Disabilities*, *30*(1), 15–25. https://doi.org/10.2511/rpsd.30.1.15

*Carter, E. W., Gustafson, J. R., Sreckovic, M. A., Dykstra Steinbrenner, J. R., Pierce, N. P., Bord, A., Stabel, A., Rogers, S., Czerw, A., & Mullins, T. (2017). Efficacy of peer support interventions in general education classrooms for high school students with autism spectrum disorder. *Remedial and Special Education*, *38*(4), 207–221. https://doi.org/10.1177/0741932516672067

*Carter, E. W., Hughes, C., Copeland, S. R., & Breen, C. (2001). Differences between high school students who do and do not volunteer to participate in a peer interaction program. *Research and Practice for Persons with Severe Disabilities*, *26*(4), 229–239. https://doi.org/10.2511/rpsd.26.4.229

*Carter, E. W., Moss, C. K., Hoffman, A., Chung, Y.-C., & Sisco, L. (2011). Efficacy and social validity of peer support arrangements for adolescents with disabilities. *Exceptional Children*, *78*(1), 107–125. https://doi.org/10.1177/001440291107800107

Chan, J. M., Lang, R., Rispoli, M., O'Reilly, M., Sigafoos, J., & Cole, H. (2009). Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, *3*(4), 877–889. https://doi.org/10.1016/j.rasd.2009.04.003

*Chung, Y.-C., & Carter, E. W. (2013). Promoting peer interactions in inclusive classrooms for students who use speech-generating devices. *Research and Practice for Persons with Severe Disabilities*, *38*(2), 94–109. https://doi.org/10.2511/027494813807714492

*Collet-Klingenberg, L., Neitzel, J., & Laberge, J. (2012). Power-PALS (peers assisting, leading, supporting): Implementing a peer-mediated intervention in a rural middle school program. *Rural Special Education Quarterly*, *31*(2), 3–11. https://doi.org/10.1177/875687051203100202

*Cook, M. (2017). *Peer support arrangements in the inclusive middle school setting: An in-depth look from observation, work samples and participant perspectives* (Publishing No. 10279229, Doctoral dissertation), University of Michigan. ProQuest Dissertations Publishing.

*Copeland, S. R., Hughes, C., Carter, E. W., Guth, C., Presley, J. A., Williams, C. R., & Fowler, S. E. (2004). Increasing access to general education: Perspectives of participants in a high school peer support program. *Remedial and Special Education*, *25*(6), 342–352. https://doi.org/10.1177/07419325040250060201

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). SAGE.

*Cushing, L. S., & Kennedy, C. H. (1997). Academic effects of providing peer support in general education classrooms on students without disabilities. *Journal of Applied Behavior Analysis*, *30*(1), 139–151. https://doi.org/10.1901/jaba.1997.30-139

*Cushing, L. S., Kennedy, C. H., Shukla, S., Davis, J., & Meyer, K. A. (1997). Disentangling the effects of curricular revision and social grouping within cooperative learning arrangements. *Focus on Autism and Other Developmental Disabilities*, *12*(4), 231–240. https://doi.org/10.1177/108835769701200405

*Donder, D., & Nietupski, J. (1981). Nonhandicapped adolescents teaching playground skills to their mentally retarded peers: Toward a less restrictive middle school environment. *Education and Training of the Mentally Retarded*, *16*(4), 270–276. https://www.jstor.org/stable/23877148

*Fetko, E. E., Collins, B. C., Hager, K. D., & Spriggs, A. D. (2013). Embedding science facts in leisure skill instruction conducted by peer tutors. *Education and Training in Autism and Developmental Disabilities*, *48*(3), 400–411. https://jstor.org/stable/23880996

*Gardner, K. F., Carter, E. W., Gustafson, J. R., Hochman, J. M., Harvey, M. N., Mullins, T. S., & Fan, H. (2014). Effects of peer networks on the social interactions of high school students with autism spectrum disorders. *Research and Practice for Persons with Severe Disabilities*, *39*(2), 100–118. https://doi.org/10.1177/1540796914544550

*Haring, T. G., Breen, C., Pitts-Conway, V., Lee, M., & Gaylord-Ross, R. (1987). Adolescent peer tutoring and special friend experiences. *Research and Practice for Persons with Severe Disabilities*, *12*(4), 280–286. https://doi.org/10.1177/154079698701200404

*Haring, T. G., & Breen, C. G. (1992). A peer-mediated social network intervention to enhance the social integration of persons with moderate and severe disabilities. *Journal of Applied Behavior Analysis*, *25*(2), 319–333. https://doi/org/10.1901/jaba.1992.25-319

*Heinrich, S., Collins, B. C., Knight, V., & Spriggs, A. D. (2016). Embedded simultaneous prompting procedure to teach STEM content to high school students with moderate disabilities in an inclusive setting. *Education and Training in Autism and*

Developmental Disabilities, *51*(1), 41–54. https://www.jstor.org/stable/26420363

*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. https://doi.org/10.1177/0014402915585482

*Huber, H. B., Carter, E. W., Lopano, S. E., & Stankiewicz, K. C. (2018). Using structural analysis to inform peer support arrangements for high school students with severe disabilities. *American Journal on Intellectual and Developmental Disabilities*, *123*(2), 119–139. https://doi.org/10.1352/1944-7558-123.2.119

*Hughes, C., Bernstein, R. T., Kaplan, L. M., Reilly, C. M., Brigham, N. L., Cosgriff, J. C., & Boykin, M. P. (2013). Increasing conversational interactions between verbal high school students with autism and their peers without disabilities. *Focus on Autism and Other Developmental Disabilities*, *28*(4), 241–254. https://doi.org/10.1177/1088357613487019

*Hughes, C., Carter, E. W., Hughes, T., Bradford, E., & Copeland, S. (2002). Effects of instructional versus non-instructional roles on the social interactions of high school students. *Education and Training in Mental Retardation and Developmental Disabilities*, *37*(2), 146–162. https://www.jstor.org/stable/23879824

*Hughes, C., Copeland, S. R., Guth, C., Rung, L. L., Hwang, B., Kleeb, G., & Strong, M. (2001). General education students' perspectives on their involvement in a high school peer buddy program. *Education and Training in Mental Retardation and Developmental Disabilities*, *36*(4), 343–356. https://www.jstor.org/stable/23879896

*Hughes, C., Golas, M., Cosgriff, J., Brigham, N., Edwards, C., & Cashen, K. (2011). Effects of a social skills intervention among high school student with intellectual disabilities and autism and their general education peers. *Research and Practice for Persons with Severe Disabilities*, *36*(1–2), 46–61. https://doi.org/10.2511/rpsd.36.1-2.46

*Hughes, C., Harvey, M., Cosgriff, J., Reilly, C., Heilingoetter, J., Brigham, N., Kaplan, L., & Bernstein, R. (2013). A peer-delivered social interaction intervention for high school students with autism. *Research and Practice for Persons with Severe Disabilities*, *38*(1), 1–16. https://doi.org/10.2511/027494813807046999

*Hunsaker, A. (2014). *The effects of peer tutoring on junior high general education students' attitudes toward students with severe disabilities* [Unpublished master's thesis]. Brigham Young University.

*Jameson, J. M., McDonnell, J., Polychronis, S., & Riesen, T. (2008). Embedded, constant time delay instruction by peers without disabilities in general education classrooms. *Intellectual and Developmental Disabilities*, *46*(5), 346–363. https://doi.org/10.1352/2008.46:346-363

*Jimenez, B. A., Browder, D. M., Spooner, F., & Dibiase, W. (2012). Inclusive inquiry science using peer-mediated embedded instruction for students with moderate intellectual disability. *Exceptional Children*, *78*(3), 301–317. https://doi.org/10.1177/001440291207800303

*Johnson, K. L. (2016). *Benefits of peer tutoring students with disabilities in a secondary school setting* [Unpublished master's thesis]. Brigham Young University.

*Johnson, R., Johnson, D. W., DeWeerdt, N., Lyons, V., & Zaidman, B. (1983). Integrating severely adaptively handicapped seventh-grade students into constructive relationships with nonhandicapped peers in science class. *American Journal of Mental Deficiencies*, 87(6), 611–618. https://pubmed.ncbi.nlm.nih.gov/6869418

*Knickelbein, B. A. (1999). *Descriptions of secondary education students' interactions and relationships with students with severe disabilities* (Publishing No. 9919303, Doctoral dissertation), University of Pittsburgh. ProQuest Dissertations Publishing.

*Koegel, R., Kim, S., Koegel, L., & Schwartzman, B. (2013). Improving socialization for high school students with ASD by using their preferred interests. *Journal of Autism and Developmental Disorders*, *43*(9), 2121–2134. https://doi.org/10.1007/s10803-013-1765-3

*Leigers, K., Kleinert, H. L., & Carter, E. W. (2017). "I never truly thought about them having friends": Equipping schools to foster peer relationships. *Rural Special Education Quarterly*, *36*(2), 73–83. https://doi.org/10.1177/8756870517707711

*Leinert, S. (2013). *Examination of a peer-mediated intervention as a method for the generalization of social skills among youth with high-functioning autism* (Publishing No. 3577966, Doctoral dissertation), University of Missouri. ProQuest Dissertations Publishing.

*Ley Davis, L. (2016). *Effects of peer-mediated instruction on mathematical problem solving for students with moderate/severe intellectual disability* (Publishing No. 10111913, Doctoral dissertation), The University of North Carolina at Charlotte. ProQuest Dissertations Publishing.

*Lopez, V. (2016). *Enhancing communication initiation of students with moderate to severe disabilities through general education peer interaction* [Unpublished master's thesis], California State University.

*Mahoney, M. W. M. (2019). *Peer-mediated instruction and interventions supporting the academic engagement of secondary students with autism spectrum disorder* (Publishing No. 13899492, Doctoral dissertation), University of Washington. ProQuest Dissertations Publishing.

*McDonnell, J., Mathot-Buckner, C., Thorson, N., & Fister, S. (2001). Supporting the inclusion of students with moderate and severe disabilities in junior high school general education classes: The effects of classwide peer tutoring, multi-element curriculum, and accommodations. *Education and Treatment of Children*, *24*(2), 141–160. https://www.jstor.org/stable/42899651

*Ogilvie, C. R. (2008). *The impact of video modeling and peer mentoring of social skills for middle school students with autism spectrum disorders in inclusive settings* (Publishing No. 3335359, Doctoral dissertation), University of Central Florida. ProQuest Dissertations Publishing.

*Perales, J. L. (2019). *Peer supported arrangements: How does participation as a peer support effect non-disabled peers?* (Publishing No. 13881575, Doctoral dissertation), The University of Texas at San Antonio. ProQuest Dissertations Publishing.

*Potter, J. (2014). *The effects of peer-coaching on social skills performance of middle school students with high functioning autism spectrum disorder* (Publishing No. 3618803, Doctoral dissertation), University of Southern Maine. ProQuest Dissertations Publishing.

*Riesch, L. M. (2013). *Measuring the social validity of peer mediated interventions: Perspectives of adolescents in general education* (Publishing No. 3592366, Doctoral dissertation), The University of Wisconsin- Madison. ProQuest Dissertations Publishing.

Schaefer, J. M., Cannella-Malone, H., & Brock, M. E. (2018). Effects of peer support arrangements across instructional formats and environments for students with severe disabilities. *Remedial and Special Education*, *39*(1), 3–14. https://doi.org/10.1177/0741932517727865

*Schaefer, J. M., Cannella-Malone, H. I., & Carter, E. W. (2016). The place of peers in peer-mediated interventions for students with intellectual disability. *Remedial and Special Education*, *37*(6), 345–356. https://doi.org/10.1177/0741932516629220

*Scheef, A. R., Hollingshead, A., & Voss, C. S. (2018). Peer support arrangements to promote positive postschool outcomes. *Intervention in School and Clinic*, *54*(1), 219–224. https://doi.org/10.1177/1053451218782430z

*Schlieder, M. (2013). *Implementing a "circle of friends" peer-mediated intervention for high school students with autism* (Publishing No. 3602946, Doctoral dissertation), Walden University. ProQuest Dissertations Publishing.

*Shukla, S., Kennedy, C. H., & Cushing, L. S. (1998). Adult influence on the participation of peers without disabilities in peer support programs. *Journal of Behavioral Education*, *8*(4), 397–413. https://doi.org/10.1023/A:1022801215

*Shukla, S., Kennedy, C. H., & Cushing, L. S. (1999). Intermediate school students with severe disabilities: Supporting their social participation in general education classrooms. *Journal of Positive Behavior Interventions*, *1*(3), 130–140. https://doi.org/10.1177/109830079900100301

*Siperstein, G. N., McDowell, E. D., Jacobs, H. E., Stokes, J. E., & Cahn, A. L. (2019). Unified extracurricular activities as a pathway to social inclusion in high schools. *American Journal on Intellectual and Developmental Disabilities*, *124*(6), 568–582. https://doi.org/10.1352/1944-7558-124.6.568

*Skipper, J. (2011). *A group intervention for adolescents with Asperger syndrome or high-functioning autism and anxiety in mainstream secondary settings: An evaluation study* (Publishing No. 10061448, Doctoral dissertation), University of East London. ProQuest Dissertations Publishing.

*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. https://doi.org/10.1007/s10803-017-3171-8

*Staub, D., Spaulding, M., Peck, C. A., Gallucci, C., & Schwartz, I. S. (1996). Using nondisabled peers to support the inclusion of students with disabilities at the junior high school level. *Research and Practice for Persons with Severe Disabilities*, *21*(4), 194–205. https://doi.org/10.1177/154079699602100408

*Stroman, K. (2019). *The impact of peer mediated instructional strategies in an inclusive project based learning environment* (Publishing No. 13858484, Doctoral dissertation), University of South Carolina. ProQuest Dissertations Publishing.

*Tekin-Iftar, E. (2003). Effectiveness of peer delivered simultaneous prompting on teaching community signs to students with developmental disabilities. *Education and Training in Developmental Disabilities*, *38*(1), 77–94. https://www.jstor.org/stable/23880187

Travers, H. E., & Carter, E. W. (2021). *A portrait of peers within peer-mediated interventions: A literature review*. Manuscript submitted for publication.

*Whitfield, S. (2016). *Teaching peer tutors to use a simultaneous prompting procedure to teach sales tax computation to secondary students with mild and moderate disabilities* [Unpublished master's thesis]. University of Kentucky.

*Wilson, B. A. (1998). *Peer tutoring in the context of cooperative learning: Including middle school students with moderate to severe disabilities in content area classes* (Publishing No. 9916064, Doctoral dissertation), Lehigh University. ProQuest Dissertations Publishing.