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Effects of Peer Networks on the Social Interactions of High School Students With Autism Spectrum Disorders

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Abstract

Supporting social interactions and positive peer relationships is an important element of comprehensive secondary education and transition programming. For many adolescents with autism spectrum disorders (ASDs), such social connections may be fairly limited apart from intentional programming. We examined the efficacy and social validity of peer network interventions as an avenue for promoting social interactions and social skills for two high school students with ASD. The introduction of peer networks was accompanied by substantial increases in peer interactions for both students. Adult facilitators, peer partners, and students with ASD each considered the intervention to be acceptable and feasible to implement. We offer recommendations for designing social-focused interventions for adolescents with ASD and highlight future research directions.

Keywords

social relationships, high school, peer-mediated intervention, autism, adolescence

Adolescence is frequently characterized as a period of substantial change within the social lives of young people (Rubin, Bukowski, & Laursen, 2009). For example, entry into high school inevitably introduces students to scores of new classmates as they take six or more classes each semester. These new relationships also take on heightened social significance within school culture and adults increasingly shift to a background role as they encourage students to develop greater autonomy and independence. Through their interactions with their peers during school, adolescents exchange a broad range of emotional and practical supports, find camaraderie, enjoy shared activities, develop new skills and values, and learn how to get along with others in a diverse world. Indeed, the opportunities students have to spend time and develop relationships with their peers can impact their satisfaction with school, sense of belonging, and overall well-being (Wentzel, Donlan, & Morrison, 2012).

For many adolescents with autism spectrum disorders (ASDs), navigating this complex social landscape can be a challenging endeavor (Carter et al., 2014). Difficulties in the areas of social interactions, communication, and behavior are at the center of definitional criteria for ASD (American Psychiatric Association,

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2013; Individuals with Disabilities Education Improvement Act, 2004). Not surprisingly, the peer interactions and social connections often described as so important during adolescence remain elusive for large numbers of high school students with ASD. Observational studies suggest social interactions among students with ASD and their classmates can be quite limited even when students are present in the same classrooms, cafeterias, or clubs (e.g., Carter, Hughes, Guth, & Copeland, 2005; Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2008). According to parent reports collected as part of a nationally representative study of high school students with autism, less than 10% of students with ASD were reported to see friends outside of school frequently, and less than half were invited to participate in social activities with peers at any time during the prior school year (Wagner, Cadwallader, Garza, & Cameto, 2004). As a result, many youth with ASD have reported feeling isolated or lonely; others have been excluded or bullied by peers (Humphrey & Symes, 2010; Locke, Ishijima, & Kasari, 2010).

Amid this backdrop, efforts to equip these adolescents with the skills and opportunities they need to enjoy increased interactions with peers take on particular importance. Absent intentional efforts to foster social connections, sustained interactions among students with and without ASD are unlikely to take place within many high schools. Although the evidence base on interventions aimed at promoting social connections within preschool and elementary settings is quite deep, far fewer studies have focused specifically on the social interactions of high school students with ASD (see reviews by Carter, Sisco, & Chung, 2012; Hughes, Kaplan, et al., 2013; Reichow & Volkmar, 2010). Yet the social-related challenges that define the ASD diagnosis do not diminish with age.

Peer-mediated interventions hold particular promise for enhancing the social connections of adolescents with ASD (Carter et al., 2014). This category of educational intervention involves equipping one or more peers to provide social and/or academic support to their peers with disabilities under the guidance of educational staff (Carter, Cushing, & Kennedy, 2009). For example, Hughes, Bernstein, and colleagues (2013) arranged for high school peers to teach their classmates with ASD to use communication books to initiate social interactions during general education classes and at lunch. In an effort to promote social interactions in Grades 6 to 8, Koegel and colleagues (2012) involved peers in social clubs designed around the perseverative interests of students with ASD. Collectively, these studies illustrate the promise and possibilities of engaging adolescent peers actively in social-focused intervention efforts.

In the present study, our focus was on evaluating the efficacy and social validity of peer networks as an avenue for fostering social interactions and skill development for high school students with ASD. Peer networks involve establishing a cohesive social group of peers around a student with disabilities to promote social, communication, and other outcomes within the classroom and/or across the school day (Carter et al., 2013). Three to six peers—usually with interests or classes in common with the focus student—are invited to an organizational and orientation meeting. Initially, an adult facilitator (e.g., paraprofessional, coach, school counselor) leads regular network meetings during which students participate in a shared activity, discuss times to connect with one another socially outside of the meeting, and/or make plans for future meetings. The facilitator gradually fades his or her involvement, and peers take the lead in organizing and running network meetings. Peer networks provide an intentional context for students with and without disabilities to meet one another in a group context, discover common interests, and connect regularly within secondary schools that often are quite segregated. Although not designed to be instructional interventions (i.e., peers are not assigned explicit tutorial or teaching roles), they do create rich opportunities for students with ASD to practice and receive feedback on use of social-communication skills within enjoyable shared activities. To date, only two studies examined the efficacy of network-based interventions with adolescents. Haring and Breen (1992) evaluated a weekly peer network intervention in which regular feedback and planning meetings were held, additional interactions were scheduled throughout the week, peers collected data on social interactions, an adult facilitator provided feedback to peers, peers reinforced specific social behaviors of the focus students with ASD, and explicit social skills training was provided to students with ASD. Koegel et al. (2012) developed lunch-based social clubs around the targeted interests (e.g., movies, trivia) of students with ASD.

The purpose of the present study was to examine the efficacy, social validity, and treatment fidelity of peer networks for students with ASD in a high school setting. We sought to answer the following research questions:

Research Question 1: Do peer networks increase social interactions among students with ASD and their peers without disabilities?
Research Question 2: How do students, peers, and educators view the feasibility and acceptability of arranging peer networks within high schools?
Research Question 3: Which aspects of the peer networks were implemented with high fidelity by school staff, and which components were more challenging to implement?

In addition to understanding the impact of these interventions on social-related outcomes, we were particularly interested in exploring how key stakeholders viewed the process and outcomes of these interventions. We also wanted to examine the extent to which particular aspects of the network were implemented as intended.

Method

Participating Students With ASD

We recruited participants in two local high schools after receiving Institutional Review Board (IRB) and district approval. Students were eligible for the study if they attended high school, had an educational or other diagnosis of ASD, were receiving special education services, and had a reliable communication system comprised of at least 10 words. We asked special educators to send home consent and assent forms to students meeting criteria who they anticipated would benefit from participation in a peer network group.

Anton was an 18-year-old, European American male in his senior year of high school. Although he had diagnoses of autism, attention deficit hyperactivity disorder (ADHD), and oppositional defiant disorder in his Individualized Education Program (IEP), he received special education services under the primary category of other health impairment. The majority of Anton's coursework was delivered in general education classrooms, with the exception of one small-group English class. He received weekly consultation services from a behavior specialist for emotional and behavior challenges. His overall adaptive behavior composite on the Vineland Adaptive Behavior Scales–2 (VABS; Sparrow, Cicchetti, & Balla, 2005) was in the 18th percentile. In the socialization domain, he was in the 8th percentile. According to teacher ratings on the Social Skill Improvement System (SSIS; Gresham & Elliott, 2008), Anton had an overall standard score of 86 (19th percentile rank) for social skills, a standard score of 113 (80th percentile rank) for problem behaviors, and a raw score of 100 (47th percentile rank) for academic competence. He had below average ratings on the subscales of Communication, Empathy, and Self-Control. Based on a Childhood Autism Rating Scale (CARS; Schopler, Van Bourgondien, Wellman, & Love, 2010) completed by his case manager, Anton had a *T*-score of 37 and was in the 10th percentile for symptom levels compared with individuals with autism spectrum diagnoses. On his IEP, Anton's social-related goals addressed (a) developing control over his own behavior by using socially acceptable language, (b) accepting responsibility for his actions, (c) exercising self-control, and (d) speaking privately to adults about his behavior.

George was a 14-year-old, Hispanic male in the ninth grade. He had a primary special education label of intellectual disability and a secondary label of autism. George received all of his educational programming within a special education classroom and was eligible for the state's alternate assessment. His overall adaptive behavior composite on the VABS was in the <1 percentile rank, and he had a standard score of 56. In the socialization domain, he had a standard score of 56 and was in <1 percentile rank. Based on teacher ratings on the SSIS, George's social skills were well below average with a standard score of 62 (percentile rank of 1). His problem behaviors were well above average with a standard score of 160 (percentile rank of 99), and he had a standard score of 67 (3rd percentile rank) in the academic competence scale. According to the CARS, George displayed severe symptoms of ASD (72nd percentile, *T*-score of 56). He had no social-related goals in his IEP.

Adult Facilitators

We asked students' special education teachers to recommend an adult facilitator to guide each student's peer network group. To serve in this role, facilitators had to be available during the anticipated network meeting

times and have prior experience supporting students with disabilities. Anton's peer group facilitator was an African American male employed at the school as a special education paraprofessional. He had completed some college, but did not hold a bachelor's degree. Although this was his first year as a paraprofessional at the school, he had worked in the field of education for a total of 9 years. George's peer group facilitator was his special education teacher. He was a European American male with a master's degree and 20 years of experience in his current role. Neither facilitator reported having previously facilitated a peer network group. Each received a US$250 stipend for serving in this role.

Peer Partners

For both peer network groups, we asked facilitators and advisory teachers to recommend at least two peers (i.e., peer partners) who did not have ASD, who demonstrated appropriate social skills, and who they anticipated would get along well with the focus student. We also suggested peers be recruited from within the same advisory class as the student (see "Setting" section). These students were approached by either the facilitators or a member of the research team and told the purpose of the project. They were given permission forms if interest was expressed. Other students in the class also expressed interest as some of Anton's peer partners were invited and were provided permission forms. The facilitator recommended one additional student from another advisory class who was initially able to attend meetings. Six students were given permission forms, and four students returned signed permission forms. After two meetings, the partner from another advisory class chose to withdraw because of the time commitment. Thus, Anton had three partners in this peer network from the same class: two males and one female. Two were in 12th grade and one was in 11th grade; all three students were Hispanic. For George's peer network group, the facilitator recruited three peers from the same advisory class. All three partners were all female. One was in 10th grade, one was in the 11th grade, and one was in the 12th grade. Two students were European American, and one student was Hispanic.

Setting

The students attended two ethnically and economically diverse high schools in an urban school district. Anton attended a high school with almost 2,000 students. Nearly half of students were African American, more than one quarter were Hispanic, and less than one quarter were European American. George's high school enrolled approximately 1,300 students. Nearly one third of students were African American, more than one third were Hispanic, and about one quarter were European American.

The peer networks took place during an advisory period for both students. In this school district, an advisory class is used to discuss classes and high school in general and is designed to help students develop a relationship with at least one adult in the school. The advisory period was scheduled for a 30- to 40-min period, 2-3 days per week in the morning. Anton was in a general education classroom with his peers for advisory. His advisory class consisted of 20 students and met 3 days a week for 30 min. The advisory period was designed to provide time for students to speak with their advisor about grades, college or job applications, or senior projects. This time could also be used to catch up on work or make up exams. George was in a special education classroom during his advisory with 14 other students with disabilities. However, 18 students without disabilities were also enrolled in this same advisory group. His advisory class met 2 days per week for 40 min. George's advisory period was also unstructured. Students were permitted to move between two adjacent classrooms and were not all always in the same room at the same time. Some of the advisory periods were used to prepare for a school play.

Measures

We used partial interval recording (15 s observe, 15 s record) to collect data on students' social interactions, social engagement, and an individual social-related goal. We focused on social interactions as a marker of conversational involvement, social engagement as an indicator of group participation, and social goals to

gauge whether particular social skills could be addressed within the context of shared activities. We used momentary time sampling (30 s) to collect information on who (i.e., peer partner, other peer, student with disability, school staff, facilitator) was in proximity to the focus student. Finally, we documented any social support behaviors observed during the entire observation period as well as observer ratings of reciprocity, affect, and overall interaction quality. These measures were all drawn from prior research on social-focused interventions (cf. Carter, Sisco, Chung, & Stanton-Chapman, 2010; Hughes, Kaplan, et al., 2013).

Social interactions. We coded any social interaction occurring during each 15 s observation window. We defined social interactions as any occurrence of verbal (e.g., speech, electronic communication devices) or nonverbal (e.g., gestures, signs) behaviors that appeared to have communicative intent. We coded separately communicative behaviors by a focus student directed toward another person (i.e., focus student to peer partner, focus to another peer not in the network, focus to another student with a disability, focus student to adult) and communicative behaviors directed to the focus student by others (i.e., peer partner to focus student, another peer to focus student, student with disability to focus student, adult to focus student). We did not code as social interaction reading aloud, talking aloud to oneself, or echolalic behavior if not clearly directed toward another person. We coded communicative behaviors as directed toward a group (i.e., focus to group, peer to group, partner to group, adult to group, student with disability to group) when multiple people were present and the intended recipient could not be determined. However, if a person was clearly addressing everyone in the group, the interaction was coded to each individual included in the group.

Social engagement. We also coded students' overall social engagement with peers as either active, passive, or unengaged. Any communicative behavior by the focus student to any peer (i.e., peer partner, other peer, students with disabilities) was considered an indicator of active social engagement. If the focus student did not engage in verbal or nonverbal social behavior in a given interval, one of the following two mutually exclusive social engagement states was coded: passively engaged or unengaged. Passive engagement was defined as being in proximity to students and attending to the social conversation of other students for at least 5 consecutive seconds within an interval but making no active contributions to the conversation. Unengaged was defined as attending to something other than ongoing social exchanges among students, whether in or out of proximity of peers. If the student was physically absent from the observation, he was considered gone for that interval.

Social-related goal. We asked teachers to identify a social-related goal that could naturally be addressed within the ongoing peer network group. For each student, we used partial interval recording to note the occurrence of that behavior. For Anton, the social-related goal identified by his case manager was to wait his turn to speak in conversation without interrupting others. The target behavior occurred if he refrained from interrupting others and did not occur if he interrupted anyone during the interval. For George, the social-related goal identified by his special education teacher was to maintain engagement with peers by making eye contact and responding verbally to communication partners for 15 min at a time. The behavior occurred if he remained engaged (i.e., maintained eye contact, responded to others) for the entire interval, and the behavior was coded as not occurring if he was unengaged at any point during the interval.

Support behaviors. We recorded the occurrence of various support behaviors directed toward the focus student by peer partners and the facilitator using a checklist completed at the end of each observation. The checklist included these behaviors: prompt student to interact with other peers, encourage other peers to interact with the student, explicitly teach student specific social skills, prompt student to use aided communication devices, model specific social skill, praise social/communication attempts/behaviors, provide emotional support or give advice, and help student self-manage own behaviors. Each behavior was recorded as either occurring or not occurring at any time during the observation. The total number of occurrences was not recorded.

Interaction quality ratings. On a narrative sheet, observers provided ratings on three dimensions of interactions with peers: interaction reciprocity (i.e., 1 = low, 2 = medium, 3 = high), affect (1 = negative, 2 = neutral,

3 = positive), and overall interaction quality (1 = low, 2= medium-low, 3 = medium, 4= medium-high, 5 = high). Ratings were provided only when interactions among students and peers were observed.

Proximity. At the end of each 30-s observation interval, we coded the student with ASD as in proximity to a peer partner, other peer without ASD, student with disabilities, network facilitator, or other school staff if he was within 5 feet of another person and in a position affording the opportunity to interact socially with that person(s). An opportunity existed when neither the focus student nor the other person had to change their physical orientation or position to communicate with each other.

Experimental Design and Procedures

We used ABAB and ABA withdrawal designs (Kennedy, 2005) to evaluate the impact of participation in each peer network group on the social engagement of the participants. Both designs began concurrently, and we staggered introduction of the intervention across students within a multiple-baseline design. We selected this design, in part, to determine whether interactions would continue when the structure of the group was removed.

Baseline. During the baseline phase, both students participated in advisory class activities as they normally did (i.e., business as usual). Advisory teachers made no changes to the advisory class, and students were not given any instructions by researchers. Anton's advisory class met in the same classroom 3 days per week, during which time there was usually no structured activity planned. Students were able to catch up on homework, talk to friends, listen to music, or consult their advisory teacher about grades. George's advisory class met in the school auditorium to practice a school play 1 day per week and met in the special education classroom on the other days. When in the special education classroom, the students could talk with peers, play games on the computer, or watch a movie. Both participants had opportunities to interact with peers during the advisory class, but conversations rarely took place during this phase.

Peer Network Intervention. During the intervention phase, the peer networks met during the advisory period 1 to 2 days per week. Although we anticipated all network meetings would be held in the advisory classroom, noise and limited space in Anton's classroom led the facilitator and students to hold the meeting elsewhere after the orientation meeting (i.e., a nearby empty conference room). George's orientation meeting occurred in the school cafeteria, and subsequent meetings were held in the special education classroom, the cafeteria, or the gym. Following each peer group, the facilitator, the primary observer, and a coach from the research team filled out fidelity checklists. Both the facilitator and the primary observer answered a series of nine yes/no questions. To be implemented with full fidelity, each social network meeting consisted of the following elements: (a) the focus student had to be present the majority of the time, (b) at least two other network members (i.e., peer partners) had to be in attendance, (c) peer partners had to participate in activities and/or conversation appropriately, (d) the focus student had to participate in activities and/or conversation appropriately, (e) the targeted social-related goal had to be addressed, (f) the facilitator had to be present for at least 10% of the time, (g) the facilitator encouraged discussion and gave prompts as needed to keep the activity or conversation going, (h) network members discussed the date of the next meeting, and (i) network members suggested activities or conversation topics for the next meeting. Table 1 displays fidelity data.

Facilitator training. Both facilitators attended an individual training session lasting 40 to 60 min and led by members of the research team. Each facilitator received a binder that included a printed copy of the peer network manual and checklists for the orientation meeting and peer group meetings. During the training session, we reviewed each section of the manual, provided examples of facilitative strategies, and answered questions. The facilitators were told how to (a) recruit peers, (b) orient students to their network, and (c) provide facilitation during network meetings. During the intervention phase, each facilitator implemented the network with support from a member of the project team. The facilitator was asked to remain in proximity for at least 10% of each network meeting, initially being present for the entire meeting but gradually fading back direct involvement over time as students gained confidence. The role of the facilitator was to

Table 1. Treatment Fidelity Findings Based on Observer, Facilitator, and Coach Checklists.

	Anton			George		
Questions	O (%)	F (%)	C (%)	O (%)	F (%)	C (%)
Common questions						
Was the focus student present for majority of meeting?	100	100	100	100	100	100
Were at least two of the network members in attendance?	80	78	78	100	100	100
Did network members participate in activities appropriately?	100	100	100	100	100	100
Did the focus student participate in activities and/or conversation appropriately?	100	100	100	75	100	67
Was the targeted social-related goal addressed?	50	100	55	75	100	67
Was the facilitator present at least 10% of the time?	100	100	100	75	100	67
Did the facilitator encourage discussion and give prompts as needed to keep the activity and conversation moving along?	80	90	—	50	100	—
Did the group discuss date of next meeting?	90	90	100	50	100	67
Did network members suggest activities or conversation topics for next meeting?	78	80	55	50	100	33
Coach-specific questions						
Was an activity or conversation planned for the meeting?	—	—	68	—	—	67
Were appropriate materials provided?	—	—	80	—	—	100

Note. Values represent the percentage of intervention phase observations during which the answer was recorded as yes. Observers had an additional fidelity checklist because a checklist was completed after the orientation meeting. "—" indicates the question was not asked. O = observer; F = facilitator; C = coach.

encourage the student and his peers to attend group meetings, offer suggestions on how students could connect outside of the group, remind students of the next meeting time, and support the group in planning activities for the meeting. When needed, the facilitator also was asked to use social facilitation strategies: redirect questions or comments from students to other group members, fill awkward silences, find a role in the selected activity for everyone, make sure each student was included as the activity progressed, draw the focus student into an ongoing conversation, and point out commonalities between the focus student and network partners (Carter et al., 2009). We followed a checklist to ensure training fidelity.

Peer training. After recruiting peers in the advisory class, the focus student, his peer partners, the facilitator, and a member of the research team participated in an orientation meeting designed to familiarize students with their roles in the group. During the meeting, we provided the facilitator with a checklist outlining the topics he should cover. The facilitator's checklist consisted of ten questions: (a) Was the focus student present? (b) Were all peer partners in attendance? (c) Did the partners and focus students introduce themselves and participate in activities? (d) Did students mention any shared interests? (e) Were the goals for the group discussed? (f) Did the group discuss ways to work toward goals of the group? (g) Was the importance of confidentiality and respectful language discussed? (h) Did the group talk about when social interactions could occur? (i) Were suggestions on ways to interact socially provided? and (j) Did the group schedule regular meetings or discuss the date of the next meeting? After the orientation meeting, the facilitator and the coach independently recorded whether each element of the orientation was addressed.

For Anton's orientation meeting, both the coach and the facilitator indicated all of the 10 elements on the orientation checklist occurred. During George's orientation meeting, 9 of 10 elements were addressed (one

of George's peer partners was not in attendance during the orientation meeting so the facilitator met with her at a separate time). Students introduced themselves and shared their interests with the group. The facilitator explained that the goals of the network were to (a) have fun together; (b) increase opportunities to meet new people; (c) help each other develop new friendships, especially those who may have difficulty forming friendships at school; and (d) encourage each other to be involved together in other school or after-school activities.

The social-related goal identified for each student was introduced to the group either indirectly (Anton) or directly (George). However, peers were not explicitly asked to serve in an instructional role or to teach specific social skills. Rather, social skills were selected by educators such that they could be addressed within ongoing interactions among students. For Anton, the facilitator explained that everyone in the group should be respectful, let each other have a turn to speak, and refrain from interrupting each other. Based on the coach checklist, the social-related goal was addressed at some point during 50% of the peer group meetings. For George, the facilitator asked group members to get George's attention when speaking to him, ask him questions, and help him ask other people questions to maintain his engagement in a conversation. George's social-related goal was addressed during 75% of the meetings.

Activities. During each meeting of the network members, students participated in at least one joint activity or conversation together. A touchscreen tablet computer (i.e., iPad) was available to be used as a shared activity to facilitate communication. During the first meeting, the students chose from several software applications identified by members of the research team. Noticing that George struggled to attend to his peers while using the iPad, the facilitator decided to use the iPad only as reinforcement for participating in the group. After the first meeting, the students and facilitators jointly identified activities in which they might engage during the next advisory period. Each activity or shared conversation included at least one of these components: built in turn-taking, answering questions, cooperation, or teaching others how to participate in an activity. Examples of activities included discussing current events or school events, playing a multiplayer trivia game, contributing to a word game, teaching the focus student to play a card game, or the focus student teaching the group to play an arcade game. Everyone in the group needed to be included in the conversation, the activity, and/or using the device. Based on data from the coach's checklist, an activity was planned by the facilitator or network members during 68% of Anton's network meetings and 67% of George's network meetings.

Withdrawal. During the withdrawal phase, students were told the peer network meetings would not be held for a short period of time. For each of the two groups, the withdrawal phase(s) occurred toward the second half of the spring semester. The upcoming end of the year activities (e.g., senior trips, field day, senior pictures) were offered as a reason to take a break from meeting formally. Students continued going to their advisory class and were not given any special instructions on interacting with each other; neither were they asked to refrain from interacting.

Reintroduction of the Peer Network. Due to the approaching end of the semester, the intervention was only reintroduced for Anton. During the reintroduction of the intervention, the group began meeting again and participating in an activity or conversation as described in the intervention phase. For George, a peer-mediated intervention was established the following semester.

Interobserver Agreement

A second observer simultaneously, but independently, coded 29% of Anton's sessions (range 20%-43% across study phases) and 37% of George's sessions (range 33%-50% across study phases). We calculated interobserver agreement in three ways. First, we calculated overall interval agreement by designating each interval as an agreement or disagreement (i.e., both observers agreed or did not agree that the behavior occurred or did not occur), dividing agreements by agreements plus disagreements (i.e., total number of intervals in this case), and multiplying the result by 100%. We averaged overall agreement results across

Table 2. Interobserver Agreement Percentages.

	Overall agreement	Occurrence agreement	Nonoccurrence agreement
Variable	*M* (range)	Total (range)	Total (range)
Peer interactions			
All peer interactions	98.5 (98.2-98.7)	89.5 (85.9-92.4)	99.2 (97.8-99.4)
Focus to any peer	98.3 (97.6-99.0)	83.6 (75.6-91.7)	99.1 (98.9-99.4)
Any peer to focus	97.9 (96.5-99.2)	84.8 (78.8-90.7)	98.4 (97.3-99.6)
Social engagement	94.0 (93.8-94.2)	—	—
Proximity	99.1 (98.3-99.9)		
To peer partners	99.2 (98.3-100.0)	97.5 (90.0-100.0)	100.0 (100.0)
To other peers	98.4 (97.2-99.6)	97.6 (96.9-100.0)	99.9 (99.7-100.0)
To students with disabilities	98.3 (96.6-100.0)	98.8 (98.2-100.0)	98.9 (97.8-100.0)
To facilitators[a]	100.0 (100.0)	100.0 (100.0)	100.0 (100.0)
To other educators	99.6 (99.4-99.8)	97.7 (85.7-100.0)	99.6 (99.5-99.7)
Facilitative support behaviors	97.1 (94.2-100.0)	—	—
Focus student's social-related goal	95.0 (93.3-97.5)	—	—

Note. "—" indicates this form of agreement was not calculated.
[a]For this measure, the behavior did not occur in any interobserver agreement observation sessions for one participant, so the number reported is the percentage agreement for one participant.

observation sessions for each participant and reported mean and range across participants in Table 2. We also calculated occurrence and nonoccurrence agreements for all measures (except engagement, facilitative support behavior, and focus student's goal) to account for less frequently occurring behaviors. Thus, we calculated the total number of occurrence and nonoccurrence agreements by combining data across all observations and across both participants. We calculated each ratio by dividing the total number of intervals of agreements or disagreements across observations by the total number of intervals of agreements plus disagreements in all observation sessions and multiplying by 100% (see Table 2).

Social Validity

We assessed social validity at the end of the semester using surveys containing both Likert-type and open-ended questions. The survey for students with ASD and parents included questions about the child's peer network, friendships, and enjoyment of school. Response options were yes, no, and I don't know; space to elaborate was provided (see Table 4). We sent surveys by mail and email to parents, and school staff read questions to students with ASD (if necessary). The facilitator survey included 20 statements addressing the amount of time and support required to implement the network, their interest and motivation to implement the intervention, and their perceptions of benefits for participating students, all rated on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*; see Table 5). Five open-ended questions addressed what went well, what could have been better, what (if anything) changed for the student with ASD as a result of being in the project, what (if anything) changed for peers as a result of being in the project, and what (if anything) changed for the facilitator as a result of being in the project. Peers partners completed a similar survey (19 items) that also asked whether they would recommend the group to other students and whether the school should have more groups in the future. Four open-ended questions addressed the first four questions asked of facilitators.

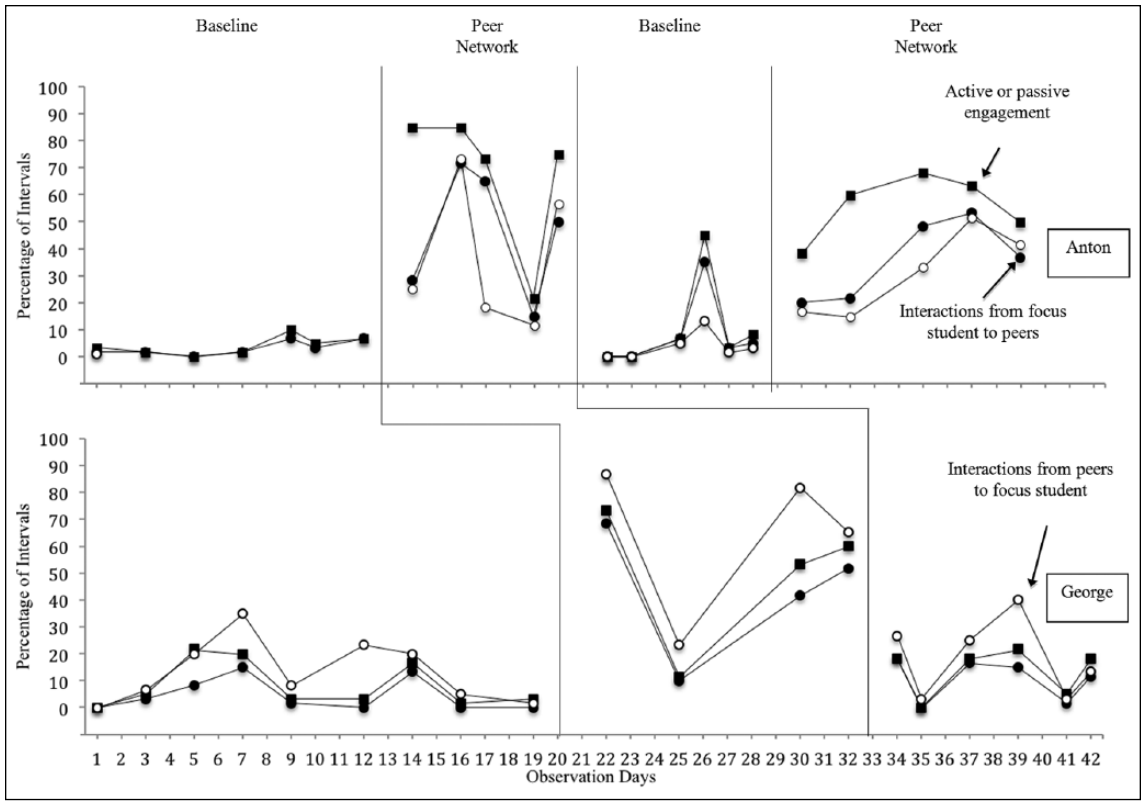

Figure 1. Percentage of intervals in which focus students were actively or passively engaged (closed squares), the focus student interacted socially with peers (closed circles), and a peer interacted socially with the focus student (open circles).

Results

Social Engagement

Active and passive engagement outcomes are displayed in Figure 1. Mean percentages of all engagement codes are displayed in Table 3. For both participants, the mean percentage of intervals during which the focus student was actively or passively engaged was substantially higher when the peer network was in place. For Anton, the mean percentage of active engagement increased from 4% during the baseline phase to 68% during the intervention phase. The mean percentage decreased to 11% when the intervention was withdrawn and increased to 56% when the peer network was reintroduced. For Anton, there was minimal variability during the baseline phase, but high variability during the intervention and withdrawal phases. No data overlap was found between the baseline and intervention phases, only 17% of data overlapped between the intervention and withdrawal phases, and 20% of data overlapped between the withdrawal phase and reintroduction of the peer network.

George's mean percentage of active engagement increased from 10% during the baseline phase to 50% during the intervention phase and decreased to 14% when the peer network was withdrawn. George's active and passive engagement was somewhat variable across all phases. Although there was 25% overlap between baseline and the intervention and 67% overlap between the intervention and withdrawal, this was primarily due to one data point in the intervention phase (i.e., Session 25). During this particular session, George became upset and exhibited problem behaviors (i.e., elopement, crying, hitting). Subsequently, his partners were not able to meet with him for the majority of the session.

Table 3. Summary of Observational Findings Across Study Phases.

	Anton				George		
	M (range)				*M* (range)		
Observational measures	Baseline	Intervention	Withdrawal	Intervention	Baseline	Intervention	Withdrawal
Peer interactions							
All peer interactions	3 (0-7)	54 (17-82)	8 (0-35)	44 (23-60)	16 (2-35)	65 (25-87)	19 (3-43)
Focus to any peer	3 (0-7)	46 (15-72)	8 (0-35)	36 (20-53)	5 (0-15)	43 (10-68)	11 (0-18)
Any peer to focus student	2 (0-7)	37 (12-73)	4 (0-13)	32 (15-52)	15 (2-35)	64 (23-87)	19 (3-40)
Social engagement							
Active	3 (0-7)	46 (15-72)	9 (0-38)	39 (20-53)	7 (0-17)	43 (10-68)	12 (0-18)
Passive	1 (0-3)	22 (7-57)	2 (0-7)	17 (10-25)	3 (0-5)	7 (2-12)	2 (0-7)
Unengaged	94 (78-100)	28 (5-75)	75 (18-100)	38 (15-62)	88 (77-98)	50 (27-87)	72 (32-82)
Gone	2 (0-15)	4 (0-10)	15 (0-78)	6 (0-17)	3 (0-8)	0 (0-2)	14 (0-68)
Proximity							
To peer partners	—	92 (85-100)	4 (0-22)	88 (75-100)	—	77 (47-100)	19 (0-40)
To other peers	41 (0-100)	36 (0-93)	5 (0-20)	0 (0)	53 (12-88)	1 (0-3)	7 (0-28)
To students with disabilities	8 (0-52)	1 (0-7)	25 (0-85)	0 (0)	43 (8-68)	3 (0-5)	13 (0-50)
To facilitator	0 (0)	72 (0-97)	0 (0)	85 (62-97)	1 (0-12)	59 (0-95)	2 (0-8)
To other educators	31 (0-100)	0 (0-2)	4 (0-18)	0 (0)	12 (0-72)	1 (0-3)	5 (0-12)
Facilitative support behaviors	—	29 (5-65)	0 (0)	36 (3-70)	—	20 (0-45)	0 (0)
Targeted social-related behavior	—	1 (0-3)	0 (0)	23 (0-52)	—	37 (0-63)	1 (0-5)
Interaction quality ratings							
Reciprocity[a]	1.3 (1-2)	2.0 (1-3)	1.5 (1-2)	2.2 (1-3)	1.1 (1-2)	1.8 (1-3)	1.2 (1-2)
Affect[b]	2.0 (2)	2.2 (2-3)	1.8 (1-2)	2.2 (2-3)	2.0 (1-3)	1.5 (1-2)	1.8 (1-3)
Overall quality[c]	1.0 (1)	2.8 (2-4)	1.5 (1-3)	3.6 (3-4)	1.6 (1-3)	2.3 (1-3)	1.5 (1-2)

Note. "—" indicates data were not collected on this variable during this phase.
[a]1 = low, 2 = medium, 3 = high.
[b]1 = negative, 2 = neutral, 3 = positive.
[c]1 = low, 2= medium-low, 3 = medium, 4= medium-high, 5 = high.

Peer Interactions

Peer interaction outcomes are also displayed in Figure 1. For both participants, the mean percentage of intervals containing a peer interaction increased during the intervention phases (see Table 3). For Anton, the mean percentage of intervals containing peer interactions increased from 3% during the baseline phase to 54% when the peer network was introduced. When the intervention was withdrawn, the mean percentage of intervals containing peer interactions decreased to 8% and increased to 44% when the peer network was reintroduced. For Anton, there was minimal variability during the baseline phase but high variability during the intervention and withdrawal phases. No data overlap was observed between baseline and intervention phases, 17% of data points overlapped between the intervention and withdrawal phases, and 40% of data overlapped between the withdrawal phase and reintroduction of the network. This overlap was primarily due to data from Session 26, during which the students in advisory were excited for an end-of-year field day and spoke more often than usual during the withdrawal phase. Overall, the percentage of intervals in which Anton interacted with peers was similar to the percentage of intervals that peers interacted with Anton,

which indicates the interactions were reciprocal. However, during Sessions 17 and 26, Anton interacted with peers substantially more than peers interacted with Anton.

George's mean percentage of intervals containing a peer interaction increased from 16% during the baseline phase to 65% during the intervention phase; it decreased to 19% when the peer network was withdrawn. George's social interactions with peers were quite variable. The overlap between baseline and the intervention phases (25%) and intervention and withdrawal phases (50%) was due to the aforementioned data point from Session 25. Overall, the mean percentage of intervals during which George spoke to peers was lower than the percentage of intervals in which peers spoke to George, indicating interactions were not always well-balanced.

Proximity

For both participants, the mean percentage of intervals in which the participants were in proximity to peer partners was high during the intervention phase (see Table 3). Peer partners were not yet identified at the beginning of the baseline phase, but there was a substantial decrease in proximity when the peer networks were withdrawn. The mean percentage of intervals in which Anton was in proximity to peer partners decreased from 92% during the intervention phase to 4% during the withdrawal phase. When the peer network was reintroduced, proximity to peers increased to 88%. The mean percentage of intervals in which George was in proximity to peer partners was 77% during the peer network, decreasing to 19% when the intervention was withdrawn. Similarly, facilitator proximity increased with peer networks for both participants.

Facilitative Support Behaviors

The mean percentage of intervals during which the facilitator was observed using any support behaviors is reported in Table 3. Anton's facilitator used some type of support behavior during 29% of the intervals during the peer network intervention and in 23% of the intervals when the intervention was reintroduced. The most commonly observed support behaviors involved providing emotional support or giving advice to the student, prompting the focus student to interact with peers, encouraging others to interact with the focus student, and modeling specific social skills. George's facilitator used support behaviors an average of 37% of intervals during the peer network intervention. Per observer report, George's facilitator primarily helped him self-manage his behaviors, praised social or communication attempts, prompted him to interact with peers, encouraged other peers to interact with him, explicitly taught him specific social skills, modeled specific social skills, and provided emotional support or gave advice.

Social-Related Goals

The mean percentage of intervals in which the participants' targeted social-related goal was observed is displayed in Table 3. During baseline, first intervention, and withdrawal phases, Anton rarely refrained from interrupting peers when he spoke. During the reintroduction of the peer network, however, the mean percentage of intervals during which Anton displayed the target behavior increased to 23%. The mean percentage of intervals during which George exhibited his targeted social-related behavior (engagement) increased from 0% of intervals during the baseline phase to 37% of intervals while participating in a peer network. This social behavior decreased to 1% of intervals when the peer network was withdrawn.

Interaction Quality Ratings

Observer ratings of aspects of conversational quality are displayed in Table 3. Anton's interactions during peer network meetings were rated as being of medium reciprocity, his affect was between neutral and positive, and overall quality was judged to be medium. Ratings of George's interactions during peer network meetings were slightly lower for all three areas.

Table 4. Student and Parent Perspectives on Social Validity.

	Anton		George	
Questions	Parent	Student	Parent	Student
Common questions (Parent [Student])				
Does your child [Do you] like going to school?	N	N	Y	Y
Does your child [Do you] have friends at school?	U	Y	Y	Y
Did your child like spending time with students from the peer group during the day [you spend time with (names of peer partners)]?	U	Y	Y	Y
Would you like your child to continue being part of a peer group next school year [to keep hanging out with ____ (names of peer partner)]?	Y	Y	Y	U
Parent-specific questions				
Did your child spend any time with the peers from this group outside of the school day?	N	—	N	—
Did your child ever talk about the peers from this group to you?	N	—	Y	—
Do you feel your child benefited socially from being part of this group?	U	—	Y	—
Student-specific questions				
Did you like spending time with ____ (names of peer partners)?	—	Y	—	U
Did spending time with ____ (names of peers partners) help you learn new things?	—	Y	—	U
Are ____ (names of peer partners) your friends?	—	Y	—	Y

Note. N = no; Y = yes; U = unclear. "—" indicates the question was not asked of this participant.

Social Validity

Responses to social validity surveys are shown in Tables 4 and 5. Overall, facilitators and peers felt they were effective in their roles, wanted to be part of a future peer network, and enjoyed participating in the project. Facilitators indicated the amount of time required to use the strategy was reasonable, they understood the procedures, and they could use the strategy with other students. Facilitators also felt the student with ASD benefited in other ways from having a peer group, had more friends, and generally did not think the strategy negatively impacted other students in the school.

Peers consistently said they and their partner benefited socially and in other ways from being a part of a peer group. All felt confident in their role and had enough help from the facilitator to do their role well. Similarly, parents and students with ASD responded positively when asked whether the student with ASD had friends at school and whether the student would like to be involved in a peer group again in the future.

In response to the open-ended questions, facilitators agreed that targeting these focus students and the overall conversation of the group went well. They also noticed changes in the social skills of the focus student and that peers "learned more about . . . their own compassion." Peers noted positive effects on themselves as well as the focus student. One peer stated the group "helped me see that at times not everybody has the same point-of-views on different matters." Another said, "I've been able to communicate better with the [group] but also with other people." Parents were interested in their child continuing to be part of the group. One parent said her child enjoyed spending time with the peer group, and the other was unsure of the child's enjoyment and benefits of the group, which she reported was due to the student not talking about the group or his friends at home.

Table 5. Peer and Facilitator Perspectives on Social Validity.

	Anton		George	
Questions	Facilitator	Peer	Facilitator	Peer
Common questions (facilitator wording [peer wording])				
I feel I was effective in this role.	4	4/4/4	4	4/5/5
I am interested in implementing this strategy again [I would be a peer group member again in the future].	4	4/4/5	5	5/5/5
The student with ASD [My partner] benefited *socially* from having a peer group.	4	3/4/4	5	3/4/5
The peers without ASD [I] benefited socially from being a peer group member.	4	4/4/4	5	4/5/5
The peers without ASD [I] benefited in other ways from being a peer group member.	4	3/4/4	5	4/5/5
Overall, I enjoyed participating [being] in this project.	5	4/4/5	4	5/5/5
Facilitator-specific questions				
The amount of time required to use this strategy was reasonable.	4	—	4	—
The amount of time required for record keeping with this strategy was reasonable.	3	—	4	—
I would need ongoing consultation to keep implementing this strategy.	4	—	2	—
Implementation of this strategy required considerable support from other school staff.	4	—	2	—
I implemented this strategy with a good deal of enthusiasm.	4	—	4	—
I am motivated to continue using this strategy.	4	—	5	—
This strategy was a good way to address the educational needs of the student with ASD.	4	—	4	—
This strategy fits well within this school.	4	—	4	—
I understood the procedures of this strategy.	4	—	4	—
I would know what to do if I was asked to implement this strategy again.	4	—	4	—
The student with ASD benefited *in other ways* from having a peer group.	4	—	5	—
The student with ASD has more friends as a result of this project.	4	—	4	—
This strategy negatively impacted other students in the school.	2	—	2	—
I could use the strategies I learned through this project with other students.	4	—	5	—
Peer-specific questions				
At first, I was excited to become a peer group member.	—	4/4/5	—	5/5/5
I felt confident serving in this role.	—	4/4/5	—	5/5/5
I had enough help from a teacher or teaching assistant to do this role well.	—	4/4/4	—	4/5/5
The amount of work I did for the group was reasonable.	—	4/4/4	—	4/5/5
The initial orientation meeting with a teacher/teaching assistant was helpful.	—	4/4/4	—	4/4/5
Other students in the school should also do this.	—	4/4/4	—	5/5/5
I understand why the teachers thought a peer group would be helpful for my peer partner.	—	4/4/5	—	5/5/5
Our school should have more peer groups for students.	—	4/4/5	—	5/5/5
My partner benefited *academically* from having a peer group.	—	3/3/4	—	4/4/5
I consider my partner to be a friend.	—	3/4/4	—	5/5/5
I would recommend being a peer group member to my other friends.	—	4/4/4	—	5/5/5
My views about students with autism have changed for the better.	—	3/4/4	—	5/5/5
I also spend time with other students who have autism at my school.	—	3/3/4	—	5/5/5

Note. Likert-type scale responses were as follows: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*. ASD = autism spectrum disorder. "—" indicates the question was not asked of this participant.

Discussion

As with most adolescents, navigating the social context of high schools can be a formidable undertaking for students with ASD. For many of these students, social connections with peers will remain elusive apart from structured efforts by school staff (Carter et al., 2008; Shattuck, Orsmond, Wagner, & Cooper, 2011). While much attention has focused on fostering these important peer relationships among preschool and elementary students with ASD, there remains a dearth of guidance on effective avenues for supporting social connections in high school settings (Carter et al., 2010; Hughes, Kaplan, et al., 2013; Meyer, Park, Grenot-Scheyer, Schwartz, & Harry, 1998). We examined peer networks as a promising strategy for increasing the opportunities students with ASD have to interact with and strengthen social skills among classmates without disabilities. Moreover, we were interested in whether such interventions would be considered feasible and acceptable to implement in high schools. Our findings extend the literature on promoting social participation and peer interactions in several ways.

First, we found that implementation of peer networks within a high school advisory classroom was associated with substantial and sustained increases in both social engagement and peer interactions. Although both students were enrolled in classes characterized by numerous potential conversational opportunities and few competing academic demands, both students with ASD engaged almost exclusively in solitary activities during the baseline phase. Absent the adult facilitation and structured opportunities associated with the peer network, students rarely initiated interactions, and few classmates directed interactions to them. Although examples of naturally forming friendships among students with and without severe disabilities have been described in the literature (e.g., Meyer et al., 1998; Rossetti, 2011), such relationships were not apparent for these two students and are infrequent in secondary schools (Wagner et al., 2004). Peer networks established shared activities within an existing classroom setting that was otherwise not considered a context for meeting the social-related goals of students. As a result, both students experienced more opportunities to engage in interactions with peers.

Although interactions increased for both students, some interesting patterns of peer interactions were observed with both students. Anton spoke much more than his peers during a few of our peer network observations, which reflects the individual nature of his social skill deficits. Anton had strong verbal communication skills but was often observed to interrupt or talk over peers when conversations did occur. However, George had fairly limited verbal communication, and his targeted social goal was to maintain social conversations with his peers. During most peer network sessions, the percentage of intervals in which George spoke to his peers was somewhat lower than the percentage of intervals in which peers spoke to him. Additional experience and instruction together may be needed to foster more balanced conversations within these peer networks. In addition, we observed considerable variability in the percentage of intervals containing social interactions from one observation to the next. Potential factors contributing to the variability of social interaction frequency were the quality of activities, the number of peers in attendance, and competing behaviors of the focus student.

Second, social interactions with peers were only observed when the peer networks actively met together as a group. Most prior peer-mediated studies have employed nonreversal designs in which the maintenance of social outcomes has not been explored. Each time the peer network was temporarily withdrawn in this study, the percentage of intervals containing social interactions decreased substantially despite students remaining in the same classes. The initial introductions taking place as part of an orientation meeting may not by themselves be sufficient to prompt sustained interactions. It may be that networks need to be implemented for a more sustained period of time before interactions begin to spill over to other contexts and/or maintain outside of meeting. Students may also simply have preferred to catch up on schoolwork during this advisory, talk with other classmates with whom they spent time prior to the launch of the network, or participate in other independent activities (e.g., playing games on their smart phone) on days when the network did not meet during advisory. In practice, we recommend maintaining these interventions for the entire semester or school year, rather than withdrawing them after several weeks of implementation. We also encourage facilitators to consider whether and how relationships developed within the network meetings are built upon beyond those meetings.

Third, both adult facilitators considered these peer networks to be an acceptable social support model within these advisory classes. Specifically, each agreed the overall time commitment was reasonable, the intervention fit well within the school context, they understood how to implement the strategy, and their motivation to continue using the strategy in school was high. For example, one of the facilitators who indicated he planned to establish similar networks for all of the students on his caseload the following semester began taking such steps at the start of the new school year. A recurring theme within the research-to-practice literature is that educational practitioners are often concerned about having the time and resources needed to implement complicated, multicomponent interventions within their classrooms (e.g., Snell, 2003). In this project, we sought to engage local school staff as much as possible in launching and leading these networks. Although a coach from our research team was present at all of the network meetings, our role was to observe and offer feedback to the facilitator following the meeting. Each facilitator was able to recruit and orient peers, arrange meeting times, and coordinate the peer network meetings with minimal direct support from research staff. Despite the relatively brief amount of training we provided, these facilitators were able to implement networks that yielded marked increases in social interactions for all students. Although prior descriptive studies have suggested special educators and paraprofessionals consider peer-mediated interventions to be effective and feasible to carry out (Carter & Pesko, 2008), we found that staff who actually implemented peer networks also provided strong affirmation of these approaches.

Fourth, our findings indicate the adolescents who participated in these peer networks reported enjoying them and affirmed their social validity. This is a key consideration as peer partners and students with ASD are asked to commit their flexible advisory time to participate in group meetings. Most of the peers agreed their school should set up more peer networks, they would recommend being a peer partner to their friends, and they would be interested in participating in a peer network again. Moreover, almost all of the participating students with and without ASD said they considered one another to be friends at the end of the semester. The students' description of these new relationships as friendships is intriguing given that students allocated their time to other activities, people, or schoolwork when network meetings were not held. While we would argue that students' descriptions of their relationships should take precedence over those of adults, it is important to consider whether and how these relationships might have differed from those students had with other friends in their school. Although peers were not asked to assume instructional roles and interactions were generally characterized as reciprocal, it is possible they still viewed these as "helping relationships" (Rossetti, 2011; Van der Klift & Kunc, 1994). If so, this could account for why students interacted less often when peer network groups were not asked to meet. As practitioners establish these social-focused interventions in secondary schools, care should be taken to reflect on the ways in which the design and delivery of these peer networks might shape the relationships that emerge over the course of the semester or school year.

Fifth, while overall fidelity of implementation was generally high, there was still some variability across network meetings. One area of lower fidelity related to having students suggest activities or topics for the next peer network meeting. While a long-term goal is to increase student leadership of these meetings, we found that the majority of early activities had to be planned by adults. Choosing activities that were context-appropriate and interesting to high school students was occasionally challenging. Because the quality of the selected activities has the potential to impact the ways in which students interact with each other, additional research is needed to identify how to select activities that best set the occasion for rich, enjoyable conversations. In future studies, school staff may benefit from additional training on selecting appropriate activities and engaging peers more actively in planning and organizing activities.

Another area of lower fidelity related to efforts to address targeted social-related goals during meetings. Although school staff chose relevant social-related goals, these goals were not always easy to address within this particular group context. Indeed, we were deliberate about not asking peers to assume instructional or tutorial roles as part of a network. For example, Anton's peers felt uncomfortable directly telling him not to interrupt and instead addressed the goal more indirectly during the reintroduction of the network by redirecting the conversation or ignoring Anton when he interrupted. Conversely, George's goal to remain engaged in conversation/activities was naturally addressed because those skills were essential to the functioning of the group. Additional efforts are needed to identify how best to focus on individualized social goals naturally in ways that still encourage students to have fun together and contribute to friendship formation.

Limitations and Future Research

Several limitations to this study suggest directions for future research. First, our choice of a reversal design required that we place an intervention on hold that typically should be implemented throughout an entire semester or school year. Although this design decision strengthened our ability to make causal claims and highlighted the importance of maintaining peer networks in sustained ways, we were thus unable to reintroduce the peer network for George due to time constraints. Moreover, peers had other commitments (e.g., senior photos, multicultural days, senior trips) toward the end of the school year that interfered with advisory times. Beginning networks earlier in the school year could enable future researchers to examine the implementation of these interventions—and the relationships that develop within them—over the longer term. Indeed, the longitudinal study of adolescent relationships involving students with ASD and the factors that shape them has been strikingly absent from the literature. Future studies should address the ways in which students' initial encounters within these networks evolve (or fail to evolve) into more lasting relationships as they engage in shared activities with one another. Second, although we observed substantial improvements in social-related outcomes when peer networks were implemented, some aspects of these interventions occurred with lower fidelity than others. Because peer networks are intended to be flexible peer-mediated approaches relevant to a broad range of students, determining the degree to which each component is recommended or required warrants additional attention. Although selecting interactive activities, including active adult facilitation, and addressing targeted social-related skills have all been recommended, component analyses are needed to determine whether and how these various intervention components ultimately impact the effectiveness and acceptability of the approach.

Third, our study was limited to just two urban secondary schools. Because peer culture, educator commitments, and school climate can each impact the receptivity of students and staff to these types of interventions, additional research is needed to determine whether similar findings would be obtained in schools that differ from those with whom we partnered. Fourth, our observational measures only address certain aspects of students' relationships within these networks. Although friendships are usually marked by frequent interaction and social engagement, additional work is needed to better capture the quality of students' interactions and the ways in which these interactions shape the relationships that develop over time.

The interactions and relationships students have with their peers can have a substantial impact on the well-being and school satisfaction of adolescents (Wentzel et al., 2012). Peer network interventions offer a practical and promising approach for connecting students with and without ASD within inclusive school classrooms. We encourage other scholars to explore further avenues for addressing the social-related needs of adolescents with ASD.

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