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Research Article

Cultural Brokers in Special Education

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Abstract

Culturally and linguistically diverse families face substantial barriers in the special education system and seek support from cultural brokers to help them navigate it. We used a qualitative design to study cultural brokering experiences among Latinx families of children with extensive support needs and cultural brokers. Through individual interviews with 10 Latinx families of children with extensive support needs, and focus groups with 10 Latinx cultural brokers, this study shows how cultural brokers inform, encourage, assist, and provide emotional support for Latinx families, and revealed their motivations, qualities, and skill sets. The findings also include recommendations for teachers and schools who want to engage in cultural brokering to improve their partnership with Latinx families.

Keywords

cultural brokering, family–school partnerships, Latinx families, students with extensive support needs, cultural humility

The term "cultural brokering" originated in the field of anthropology in the mid-1900s in the context of colonialism. It is commonly understood as the act of bridging or mediating between groups or persons of differing cultural backgrounds to reduce conflicts or produce change (Jezewski, 1990; Jezewski & Sotnik, 2001). Rossetti and his colleagues (2018) defined it as "any advocate who had engaged in the purposeful act of connecting people of differing cultural backgrounds to improve collaboration" (p. 3). Wenger (1998) included brokering as part of his Communities of Practice knowledge framework as "connections provided by people who can introduce elements of one practice to another" (p. 105). The concept of cultural brokering has mostly been explored in the health care sector because changing demographics in the United States created a disconnect between health care professionals and their patients who adhered to different belief systems around sickness, health, and health care providers (Lo, 2010). In health care contexts, people with different professional responsibilities, or community members, take on the role of cultural brokers, who are engaged as liaisons, cultural guides, mediators, and catalysts for change (National Center for Cultural Competence, 2004).

These definitions of cultural brokering may feed the notion that people belong to well-delineated cultures based on ethnicity, who simply need to be connected by someone who has cultural competencies in two groups. We, however, build on Lo's (2010) understanding of culture as "broad orientations or sense-making schemas that are shaped by multiple, intersecting structural forces, including, for example, race or ethnicity, immigration, gender, poverty, or religion. Culturally diverse families 'mix and match' their available schemas and sometimes pick up new ones" (p. 485). Following this hybrid interpretation of culture

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implies that "cultural brokering entails the mutual inclusion of different sets of seemingly incommensurate sense-making schemas or orientations so that there is a basis for sharing meanings and narratives" (p. 499). Pang and her colleagues (2019) consider cultural brokering as an appropriate intervention to address the intersectionality of culturally and linguistically diverse (CLD) families. CLD families can be born inside or outside of the United States and are minoritized due to one or more intersecting identity characteristics related to race, class, ethnicity, language, disability, and other characteristics (Rossetti & Burke, 2019). In the education literature, cultural brokering is emerging as a practice using different forms such as language brokers, school liaisons, and instructional aides (Anguiano, 2018; Cooper et al., 1999; Howland et al., 2006; Ishimaru, 2019; Ishimaru et al., 2016; Lewis, 2004).

In special education in particular, cultural brokering holds promise for CLD families who have to navigate a White, Eurocentric, complex system (Pang et al., 2019; Rossetti et al., 2017; Rueda & Genzuk, 2007; Smiley et al., 2008). Schools are mandated to give parents the opportunity to be involved in the education of their child with a disability (Individuals with Disabilities Education Act [IDEA], 2004). Parents are required members of the Individualized Education Program (IEP) team, and they have the right to consent to evaluations, placements, and services (Turnbull, 2005). For the purpose of this article, we use an interpretation of parent involvement that reflects partnership because a family–school partnership explicitly acknowledges the expertise of families:

> A relationship in which families (not just parents) and professionals agree to build on each other's expertise and resources, as appropriate, for the purpose of making and implementing decisions that will directly benefit students and indirectly benefit other family members and professionals. (Brogdan et al., 2015, p. 161)

Family–school partnerships are particularly important for students with extensive support needs (including autism, deafblindness, moderate to severe intellectual disability, multiple disabilities, and serious emotional disturbance) because of the need for person centered planning to develop meaningful student goals (Shogren et al., 2017; Snell & Janney, 2005), the risk students face of being placed in restrictive environments (Agran et al., 2020; Brock, 2018), and the presence of large educational teams (Cooper-Duffy & Eaker, 2017; Hunt et al., 2003)—all of which require parents to have strong communication and advocacy skills. For many of these students, there is also a need for intense collaboration around behavior support plans (Weist et al., 2017) and alternative communication systems (Chung & Stoner, 2016). Consequently, family–school partnership benefits the student's placement options, services, and academic and social learning outcomes (De Apodaca et al., 2015; Lovelace et al., 2018; Newman, 2004; Weist et al., 2017), and it also reduces parent stress (Burke & Hodapp, 2014).

Despite evidence of its effectiveness, family–school partnerships have largely remained an unattainable ideal for families raising a child with a disability (Francis et al., 2016; Starr & Foy, 2010). Establishing the necessary partnerships is even more challenging for families from CLD backgrounds due to practical constraints (e.g., language barriers), cultural differences (e.g., beliefs about professionals), and the cultural underpinnings and characteristics of the special education system (e.g., the assumption of advocacy) (Burke et al., 2018; Cobb, 2014; Gómez Mandic et al., 2012; Kalyanpur & Harry, 2012; Lightfoot, 2004). Rossetti et al. (2018) found that parents from different immigrant backgrounds were not able to engage in meaningful ways in IEP meetings due to language barriers, problematic meeting logistics, and a lack of value for parental input. They also found issues of accountability and a lack of effort by school personnel to connect with families in between the meetings. The expectation of parent advocacy within special education is culturally rooted and is premised upon cultural capital (Kalyanpur et al., 2000; Rodriguez et al., 2014; Salas, 2004; Trainor, 2010). Across the United States, special education teachers have reported difficulty engaging with CLD families as a major issue in special education (Fowler et al., 2019). Building cultural reciprocity implies that special education professionals become aware of their own biases and the cultural underpinnings and implicit values and beliefs that drive their field. It also means that CLD families can build up the cultural capital to engage in partnerships and achieve equal opportunities and outcomes for the education of their children with disabilities.

Rethinking family–school engagement models is essential to avoid a mismatch between the practice of special education and the needs of large portions of the communities being served (Cohen, 2013;

De Gaetano, 2007; Hoover & deBettencourt, 2018; Lian & Fontanez-Phelan, 2001). According to Mortier et al. (2020), Latinx families with children with extensive support needs were stressed due to inaccessible IEP meetings, feelings of isolation and vulnerability, and substandard programs and services for their children. They felt empowered when they became informed and connected, when they changed their perspective about their own position in the team, and when they learned specific strategies to navigate IEP meetings. A theme throughout these families' stories was the people on their journey who made a real difference and who fulfilled the role of a cultural broker.

Because of the emerging research on cultural brokering and the identified needs of CLD families, our research focused on cultural brokering and family–school partnerships for Latinx families of students with extensive support needs. The purpose of the study was to explore the potential of cultural brokering for the field of special education, based on the experiences of Latinx families and cultural brokers. The research question addressed was, "What are the cultural brokering experiences of Latinx families of children with extensive support needs and cultural brokers as it relates to family–school partnership?"

Method

We used a generic qualitative research design (Lichtman, 2013) to investigate the research question. Data were collected through semi-structured individual and focus group interviews, and two data sources (families and brokers) were used to examine the phenomenon of cultural brokering for Latinx families of students with extensive support needs.

Participants

This research focused on Latinx families in California for demographic reasons. A Latinx person is someone from Cuban, Mexican, Puerto Rican, South or Central American, regardless of race (California Department of Education, 2019). "Currently most people who use 'Latinx' indicate that they do so in the spirit of gender inclusivity" (Torres, 2018, p. 284). In California, Latinx students make up 54.6% of the student population, with 12% of them receiving special education services (California Department of Education, 2019).

After receiving approval from our Institutional Review Board, we used purposeful and snowball sampling procedures (Patton, 1990) to recruit parents of children with disabilities from the Latinx community and cultural brokers. A total of 20 participants were included in this research: 10 were parents and 10 were cultural brokers. All participants lived in an urban area in California.

Inclusion criteria for parent participants were that they identified as Latinx and were a parent of a child that is eligible for special education services. We recruited the 10 parents who participated in the study through a Latinx support group, a parent resource center, and two special education teachers from school districts with a large Latinx student population. The interested parents provided the researcher with their contact information through a trusted intermediary. The first author called each of the potential participants to go over research and consent procedures. The phone calls were conducted in Spanish and were followed by an email communication regarding informed consent procedures. Even though the recruitment efforts did not exclude fathers, only mothers agreed to participate. The 10 mothers in this study (Table 1) had children between the ages of 8 and 17 years, who were eligible for special education services. Eight out of their 11 children had extensive support needs, participated in the state alternate assessment, and were enrolled in moderate/severe disabilities programs. One of those students was included in the general education classroom, and the other seven received instruction in special day classes. One mother had a child diagnosed with attention deficit hyperactivity disorder and a learning disability, and one mother's twins were both diagnosed with autism and a learning disability. Those children were supported by a resource teacher in a mild to moderate disabilities program and were included in general education classes. Two of them participated in the state alternate assessment. Their experiences spanned six different local education agencies in an urban area in California. All of the parents were born in Latin American countries, and they self-identified as Latinx and as monolingual Spanish, with varying levels of comprehension of English. Parents had

Table 1. Parent Participants ($N = 10$).

Parent	Child	Age (years)	Label	Placement	District
Mercedes	Girl	8	Intellectual disability	SDC	SD 1
Maricruz	Boy	8	Autism and learning disability	Inclusion	SD 2
	Girl	10	Autism and learning disability	Inclusion	SD 2
Maritza	Boy	11	ADHD and learning disability	Inclusion	SD 3
Regina	Girl	12	Down Syndrome	SDC	SD 2
Hermina	Boy	12	Autism and learning disability	Inclusion	SD 1
Eva	Boy	13	Intellectual disability	SDC	SD 4
Luz	Girl	14	Multiple disabilities	SDC	SD 5
Monica	Boy	15	Multiple disabilities	SDC & mainstreaming	SD 3
Hortencia	Boy	16	Autism and intellectual disability	SDC	SD 6
Irma	Girl	17	Autism and intellectual disability	SDC	SD 6

Note. SDC = special day class; SD = school district; ADHD = attention deficit hyperactivity disorder.

different levels of experience with and involvement in disability-related support groups or family resource centers.

The inclusion criterion for cultural brokers was having been engaged as an advocate for Latinx families of children with disabilities to improve family–school collaboration. The criterion was intentionally kept broad because we did not want to predetermine who cultural brokers are for families in special education. Seven cultural brokers were referred to us by the mothers who participated in the study and by a family resource center. For three cultural brokers who were involved in a longer period of data collection, we used intensity sampling (Patton, 1990), finding "information-rich cases that manifest the phenomenon intensely, but not extremely" (p. 182). These participants were chosen because of their extensive experience (5, 11, and 20 years) as cultural brokers for Latinx families. In addition, they engaged in this role from different positions (a special education teacher, a voluntary parent mentor at a family resource center, and a family engagement specialist for a disability specific agency). The special education teacher was a graduate from the first author's credentialing program, and the other two cultural brokers were recruited through snowball sampling (Patton, 1990). Four out of the 10 cultural brokers had a job description that involved supporting families of children with disabilities, whereas the other six fulfilled that role entirely on a voluntary basis. Three of the 10 cultural brokers did not have a child with a disability. Three identified as monolingual Spanish, and they all self-identified as members of the Latinx community (Table 2).

Procedures

Data collection. Overall, 10 mothers participated in individual semi-structured interviews with the first author of this study. The interviews were conducted face-to-face in the interviewee's preferred language and location. All mothers chose Spanish, and locations included the homes of participants, a café, and a library. They were asked to provide examples of instances of connection/trust and disconnection/distrust with the school and to reflect upon them. Other questions related to the help they receive from and give to others, and their suggestions for teachers and administrators to enhance partnership with Latinx families. The mean length of the interviews was 44 min.

For the data collection with seven cultural brokers, we used focus group interviews because the interaction between the participants would allow for a deeper discussion of the phenomenon (Krueger & Casey, 2018). The element of interaction was especially appropriate because cultural brokers often engage in that role without explicitly referring to it as brokering. Due to logistical constraints, we were not able to set up a single focus group interview but organized three small focus groups (two with two participants and one with three participants) in locations that were easily accessible to the participants. The locations included an office of a local education agency, a meeting room at a parent resource center, and a classroom. Two focus

Table 2. Cultural Brokers Participants ($N = 10$).

Pseudonym	Gender	Affiliation	Parent	Language
Camilla	Female	Translator	No	Bilingual
Emilia	Female	Special education teacher	Yes	Bilingual
Victoria	Female	Family service coordinator at regional center	No	Bilingual
Olivia	Female	Resource specialist at a family resource center	Yes	Bilingual
Carmen	Female	Voluntary parent mentor at a family resource center	Yes	Monolingual
Yolanda	Female	Special education teacher	No	Bilingual
María	Female	Family engagement specialist for a disability-specific agency	Yes	Bilingual
Isolda	Female	Voluntary parent mentor at a family resource center	Yes	Monolingual
Felipe	Male	Education coordinator at a family resource center	Yes	Bilingual

group interviews were conducted in Spanish and one in English. The mean length of the focus group interviews was 74 min.

Three cultural brokers were asked to keep a log of their brokering activities for 5 months. A summary of the log activities was used during the individual semi-structured interview at the end of the 5 months to ensure the participants reflected upon the full range of their brokering activities. Based on the participant's preference and availability, one of the interviews was conducted at the participant's home in Spanish, and two were done using Zoom video conferencing software in English. The interview questions focused on why and how they engaged as a cultural broker and their suggestions for schools (teachers and administrators) as well as for Latinx families to facilitate parent–school partnerships. The mean length of those interviews was 47 min.

Data analysis. We used inductive data analysis procedures (data, transcripts, codes, categories, themes) to find themes in the data related to the research question about the phenomenon under study (Lichtman, 2013; Saldaña, 2016). Each interview was audio-recorded and transcribed verbatim in Spanish and English by a professional transcription service. Three authors and a graduate student did a line-by-line analysis of the transcripts. This open coding process was done manually using the Microsoft Word review function. Two thirds of the data (62.5%) were independently coded by two researchers. This led to a master list of codes across all of the data related to experiences with cultural brokering.

Through an iterative process, the three authors identified categories within the codes. We listed all the codes from the open coding and assigned a potential category to each code. As soon as patterns started to emerge, we grouped the codes into those categories and assigned subsequent codes to those categories as well. During that process, some categories were collapsed and renamed when there was overlap. This collaborative consensus process resulted in a codebook of seven categories that covered reoccurring codes across all of the interview data. Categories were as follows: *roles and strategies, qualities of a cultural broker, issues and support needs of Latinx families, motivation to take on a cultural broker role, recommendations for schools and professionals, commitment and challenges*, and *reaching Latinx families*. We developed a codebook by defining each of the categories and adding an example (Table 3).

The next phase consisted of identifying themes within those categories and across participants. We uploaded the 16 transcripts into NVivo (v.11.4.3) software and developed seven NVivo nodes based on the codebook. The researchers compared differences after coding one transcript which led to refinement of the definitions in the codebook. Once all the transcripts were coded in NVivo, the first two authors developed tables of themes within each of the categories, compared them, and engaged in several discussions about the differences in interpretation of emerging key patterns and themes until consensus was reached. During that process, we decided to drop the "issues and support needs of Latinx families" category for this study because the data in that category did not correspond with our research question. To show the distribution across categories and between data from cultural brokers and from families, we calculated the code frequency and the code representativeness of the parent interview data and the cultural broker data (Table 4).

Table 3. Categories Defined.

Categories	Definition and examples
Roles and strategies	What a cultural broker does (at different levels) and how a cultural broker engages, informs, and empowers Latinx families. *Example*: "We have school events like there's Academy of Science Family Day, and you can go to that. And I make sure all the parents know and sign up for it."
Qualities of a cultural broker	Comments related to attitudes and skill set that a cultural broker has. *Example*: "The most important thing is empathy, putting yourself in the shoes of the other person, I think that is the first door you have to have."
Issues and support needs of Latinx families	Issues, barriers, and needs that Latinx families with children with disabilities have according to cultural brokers. *Example*: "It was horrible in my case, being in a country with a language that wasn't mine, I didn't have family, I had nothing, I didn't have my parents here, it was terrible, apart from everything, having the autism of my daughter, and all that that meant in relation to other people."
Motivation to take on a cultural broker role	Comments about what drives someone to get involved as a cultural broker for Latinx families, what they get back, their goal of brokering. *Example*: "So, I learned, and I want to teach new parents that. You know, they helped me, and I want to help them so bad."
Recommendations for schools and professionals	Suggestions that participants have for other professionals (teachers, administrators, therapists). *Example*: "I think like showing parents what their kid is capable of is also really powerful."
Commitment and challenges	Comments about the kind of commitments made and issues related to their commitment. *Example*: "And I had to create a Google Voice number because I was getting too many calls on my normal phone, outside my work hours."
Reaching Latinx families	Comments about how Latinx families are reached. *Example*: "They knew I'm in this position, and I had a son with disabilities, they reach out to me for support."

Table 4. Coding Frequency and Representativeness.

	Coding frequency[a]		Cultural broker interviews Representativeness[b]		Parent interviews Representativeness[b]	
Categories	*n*	%	*n*	%	*n*	%
Roles and strategies	201	36.7	103	51.2	98	48.8
Qualities of a cultural broker	47	8.6	34	72.3	13	27.7
Motivation to take on a cultural broker role	57	10.4	39	68.4	18	31.6
Recommendations for schools and professionals	166	30.3	83	50.0	83	50.0
Commitment and challenges	18	3.3	16	88.9	2	11.1
Reaching Latinx families	59	10.8	49	83.1	10	16.9
Total	548	100	324	59.1	224	40.9

Note. The category of *issues and support needs of Latinx families* was dropped during analysis and therefore is not reported in this table.
[a]Total number of codes in each category, and percentage of total codes. [b]Number and percentage of codes in each category.

Credibility measures. Interview transcripts were sent to participants for member checking (Brantlinger et al., 2005); 85% of the participants responded. These member checks led to minor changes in the transcripts such as corrected acronyms or completed sentences that were left open due to poor audio. In addition, two different data sources were used to study this phenomenon (data triangulation), and we engaged in collaborative work (investigator triangulation). Data analysis triangulation was used in each step of the analysis process to minimize researcher bias and to ensure reliability of the results (Brantlinger et al., 2005).

Our four-person research team consisted of one team member who identified as Latinx, one parent of a child with extensive support needs, one special education teacher, and a university professor; the four members were from differing cultural backgrounds and had different levels of engagement with this topic. The awareness of our positionality and the deep discussions among team members during the coding process promoted the trustworthiness of the findings.

Findings

This study's findings show why cultural brokers engage in this role, what skill set they have in common, and the main strategies they use. The data also suggest how to reach out to Latinx families and what teachers and administrators can do to improve partnerships with families from the Latinx community.

Commitment of Cultural Brokers

Witnessing parents struggle was a major motivator for cultural brokers to become involved. It could be parents who were intimidated or overwhelmed by the system (e.g., IEP meetings), unable to communicate due to language and terminology, or uninformed about their rights or available services. Irma's feelings of indignation motivated her to be a cultural broker:

> When I see this mom being threatened to get transportation services taken away and she doesn't drive a car and how scared she feels, it gives me a lot of courage [to fight] because it is unjust because they [the administrators] wouldn't do that to a person who is informed.

Cultural brokers who were parents felt compelled to give back because someone had done the same for them in the past. One parent described that it felt like "her duty" to share what she knows. A recurring motivator across all of the participants was that cultural brokering often results in new parent leaders who will, in turn, help other families. "I like helping them [parents] take steps so that they can achieve what they want to achieve. And obviously there is the hope that when they are successful, that they will share with others," shared Victoria. Commitment to the Latinx community was another common drive for action. Last, there were many accounts of how rewarding cultural brokering was because advocating together was powerful, making a difference was satisfying, and sharing stories was mutually beneficial. "We have been able to get, thank God, a lot of things for kids and it makes me happy" (Luz).

The strong motivation to act as a broker led to voluntary time commitments for all participants. Most of them were available as a resource to many different families, often in long-standing relationships. Vicky shared as follows:

> I always answer my phone, to be honest . . . And sometimes just to listen to them and say "Maybe you should go there," give them information. I believe they feel good when somebody's listening and always following up.

This would sometimes lead to being asked to help with random unrelated tasks, like help with ordering school pictures. Depending on the situation, they found ways to set boundaries that worked for them. The commitment of the cultural brokers extended to leadership roles in school and other communities.

Strategies Used by Cultural Brokers

Four brokering strategies common across all participants in this study were as follows: (a) informing, (b) encouraging, (c) assisting, and (d) providing emotional support. First and foremost, cultural brokers informed parents. Brokers inform to empower: "We have to empower families to want to express themselves, to raise their voices, but in order to do that, we have to inform them" (Maria). They informed families about their rights and their role as an IEP team member, and that their child has the same rights as a U.S. citizen. Knowing that they have a right to an interpreter, that they can record an IEP meeting and bring an

advocate, and that they do not have to sign the IEP right away were considered empowering pieces of information. Cultural brokers also informed parents about available services, resources, trainings, Latinx support groups, and parent resource centers. Hermina recalled getting help from teacher Osorto when her child started having anxiety issues:

> I did not know what to do at all and I knew Ms. Osorto from the school. She wasn't my child's teacher but she spoke Spanish. I told her my experience and she started giving me papers about mental health problems, and she encouraged me to look for help.

Last, they helped them understand that special education is a joint effort between families and professionals. Teacher Yolanda explained, "I also think it's important that parents know that I'm not the expert either. Like, I'm not God. I'm not gonna solve all the problems, and it's a team effort too."

A second strategy was encouragement. Cultural brokers encouraged parents to trust their own knowledge, not to be afraid and raise their voice, not to give up even after negative experiences, to follow up and check if services are delivered, to build positive communication and to get involved in the school despite possible language barriers, and to connect with other families who have a child with disabilities. Emilia reflected upon situations in which families give up because they don't receive the services that they requested:

> They [administrators] said yes, but they are not following that. The families said, "How am I going to ask for something else? They never did what they told us at the beginning." Sometimes we need to encourage these people, "Please, don't give up, keep asking."

Third, cultural brokers assisted parents with a variety of tasks including reading, writing, and translating documents, keeping track of names of professionals, preparing for and attending meetings, explaining documents with confusing or inaccurate information, and helping with the use of technology. Emilia recounted, "Also, translating, I would write letters for families, they needed letters. I would get my computer, go with them, and I would just write what they needed to say and then bring it to the IEP."

A fourth role that cultural brokers engaged in was providing emotional support. This was often necessary after a diagnosis or after parents listened to negative and harsh language about their child during IEP meetings. One approach was to build the parent's confidence by doing something together, such as sending email messages or attending school events together. Monica remembers bringing a cultural broker to the IEP meeting, "when I became too passionate, she would grab my hand and tell me 'wait' or 'wait, let me translate because I don't think you understood'." They also provided emotional support by being available, listening, and creating spaces in which parents are free from judgment, like support groups. Eva reflected on her experience in a support group, "It makes a difference in that I don't feel that I am the only mother with this experience." The two cultural brokers who were also special education teachers stressed the importance of having a positive focus such as discussing the child's strengths and growth, and sharing when a positive breakthrough happens at school. Yolanda confirmed that a picture is worth a thousand words because it gives parents valuable insights into school life and it can also be an effective language accommodation:

> I send a lot of pictures of my kids during the day. If they're working on—I have a student that's working on writing lowercase letters, and so, I'll have her hold her board up and I'll send the mom the picture of—and I'll tell her, "oh, she did it on her own," type-thing, and they love getting pictures.

Last, cultural brokers engaged in leadership roles by taking part in different school and community platforms, by organizing activities that benefit Latinx families who have children with disabilities, and by collaborating with others to change the system (e.g., advocating at the state capital, organizing a support group). Luz set up a support group: "We [the Latinx support group] just started here in the garage and we now have a space at the regional center with childcare."

Table 5. Qualities and Skill Set of Cultural Brokers.

Qualities and skill sets
View of families and children
Seeing families as capable
Seeing the families' priorities within the Latinx immigrant culture with all its variations
Regarding every child with a disability and their situation as unique
Having a strengths-based view of disability
Desire to start from the families' perspectives and their wants
Interaction style
Being empathetic and nonjudgmental, with a focus on listening
Establishing a bond
Refraining from giving advice, but being patient while showing options and explaining
Being trustworthy and making people feel comfortable
Being culturally humble
Desire to educate and empower
Desire to share the knowledge they have
Being available and being active in the community
Driven to self-educate continuously
Focus on giving tools so families can advocate for themselves
Desire to create community

Qualities and Skillset of Cultural Brokers

A central finding of this study is *how* cultural brokers took on their role. The data revealed that they shared particular qualities and skill sets (Table 5). First, they considered the families as capable and unique. Marie felt strongly about this:

> Well, every time I'm requested to do a guest lecture, I just make sure to bring that up, you know, and we have to believe in our families. That's the number one thing. We see a family that doesn't have much, you know, education or they don't have—like the socioeconomic level it's really low. They think they're ignorant. Or they think they don't want to do stuff, but they lay low. So, whatever, it is not true. We have to be really thinking that they're able parents. You know, they can do a lot of things if they're taught.

Cultural brokers in this study thought of each family and their child as unique—they had a nuanced view of culture and a strengths-based view of disability. Second, there were similarities in their interaction style, which was based in empathy and active listening. "A quality is, how to put this, knowing how to listen, because sometimes it is very easy to want to give advice, you barely have started talking about something and you want to tell them what to do already" (Isolda). They all had a strong focus on establishing a bond, being trustworthy, respecting their differences, and making parents comfortable. Third, cultural brokers had a strong desire to educate themselves and to empower others with what they had learned.

The parents valued brokers' availability and support, and they stressed the importance of a personal connection and a trusting relationship. Carmen expressed this sentiment when thinking back on her experience during her son's middle school years: "I had a case worker for my son in middle school for three years and she is like part of the family. We had such a very close relationship with her that now she comes to my house."

Reaching Latinx Families

An important way to reach Latinx families was to be out in their communities. All cultural brokers were active and involved community members, known as a resource for families who have a child with a disability. In addition, there was acknowledgment and consideration for the families' barriers such as work schedules, language barriers, shame and stigma around disability, their view on parent involvement with

professionals, and their hesitance due to fear of deportation. Emilia commented on how inaccessible meetings discourage parent participation, "these parents or families were probably intimidated, or they got to meetings where it doesn't make any difference if they go or not because maybe they don't understand." If lack of participation is not automatically assumed to be a lack of interest in their child's education, then possibilities for reaching families remain open. Carmen explains, "We are from a different culture, we trust the professionals and that they are doing things well. Parents are their own big barrier in that they stay away." Building relationships was key to reaching families, for example, by showing interest in their lives and care for their child. They encouraged parents to get involved in school activities, and the two brokers who were teachers shared that they organized celebrations that allowed families to connect with each other.

Recommendations for Schools

Brokers and parents provided suggestions for what schools can do to improve partnerships with Latinx families. First, they recommended that teachers and administrators be culturally humble, that they should get to know the families and show interest in their culture. "Cultural humility is a process of committing to an ongoing relationship with patients, communities, and colleagues that requires 'humility' as individuals continually engage in self-reflection and self-critique" (Tervalon & Murray-Garcia, 1998, p. 118). Showing interest in their culture also implies acknowledging that there are many variations of Latino culture and families. Yolanda spoke to this:

> One thing is to understand the diversity within Latino families, not everyone is the same. Not everyone celebrates the same holidays. Not everyone has the same expectations or beliefs. Not everyone can read and write in English or in Spanish. Don't assume. Like that is a huge thing for me, don't assume because you never know.

The participants shared that teachers and administrators can also show cultural humility by being honest and acknowledging their position of power, and by helping families feel comfortable when they attend school events.

A second recommendation was related to creating welcoming environments. They encouraged teachers to be as inviting and collaborative as possible. Parents appreciated it when teachers introduced themselves at the beginning of the school year, when they figured out ways to establish ongoing communication, and when they found common ground in terms of goals and strategies. It did imply doing things differently and sending out additional reminders:

> Finding opportunities, not just the typical once a year, back to school night where everybody sits and listens to what the teacher needs to do and leaves. It's still not a bonding opportunity, there is not a lot of time. [. . .] Just finding opportunities, anything, like a Mother's Day Zumba. (Emilia)

Third, having a positive focus makes a substantial difference. Examples that the brokers and parents shared were showing that you care about their child, using strengths-based language, and avoiding negative predictions about the future. Regina recalled, "They loved my child a lot in that school. They helped her a lot." A fourth recommendation was to organize trainings for teachers and parents. Camilla encouraged parents, "Ask for workshops on how to read an IEP, to learn how to read the page about related services, the page about the IEP goals, the transition plan. It is important that they [parents] voice that." There were several suggestions about school policy such as making sure there are certified translators and that all school communications sent home are translated. Two parents felt strongly about the need for commitments and training for inclusive education. Last, in one of the focus groups, participants discussed setting up a special committee that includes parents:

> For me the ideal would be that the LEA [local education agency] would form a special education committee in each school in which special and general education teachers, parents who have a child with a disability, and the principal would have the chance to meet every month. (Felipe)

Discussion

This study explored cultural brokering in family–school partnerships for Latinx families of students with extensive support needs. These children require ongoing parent and caregiver involvement in all aspects of life. A strong partnership with the school is key for the success of these students (Brogdan et al., 2015). Nevertheless, the literature about family–school partnerships for families with students with extensive support needs from diverse backgrounds is scarce. Studies on CLD families with children with extensive support needs mainly focus on the impact of disability on the family or on disability beliefs and behaviors (Shurr & Hollingshead, 2017). The results of this study highlight four strategies used by cultural brokers: informing, encouraging, assisting, and providing emotional support. The data show why cultural brokers engaged in this role and what qualities and skill set they had in common. Finally, the results include ideas about how to reach out to Latinx families, as well as indicate recommendations for schools.

The results align with literature on advocacy and parental engagement for CLD families of students with other disability characteristics in special education. The strategies used by cultural brokers in this study overlap with the elements of advocacy processes in special education: developing rapport, establishing clear expectations, learning about the child and the family, educating and empowering, and participating in IEP meetings (Burke & Goldman, 2017; De Apodaca et al., 2015). Our study also expands on the emerging literature on cultural brokering in education and in special education (e.g., Smiley et al., 2008). Like Ishimaru (2019), we notice that cultural brokering activities mainly aim to support families in decoding and assimilating to the dominant system, to improve access to special education resources and services for individual students. Even though these are important steps for families, they do not necessarily mitigate the power imbalances or systemic inequities for CLD families in educational contexts. Some transformative ideas were seen in the data about cultural brokers as leaders in school and in their communities, as well as in the suggestions for teachers and administrators that include more equitable collaborative roles, cultural humility, and power sharing. This study also contributes to the knowledge base of Latinx families in special education, which is essential, considering 18.5% of the population in the United States is Latinx (U.S. Census Bureau, 2019).

Implications for Schools

There needs to be an increased awareness among teachers and administrators that traditional parental involvement structures in schools, such as Parent–Teacher Association meetings, school open houses, parent–teacher conferences, and IEP meetings, place CLD families in a position of assimilation to dominant cultural norms, expectations, and behaviors (Ishimaru, 2019; Kalyanpur et al., 2000). Schools should acknowledge cultural brokering as an essential practice for increasing the engagement of CLD families. Teachers and administrators should encourage families to connect with cultural brokers within the school community, family resource centers, and community organizations. A cultural broker who is trusted by the family should be welcomed during IEP meetings and also between meetings. Especially for students with extensive support needs, ongoing communication is essential for implementation, generalization, and coordination of services (Lian & Fontanez-Phelan, 2001; Shapiro et al., 2004). Recognition of teachers and/or school staff who are already informally engaging in cultural brokering can be a way to acknowledge their important roles more formally and to provide them with the supports that they need.

Teachers, administrators, and other professionals who work with children can engage as cultural brokers themselves to bridge the gaps between families and the school system. Our data illustrate various ways in which teachers and administrators can engage as brokers, such as by creating welcoming environments, offering trainings for parents and teachers, setting up policies and committees that enhance parent partnerships, and by practicing cultural humility. In addition, the qualities and skill sets of cultural brokers in this study—such as positive views of families and children, an open interaction style, and the desire to educate oneself to empower others—provide an important model for educators who have the desire to be cultural brokers. The underlying assumptions of cultural humility are that to understand families, educators must also understand themselves (and their communities and colleagues) and they must be willing to see the

structural inequities. Thus, cultural humility involves an openness to ongoing critique of oneself and the system (Brown et al., 2016; Fisher-Borne et al., 2015; Tervalon & Murray-Garcia, 1998).

Limitations and Future Research

The exploratory nature of this study with a small number of participants, in one geographical area, and focused on one demographic does not allow generalization beyond the participants who participated in this study. An additional threat to the generalizability of our study results is that 15 out of the 20 participants represented visible, and potentially more acculturated, members of the Latinx community who were engaged in special education activism. Their views may be influenced by acculturation processes in the California special education system and through family support organizations, and do not necessarily reflect the experiences of families who are more isolated and on the outside of available support systems. A last limitation of this study is that there was no chance to do a second member check that included back translation.

Replication of this work with more Latinx participants and with other marginalized groups, and in different regions of the United States is needed to explore the potential of cultural brokering in family–school partnerships. In addition, studies that analyze the impact of trainings on cultural humility and cultural brokering will advance insights into awareness and competency building with teachers and administrators. Finally, action research that allows special education teachers and families to design partnerships that are based on cultural brokering and cultural humility would enhance our understanding of how these concepts can be more deeply integrated in special education practice.

This study challenges professionals in the field of special education to identify and connect families to cultural brokers, and to reflect on how they themselves can take on a cultural brokering role. The trust that is central to family–school partnerships can only grow within the context of authentic relationships with culturally humble professionals.

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Effects of a Literacy Feature in an Augmentative and Alternative Communication App on Single-Word Reading of Individuals with Severe Autism Spectrum Disorders

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Abstract

The purpose of this study was to investigate the effects of an augmentative and alternative communication (AAC) app with transition to literacy (T2L) software features (i.e., dynamic text and speech output upon selection of a graphic symbol within the grid display) on the acquisition of 12 personally relevant single words for individuals with severe autism spectrum disorder (ASD) who had minimal or no speech. The study implemented a single-subject, multiple-probe, across word sets design with four participants. All four participants in this study demonstrated increased accuracy reading targeted single words and results from this study provide preliminary evidence that the T2L features can positively affect the single-word learning of individuals with ASD who have minimal speech and limited literacy skills.

Keywords

augmentative and alternative communication, autism spectrum disorder, minimal speech, literacy, apps

Communication impairments are inherent with an autism spectrum disorder (ASD) diagnosis (Kasari et al., 2014). As many as 30% to 50% of individuals with ASD do not develop functional speech (Shane et al., 2015). These individuals have significant communication impairments characterized by having a very small repertoire of spoken words or fixed phrases that are used communicatively (Kasari et al., 2013). In addition, the spoken words or phrases are often restricted within contexts and functions and likely include scripted phrases that have been highly trained. For example, the individual may only use spoken words for requesting preferred food items with a familiar adult (e.g., I want X; Kasari et al., 2013).

To support communication and increase opportunities for participation, augmentative and alternative communication (AAC; for example, sign language, picture communication boards, AAC apps on mobile technology) may be required for individuals with ASD who have minimal speech. Currently, AAC systems are used with these individuals with the purpose to decrease challenging behaviors, increase social participation (e.g., turn-taking, social initiations), make requests, and participate in academic activities (e.g., spelling). More specifically, research demonstrates that aided, graphics-based AAC systems are successfully and frequently used with individuals with ASD and complex communication needs (Ganz, 2015; Ganz et al.,

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2012; Holyfield et al., 2017; Mirenda & Erickson, 2000). Individuals with ASD who require AAC often select high-tech devices when offered choices among high-tech speech-generating devices, low-tech picture exchange-based systems, or manual sign language (Ganz, 2015).

More students are being diagnosed with ASD, and subsequently, more students with severe ASD who have minimal speech are entering school than ever before. These learners must have access to, be involved in, and progress in the general curriculum. Therefore, instruction must be adapted to meet their needs (Knight et al., 2010; Light & McNaughton, 2013). Assistive technology and use of an AAC system become critical components to full educational participation, including participation in literacy instruction.

Research indicates only one in five students with extensive support needs acquires basic literacy skills upon leaving secondary education (Allor et al., 2010). One critical component of skilled reading is the ability to read individual words. When approaching a written word, an individual may either decode the word or recognize the word by sight. If decoding, the individual looks at the letters, retrieves the sound of each letter, blends the sounds, and thus determines the word. Alternatively, an individual may focus primarily on the orthography of the word and associate it with its referent by sight (Ehri, 2005). Sight word reading instruction alone is not sufficient for students to meet high literacy standards. Yet, in the absence of developed phonic skills, it can assist individuals in navigating their environments to support everyday independent functioning (e.g., grocery or community words; Mechling et al., 2002), help individuals increase confidence (Light & McNaughton, 2013), support meaningful reading experiences (Mandak et al., 2019), and assist students with limited literacy skills in seeing a relationship between words and meaning (Broun, 2004).

Sight words are generally taught through the systematic presentation of words, prompts, and contingent feedback for correct and incorrect responses (Browder et al., 2006). Sight word intervention components and stimuli have included matching tasks (Fossett & Mirenda, 2006), computer-based instruction (Hetzroni & Shalem, 2005), flashcards and games (Crowley et al., 2013), and tablet technology (Caron et al., 2018; van der Meer et al., 2014). Browder and colleagues (2006) conducted a meta-analysis of 128 studies of reading instruction for students with significant cognitive disabilities and found that 75% addressed sight word instruction. Analyses yielded strong evidence of effectiveness for sight word instruction that used massed trials and systematic prompting. In a review of sight word studies for individuals with ASD, Spector (2011) found similar results with strong effectiveness for interventions with massed trials and systematic prompting. Studies that included visual supports and task modifications also yielded high effectiveness. In the previously mentioned reviews, many of the participants were able to use speech to participate in interventions and sight word–related assessments. Spector found only nine single-subject sight word studies for individuals with ASD. Of the nine, six of these studies included individuals with ASD who used speech and therefore instructional and/or assessment tasks that required spoken responses.

Although explicit literacy instruction is vital, current AAC technologies and features within high-tech speech-generating devices could also be used to complement more robust literacy instruction and possibly even incorporate literacy into everyday communication opportunities. Individuals with ASD who have minimal speech and use AAC typically have systems with graphic symbols (i.e., photographs, line drawings) to represent words or concepts for communication. These graphic symbols are often paired with a static text label located above the image; however, this static pairing of text and graphic symbols may interfere with sight word learning (Erickson et al., 2010; Fossett & Mirenda, 2006). Emerging research has begun to explore redesigning AAC systems to better support literacy, with Light et al. (2014) proposing the incorporation of a transition to literacy (T2L) feature into AAC technologies. The T2L feature pairs voice output messages with corresponding orthographic output, upon selection of a graphic symbol within an AAC display (Light et al., 2014; see https://tinyurl.com/rerc-on-aac-T2L for a video example of the feature).

The T2L feature has been incorporated into both visual scene display applications (hereafter referred to as an "app") and AAC systems that use grid-based displays. Mandak et al. (2019) investigated the effects of the T2L features in a visual scene display app with preschoolers with ASD and some speech. All participants demonstrated successful acquisition of the 10 target single words (range: 77%–100% accuracy) during the shared reading of the book *Brown Bear Brown Bear*. In a study by Caron et al. (2018), the T2L app feature was investigated using a grid-based display within an AAC application. All five participants with ASD demonstrated increased accuracy reading 12 single words through exposure to the T2L feature during a structured matching task. These participants, who were described as

minimally verbal with some literacy skills (e.g., could not decode, yet were able to identify more than 100 sight words), were also able to transition from a 15 location graphics-based grid display to a 15 location text-only grid display during generalization tasks.

The purpose of this study was to further investigate the effects of dynamically displaying text along with speech output (T2L feature) within a graphics-based grid display AAC app, to support the acquisition of targeted single words with individuals who have severe ASD and minimal speech. In previous studies using the T2L feature, the participants had an ASD diagnosis, minimal speech, and more literacy skills (e.g., over 100 sight words; Caron et al., 2018), or the participants had diagnoses of moderate ASD, were young, and primarily used speech (e.g., Mandak et al., 2019). Although gains were observed with both studies, the researchers speculated that intrinsic factors including speech abilities, age, severity of diagnosis, and prior literacy skills may have played a role in the rate of acquisition, as well as the positive benefits of the T2L feature. Additional research with individuals who have severe ASD, minimal speech, and more minimal literacy would expand understanding of who the T2L feature could benefit. Subsequently, the research questions for the proposed study were as follows: (a) What is the effect of the AAC app with the T2L software feature on the acquisition of 12 single words, during a structured matching task, by individuals with severe ASD who are minimally verbal and have very limited literacy skills? (b) Are the effects maintained once exposure to the AAC app with the T2L feature is terminated? (c) Do the participants generalize the single-word reading skills to different stimuli?

Method

Participants

Participants for this study were recruited through outreach to teachers and speech-language pathologists in Pennsylvania schools who worked with students with severe ASD. The inclusion criteria used to select participants required that individuals: (a) had an ASD diagnosis based on the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM*-5) criteria and a rating of severe on the Childhood Autism Rating Scale (second edition; CARS-2; Schopler et al., 2010), per teacher report; (b) were aged 5 to 21 years old; (c) were unable to meet daily communication needs through speech per teacher report, parent report, and classroom observation; (d) were able to follow one-step directions per teacher report and classroom observation; (e) could communicate symbolically with a minimum of 10 spoken words, signs, or graphic symbols, per teacher report and classroom observation; (f) had English as the primary language used at home; (g) had hearing and vision that were unimpaired or corrected per teacher or parent report; and (h) were not decoding and recognized less than 50 sight words, per teacher report.

Four boys with ASD ranging in age from 9;7 (years; months) to 18;7 ($M = 14;0$) participated in the study (see Table 1). All of the individuals scored below the first percentile on the Peabody Picture Vocabulary Test Version 5 (i.e., they received a Standard Score of 42 or below, corresponding to an age equivalent of 3.2 years or below). Three out of four participants had very limited to no speech and used AAC apps with grid-based systems on the iPad. The fourth participant also used physical communication and gestures; however, he primarily used 20 spoken word approximations and rote phrases (e.g., "I want that") to communicate. They all attended educational programs with substantially separate ASD support services. No participants had specific literacy goals (e.g., letter-sound knowledge, sight word learning) as part of their education plans. In previous classroom settings, participants did have exposure to letters and words of the week. Participants did have access to a variety of iPad applications that had reading-related activities (e.g., BitsBoard). Refer to Table 1 for literacy screening results regarding participants' letter-sound correspondence, sound blending, and sight word knowledge prior to the start of the study.

Research Design

This study implemented a single-case multiple-probe, across word sets design with four participants. The acquisition of the 12 single words was evaluated across four phases for each of the three-word sets including baseline, intervention, generalization, and maintenance.

Table 1. Participant Demographics.

Demographic	Nick	Jake	Cole	Curt
Age	18 years; 7 months	17 years; 1 month	9 years; 7 months	10 years; 10 months
Gender	Male	Male	Male	Male
Disability	ASD	ASD	ASD	ASD; Seizure disorder
CARS-2[a]	Severe	Severe	Severe	Severe
Grade and educational placement	11th grade; substantially separate autism support classroom; no inclusion	10th grade; substantially separate multi-disability classroom; no inclusion	4th grade; ½ day of therapies and ½ day of 1:1 virtual charter school; no inclusion	5th grade; Substantially separate autism support classroom; included for gym and art
Communication modes	Physical communication; low-tech communication notebook with 8 to 12 line drawings (icons or photographs) per page	Physical communication; 10 sign approximations; limited use of an iPad with GoTalk Now (9 icons per page)	Physical communication; 10 sign approximations; iPad with Proloquo2Go	Physical communication; rote spoken utterances (I want + object); low-tech supports for task completion and schedule
PPVT-4, Form A)[b]	Standard score: 40 Percentile rank: <0.1% Age equivalent: 3.2 Description: Profound impairment	Standard score: 40 Percentile rank: <0.1% Age equivalent: 2.3 Description: Profound impairment	Standard score: 40 Percentile rank: <0.1% Age equivalent: 2.9 Description: Profound impairment	Standard score: 42 Percentile rank: <0.1% Age equivalent: 3.11 Description: Profound impairment
LSC[c]	12	26	26	10
Dolch word screening[d]	3	15	10	2
Estimated total sight word inventory[e]	10	20	25	15

Note. ASD = autism spectrum disorders; CARS-2 = Childhood Autism Rating Scale (2nd edition); PPVT-4 = Peabody Picture Vocabulary Test (4th edition); LSC = letter-sound correspondences.
[a]CARS-2 helps to identify and distinguish severity of Autism. [b]PPVT-4 is an assessment of understanding of spoken language. No test modifications or adaptations were provided. [c]LSC were assessed by presenting four-letter tiles and the researcher stating the target letter sound. Each letter-sound was targeted three times. If the participant identified the letter-sound correctly in two out of three trials (or more), then the sound was considered known. Scores are presented as total correct out of 26. [d]Number correct out of 40, based on pre-primer word list. Written words were presented in groups of four and words were read aloud. The participants pointed to a word. [e]Sight word inventory is estimated based on (a) screening of Dolch words ($N = 40$) and (b) teacher report. The total includes the Dolch words read successfully plus personally relevant words like names, places, foods, movies, and so on.

Measures and Data Analysis

The dependent variable for the study was the percentage correct during the single-word reading probes. Specifically, the correct identification of a graphic symbol selected from a field of four, when provided with a target written word, across eight trials (each target word presented twice). Probes were conducted across all study phases. A correct response during the probe tasks was defined as an independent selection of the correct graphic symbol within 5 s of the researcher's presentation of the word. An incorrect response was defined as the selection of the wrong graphic symbol or lack of response within 5 s of the researcher's presentation of the written word.

Data on the accuracy of reading the target words were graphed separately for each individual across the four phases and three word sets. The level, slope, and variability of the data in the intervention condition were compared to those at baseline to determine the effectiveness and efficiency of the introduction of an AAC app with T2L software features. In addition, Tau-U effect size was calculated (Parker et al., 2011). A Tau-U score ranges from 0 to 1 and can be interpreted using the following criteria: .20 or lower is a small

effect; between .20 and .60 is a moderate effect; between .60 and .80 is a large effect; and between .80 and 1 is a very large effect (Vannest & Ninci, 2015).

All sessions were videotaped, and probe data were recorded live. To ensure the reliability of the data, coding from the videotaped sessions by the graduate student was compared to the data sheets collected live by the researcher. The graduate student coded a randomly selected sample of 30% of the baseline and intervention sessions and all of the generalization and maintenance sessions, for each of the participants, across each word set. Interrater agreement was calculated by determining the number of agreements divided by the number of agreements plus disagreements plus omissions. The mean interrater reliability per participant, per phase, was 100%.

Materials

Target words. Twelve personally relevant motivating single words were selected for each participant. To identify personally relevant and motivating words, teachers, para-educators, and family members were provided a questionnaire and asked several questions about the participants, including (but not limited to): general likes and dislikes, places they visit frequently, common leisure activities, objects, and items they request or talk about with frequency. Available high-tech and low-tech AAC supports were reviewed to gather additional information regarding words that were communicated frequently or rewards that the individuals selected for task completion or engagement (e.g., juice, lego pieces). After a corpus of 20 words was gathered per participant, the words were discussed with relevant stakeholders, including the individual with ASD. A final list of 12 words was grouped into three sets of four words, for each participant. Words had to be three to nine letters in length; imagable (e.g., pizza, legos); and contain, within a set, at least two words that shared the same initial letter (e.g., jeep, juice, bike, mickey). All target words were presented with lower case letters.

Probe materials. Assessment probes were used throughout the study to evaluate the participants' accuracy in recognizing the target words. The materials for the assessment probes included laminated graphic and orthographic representations of the target words. The graphic representations included SymbolStix icons (see https://www.n2y.com/symbolstix-prime/). Screenshots of the AAC application were taken to obtain these graphic symbols. The graphic symbols were printed in color and cut into 2″ × 2″ squares. Assessment probes for generalization included photographs of the target words. The photographs selected for the probe were not seen during instruction. For the orthographic representations, laminated text cards were created by printing the word in black, 72 point Arial font on yellow paper.

AAC hardware and software. During the intervention phase, the AAC technology with the T2L feature was introduced to the participants. The T2L software feature was used on a NOVA Chat 12™ device (see https://saltillo.com/products/print/nova-chat-12). A 15-button display was programmed with graphic symbols (i.e., symbols for the 12 target words and three words for models). The T2L feature occurred sequentially. First, the dynamic presentation of the text appears. It emerges from the selected graphic symbol. Then, the grid display is slowly replaced by a black background and the word. The word stays on the screen for 3 s. While the text is on the screen, it is paired with speech output (matching the text exactly). After 3 s is over, the text shrinks back into the graphic symbol and disappears. Refer to https://tinyurl.com/rerc-on-aac-T2L for a video demonstration of the T2L feature.

Individualized photo books. Three books were created for each target word set using Microsoft Powerpoint and then printed for intervention. Each of the books included one photograph or AAC symbol without text per page. Participants were prompted to match the picture from the book to the symbol in the device. The first picture book used the SymbolStix icons from the device, creating an "exact match." The second book used photographs, representative of the same concepts as the AAC symbols on the device (and the target words), but no longer a direct match to the AAC symbols on the device. These photographs were different from the photographs used during generalization. The third picture book also used photographs,

representative of the same concepts as the AAC symbols on the device and the target words. However, these photographs were combined with characters or other objects of interest (e.g., SpongeBob with the target sight word jeep). Each book included three pages of photograph symbols for each target word. The photobooks did not include any written words.

Procedures

All of the sessions were conducted by the first author and took place in a classroom. Three to four sessions occurred each week, with each session lasting approximately 20 to 30 min. Due to scheduling challenges, two sessions were sometimes scheduled on the same day, yet a break including completing other tasks occurred between each session. The procedures for each of the study phases are outlined in more detail next.

Symbol training. Before the start of the study, all participants were assessed on their accuracy in symbol identification of the target words and foils. They were presented with four graphic symbols and the spoken instruction, "*point to*_____." Matching picture-to-text probe tasks were used to eliminate the need for the participants to respond verbally during assessments (Fossett & Mirenda, 2006). If errors were made in symbol identification and training was required, the researcher completed the following procedures, per concept: First, the researcher placed four graphic symbols in front of the participant and stated "show me" and verbally labeled the target concept (e.g., swim). If training was required for a symbol, the researcher implemented a most-to-least prompting procedure, similar to strategies currently used in their classrooms. First, the researcher identified the correct image for the participant and had the participant touch that image, stating "*point to* ___ *with me*." Then the researcher said, "*point to* _____" and provided a gestural prompt after 3 s time delay. If the participant was correct, the researcher provided additional trials with the same target symbol until two consecutive trials did not need gestural prompts. Corrective feedback (i.e., showing the correct response) was provided and graphic icons were rearranged per trial. Once participants consistently identified all the symbols with greater than 90% accuracy over two consecutive sessions, the study began (i.e., baseline for all sets).

Baseline. During baseline probes, the participant was presented with one text card and four SymbolStix picture cards. The researcher pointed to each picture card and labeled the picture aloud. Then, the researcher stated, "Read the word, find the picture that goes with this word." To demonstrate the probe task, two models were provided using words not targeted within this study. After the models, the four target words were each probed twice, for a total of eight trials per target word set. No feedback was provided during the eight trials per set. Probes of all three word sets began on the same day. Once a stable baseline was established for Word Set 1, the participant began intervention for Set 1, while Word Sets 2 and 3 were held in baseline. Due to the severity of ASD diagnoses and reported challenges with task participation in academics, participants worked on one word set at a time. Intervention for each subsequent set began once the participants reached the minimum treatment criterion for the previous set (i.e., six out of eight on probes for three consecutive sessions).

Intervention. Each instructional session included two parts: (a) probes to measure the participants' accuracy of reading the targeted single words and (b) structured matching tasks with photo books (described previously) and the AAC device with the T2L features. The probes followed the same procedure as the probes during the baseline phase. The probes were completed as the first task in every session to measure word learning from previous instructional sessions.

After the probes, the participants chose two of the three picture books to use for the matching task with the AAC app and T2L feature. Following stimulus equivalence principles and match-to-sample procedures (Sidman, 1971), the participants matched the image representation of the target word in the book to the SymbolStix on the AAC device. Upon selection of the SymbolStix within the AAC system, the T2L features were activated (i.e., dynamic text appeared on the screen for 3 s, paired with speech output). The researcher modeled the task for two words that were designated as models. The researcher stated, "match the picture

and read your word." During the two models, the researcher pointed to the photo book, then pointed to the correct symbol on the device, and then stated the word verbally with the voice output on the device while moving their finger left to right under the word on the screen. After the models, the researcher did not label the target words (letting the speech output on the device be the only auditory output the participant received) nor point to the text when it appeared (letting the dynamic nature of the text attract the visual attention). The researcher assisted in activation of the graphic symbol on the device if the participant did not make a selection on the device after 3 s, or if the participants selected the wrong icon. The focus of the intervention was on the activation of the T2L and not whether the participant was able to successfully match the book to the device. If a wrong icon was selected, the researcher put their hand over the screen. The participants were instructed to select the same SymbolStix icon from the AAC device twice in a row, per page of the book. The researcher provided general feedback to keep the session moving and the participants engaged. For example, "you are working hard," "we only have 10 pictures left," "great job." Overall, the participants had 12 exposures to each of the target words per session, six from each matching photo book. No classroom instruction was provided on these words.

Generalization. Generalization data were also collected during baseline and after the intervention ended to determine whether participants generalized their word reading skills to different graphic representations of the target words. The single word assessment probes for generalization followed the same procedures used for all other probes. However, new photographs (not seen during intervention) were used to represent the target words.

Maintenance. The probes for maintenance followed the same procedures used for all probes. Maintenance occurred at different times across sets and participants, due to constraints related to school schedules and time of acquisition. Maintenance data ranged from 2 to 10 weeks from the last intervention session. Because of the nature of the research project, participants did not have access to the tablet and app after the intervention concluded. Yet, at the end of the study, the app and commercially available options (e.g., NOVAChat, SnapScene) were discussed with each participant's team.

Procedural reliability. To ensure consistency of the procedures, all probes and instructional sessions were video recorded. Procedural reliability was completed for the probe and intervention procedures across all phases. To assess procedural fidelity, a graduate student in Communication Sciences and Disorders was trained in the use of two checklists: one for probe and one for intervention sessions. First, the first author and graduate student watched and scored a video (using the checklists) per phase together, discussing scoring while watching. The researcher and the graduate student then watched an additional video from each phase independently, compared their checklist scoring, and then discussed any discrepancies. Once the researcher and graduate student agreed on >90% of the completed steps for three consecutive videos, the graduate student began coding independently. The graduate student then reviewed a random sample of 20% of the probe and intervention sessions for each participant, per set. For both the probes and the intervention sessions, steps in the procedures correctly implemented were divided by the total number of procedural steps then multiplied by 100 to yield a percentage of fidelity. The fidelity means of probe sessions and the intervention procedures for each of the participants were calculated across sets and ranged from 85% to 100%.

Social validity. The first author developed a 10-item questionnaire to assess the acceptability of the intervention and T2L features. The questionnaire included two open-ended questions and eight items to be answered using the following 5-point Likert-type scale: 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), and 5 (*strongly agree*).

Results

Results for participants' correct responses on the three word sets (total of 12 words) are represented in Figures 1 (Nick and Jake) and 2 (Cole and Curt). The results are presented, per participant, according to

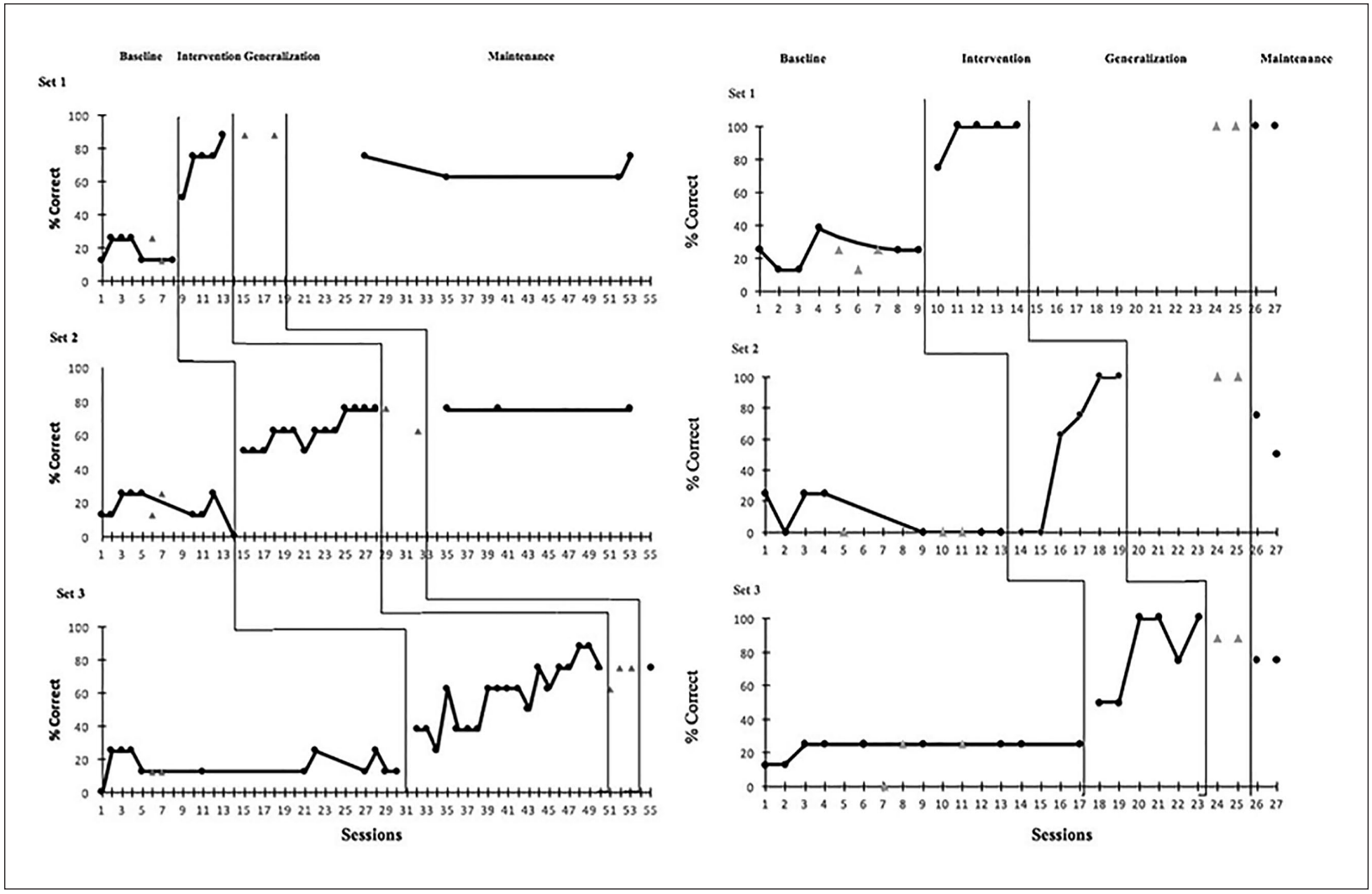

Figure 1. Percentage of single-words read correctly, by Nick (left) and Jake (right), out of eight trials, in the probes during baseline, intervention, generalization (the triangles on the graph), and maintenance.

(a) the effect of the T2L feature (dynamically presenting text, paired with speech output, upon selection of a specific graphic symbol in the device) on the acquisition of 12 personally relevant single words; (b) the rate of acquisition (e.g., number of exposures); (c) the generalization to different graphic representations of the targeted single words; and (d) the maintenance of these effects. Overall, all participants demonstrated low and stable baseline performance, across word sets. Once the T2L feature was introduced, increases in correct responses were observed for all participants. Generalization and maintenance of skills were observed for three out of four participants and were not completed for one of the participants because he left the study early due to health issues.

Acquisition of Single Words

Nick demonstrated considerable improvement as a result of intervention across all three word sets (Figure 1). Gains were calculated by comparing the average of baseline to the average of the last three intervention sessions. Gains across sets included +59% for Set 1 (almonds, crackers, swim, stop), +58% for Set 2 (bird, read, run, gym), and +63% for Set 3 (scooter, help, computer, horse). According to Tau-U calculations, the size of the effects was very large, with a Tau-U value of 1.0 for Set 1 ($p = .006$), 1.0 for Set 2 ($p = .000$), and .97 for Set 3 ($p = .000$).

Jake also demonstrated significant improvements across all three word sets, as a result of the intervention (Figure 1). Gains across sets included +77% for Set 1 (washer, wrench, baler, shovel), +81% for Set 2 (harrow, hose, pliers, litter), and +72% for Set 3 (camping, camo, pager, lure). According to Tau-U calculations, the size of the effects was medium to very large, with a Tau-U value of 1.0 for Set 1 ($p = .006$), .52 for Set 2 ($p = .116$), and 1.0 for Set 3 ($p = .000$).

Similar results were seen for Cole, with improvements from baseline across all three word sets as a result of participating in the intervention (Figure 2). Gains across sets included +79% for Set 1 (frito, bunny, potty, pizza), +73% for Set 2 (pool, pretzel, cars, ipad), and +54% for Set 3 (jeep, juice, bike, mickey). According to Tau-U calculations, the size of the effects was very large, with a Tau-U value of 1.0 for Set 1 ($p = .002$), 1.0 for Set 2 ($p = .002$), and .88 for Set 3 ($p = .007$).

Figure 2 displays the percentage of targeted single words in each set identified correctly by Curt during the baseline, intervention, and generalization conditions. The participant experienced medical issues (including seizures) during the study and subsequently left school. Due to this, intervention probes were completed for word Sets 1 and 2, and generalization probes were completed for word Set 1 only. No maintenance probes were completed. For word Set 1 (cheetos, minecraft, computer, water), Curt demonstrated a notable gain of +52% (calculated by comparing the average of baseline to the average of the last three intervention sessions). According to Tau-U calculations, the size of the effects was large, with a Tau-U value of .79 for Set 1 ($p = .000$). For Set 2 (marker, milk, legos, eraser), an improvement was seen as a result of the intervention. Baseline mean percent accuracy was 16% (range, 0%–25%), with improvement to a mean accuracy of 50% for the last three interventions that Curt participated in. A stable baseline was established for Set 3 (spin, run, candy, cut) with a mean percent accuracy of 21% (range, 0%–38%); however, intervention probes were not completed due to illness.

Rate of Acquisition

Participants ranged in exposures per word from 60 to 348. More specifically per participant, Nick averaged 152 exposures (range, 60–228) or approximately 7 mins. per word. Jake averaged 68 exposures or approximately 3 mins. per word (range, 60–72). Cole averaged 68 exposures or approximately 3 mins. per word (range, 60–84). Curt only met the criterion for Set 1 words. He participated in 29 sessions, for a total number of 348 exposures, per word.

Generalization

Generalization data were also collected during baseline and after the intervention ended to determine whether participants generalized their word reading skills to different graphic representations of the target

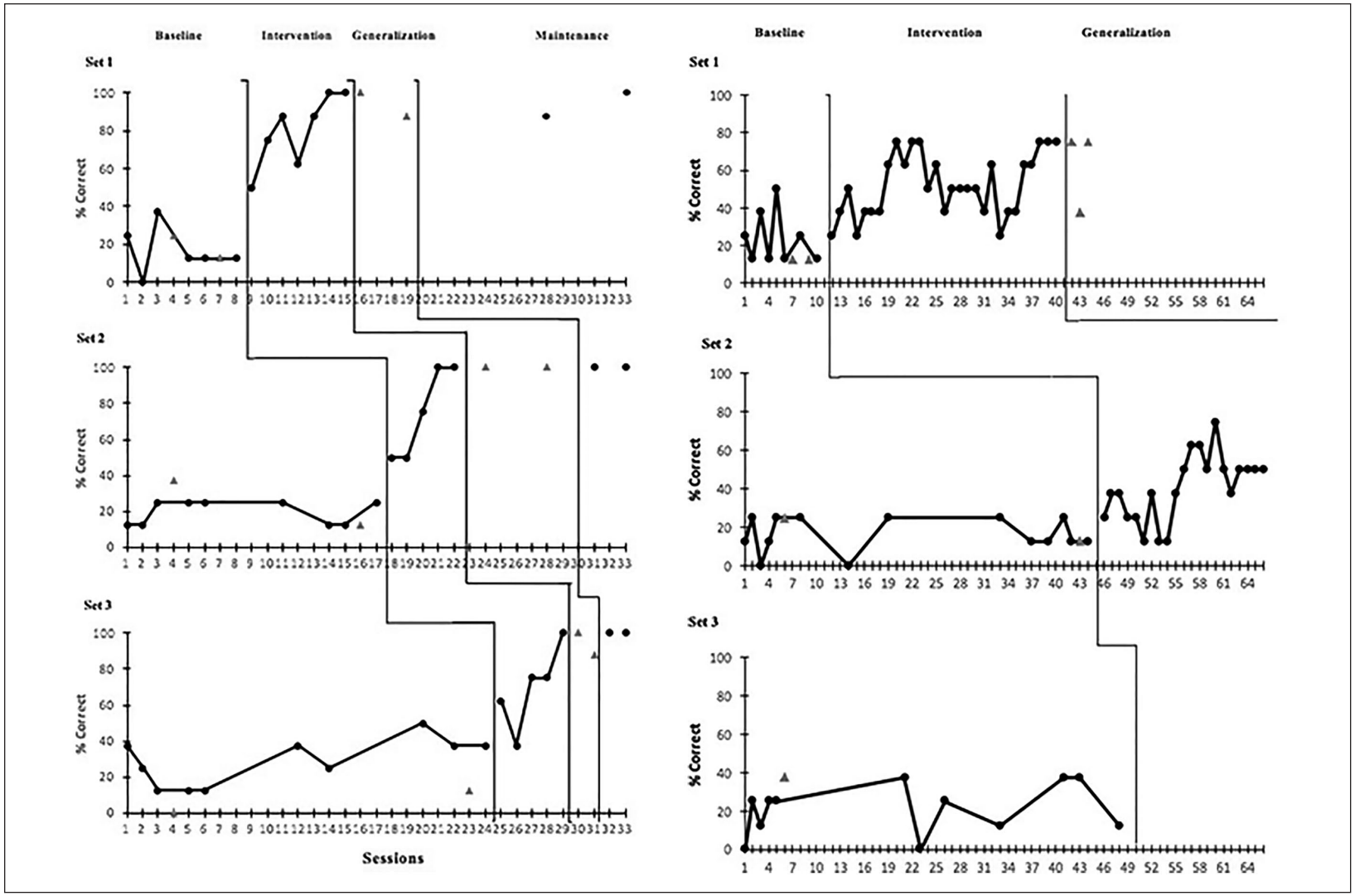

Figure 2. Percentage of single-words read correctly, by Cole (left) and Curt (right), out of eight trials, in the probes at baseline, during intervention, and during generalization and maintenance.

words. Generalization occurred immediately after criterion was reached for Nick, Cole, and Curt. Due to school breaks and some health issues, Jake's generalization occurred right before maintenance. During generalization new photographs (not seen during intervention) were used to represent the target words. Nick demonstrated notable gains of +69% (Set 1), +50% (Set 2), and +58% (Set 3) for pre- and post-intervention generalization measures. Like Nick, Jake demonstrated notable gains of +79% (Set 1), +100% (Set 2), and +63% (Set 3) for pre- and post-intervention generalization measures. Cole demonstrated similar generalization results, with pre-intervention generalization scores at low levels (range, 6%–25%) and scores were significantly increased (range, 94%–100%). These changes from pre- to post-intervention resulted in large gains: +75% (Set 1), +75% (Set 2), and +88% (Set 3).

Maintenance

Maintenance data ranged from 2 to 12 weeks from the last intervention session of the Set, with Set 3 having the least amount of time between intervention and the final maintenance measure. Maintenance probes were conducted at different times across the Sets and will be reported per participant's data. No maintenance measures are available for Curt, as he left the study early due to illness.

Nick's mean percent accuracy for maintenance was 69% (Set 1), 75% (Set 2), and 75% (Set 3). Set 1 was measured at 8 and 12 weeks from the last intervention session; Set 2, 4 and 8 weeks; and as previously stated Set 3 was measured at 2 weeks from the last intervention session. Jake's mean percent accuracy for maintenance was 100% (Set 1), 63% (Set 2), and 75% (Set 3). Set 1 was measured at 8 and 12 weeks from the last intervention session; Set 2, 4 and 8 weeks; and Set 3 was measured at 4 and 6 weeks from the last intervention session. Cole demonstrated the strongest maintenance means. His percent accuracy for maintenance was 94% (Set 1), 100% (Set 2), and 100% (Set 3). Set 1 was measured 4 and 12 weeks from the last intervention session; Set 2 4 and 12 weeks; and Set 3 was measured at 2 and 8 weeks from the last intervention session.

Social Validity

A total of four educational professionals provided written and/or oral responses to the questions, including the three paraprofessionals and one classroom teacher. All professionals who completed the social validity questionnaire worked closely with the participants and had observed some sessions during the course of the study. After the study, each professional either strongly agreed or agreed that the goals of literacy were important for the participant with whom they worked; that they see a place for technology to help support literacy; that they struggle to find literacy instruction that allows adaptations for minimally verbal students; and that AAC systems could be used to support literacy learning.

In response to the two open-ended questions, all of the education professionals stated they believed the participants enjoyed the task and that they would like to continue to implement the intervention with the students and other students they work with in the future. For example, one paraprofessional shared, "I think the software is practical and easy to use." A teacher shared, "It was great to see the progress they made. This is something we can keep doing every day. I am always looking for more structured ways to use their AAC systems."

Discussion

Students with severe ASD and minimal speech are likely to require specialized instruction for literacy and communication to experience better post-school outcomes (Caron et al., 2018; Tager-Flusberg & Kasari, 2013). With federal mandates that schools achieve improved outcomes in reading for all students (Knight et al., 2010), including those with severe disabilities, research to support access to literacy instruction for individuals with minimal or no speech who require or benefit from AAC is vital to accomplish this goal. This study aimed to improve literacy outcomes, specifically single-word reading, with four individuals who had severe ASD and minimal or no speech through the use of AAC technology.

Results from this study provide preliminary evidence that redesigning AAC apps with literacy support features (i.e., T2L feature) can positively affect single-word learning. The four participants in this study

demonstrated increased accuracy reading as many as 12 words, with the introduction of an AAC app with T2L features. The gains were observed after a range of 60 to 348 exposures to the target words. Although no research to date has evaluated the impact of AAC apps with the T2L feature with older individuals with severe ASD who have minimal speech and very limited literacy skills, the results from this study are notable given the participant's challenges and previous literacy history. Also, the results contribute to the growing body of research that demonstrates the effectiveness of the T2L feature in AAC apps to support literacy learning for individuals with complex communication needs (e.g., Caron et al., 2018; Caron et al., 2020; Holyfield et al., 2020; Mandak et al., 2019). Extrinsic and intrinsic factors may have contributed to the effectiveness of the intervention and positive gains made by the participants.

Extrinsic Factors

The T2L literacy feature was likely a contributing factor to the positive gains made by the participants. For example, first, the individual selects a graphic symbol using his or her AAC system, ensuring the learner's knowledge of the concepts and supporting literacy learning driven by the individual's interests and needs (Light & McNaughton, 2013). After the selection of the graphic symbol, the text is dynamically presented on the screen and uses movement to attract the learner's visual attention to the text (cf., Wilkinson & Jagaroo, 2004). In addition to the dynamic presentation of the text, the text is paired with speech output upon selection. After the text appears on the screen for 3 s, the text disappears back into the graphic symbol that was selected. The active pairing (both between the text and graphic symbol and text and speech output) is designed to support the learning of the association between the written word and its referent (picture symbol and/or spoken word; cf. Browder & Xin, 1998; Fossett & Mirenda, 2006). Integrating literacy supports into communication systems has the potential to provide increased opportunities for functional learning and exposure to text throughout the day (Light et al., 2014).

In addition to the design of the T2L features of the AAC app, the effectiveness and the efficiency of the intervention may have also been impacted by the task and the words selected. The participants matched the image representation of the target word in the book to an icon on the AAC device. The match-to-sample procedures (Sidman, 1971) were tasks with which the participants were familiar; these procedures allowed for multiple exposures to the word in a small amount of time. In addition, personally relevant and motivating words were selected for each participant. Individuals learn single words more rapidly when the words are more familiar, real (vs. nonsense, like "fim" or "bol"), and appear more frequently (e.g., cake vs. sake; Roberts et al., 2011). Also, using words with meaning to the individual has a greater potential of fostering intrinsic motivation and increasing engagement in literacy activities (Caron et al., 2020; Light & McNaughton, 2013). Thus, the selection of personally relevant and highly motivating words may have been an important factor in positive gains.

Despite the gains demonstrated in this study, the individuals previously experienced very limited literacy success. Low expectations and inadequate instruction have contributed to poor literacy outcomes for individuals with severe disabilities (Ruppar, 2017; Spooner et al., 2006). None of the individuals included in the study had specific literacy goals in their educational plans (e.g., no goals for sight words or letter sounds). These issues may be due to service providers' training experiences; training may not have emphasized the means for adapting instruction when individuals have minimal or no speech (Spooner et al., 2006). Limited to no training for providers is required for use of the T2L feature, as the feature presents words to the individual through AAC system activation. All four service providers that completed the social validity questionnaires stated that the intervention was something that they could do. Although parallel instruction in literacy is recommended (e.g., direct instruction in phonological awareness like letter-sound knowledge or decoding), the T2L feature may have the potential to provide a means for access to some literacy instruction.

Intrinsic Factors

Three studies, including this study, have investigated the use of the T2L feature with participants with ASD. The participant's age, diagnosis, and current literacy skills likely played a part in the different outcomes

observed. Caron et al. (2018) introduced the T2L feature in the same AAC app used in this study, to five school-aged students with ASD (aged 6–14), in structured one-on-one sessions targeting 12 single words. Mandak et al. (2019) investigated the effects of the T2L feature within a visual scene AAC application, targeting 10 single words, during a shared reading of the storybook *Brown Bear Brown Bear* with three preliterate preschoolers with ASD (ages 3–4). Each of these studies offers promising results for use of the T2L feature with individuals with ASD, with all three studies showing positive gains for the participants and moderate to very large effects. Yet, there are differences across the three studies.

All individuals with ASD, across the studies, have made some progress with word acquisition after exposure to the T2L feature. Although caution should be taken when comparing these findings, the number of exposures required to support acquisition varied; this provides potentially important considerations for future interventions. The preschoolers in the study by Mandak and colleagues (2019) acquired single words with 55 to 135 exposures. In the study by Caron and colleagues (2018), the participants learned to recognize the single words in 20 to 32 exposures. The participants who completed this study learned the single words in 60 to 228 exposures. The participants in the study by Caron and colleagues required considerably fewer exposures. The participants in that study had acquired 26 letter-sound correspondences and demonstrated greater knowledge of sight words. With this level of phonemic awareness and more literacy success, these individuals were likely able to use partial visual and phonetic connections to help identify sight words (Ehri, 2005).

Ehri's phase theory (2005) has application to the study differences. This theory portrays the emergence of skills and strategies that support sight word reading. During the pre-alphabetic phase, individuals mainly rely on salient visual or contextual features to read words. The individuals in this phase may not know letters and lack phonemic awareness skills (Ehri, 2014). Also, their sight word skills may be described as unreliable and having several guessing errors. Nate and Curt fit this description, and therefore, it is not surprising that these two individuals needed the most exposures to acquire the target words.

Once individuals learn letter sounds, they can begin to apply this knowledge to remember how to read a word. Ehri (2005) describes individuals with this knowledge as partial alphabetic. The connections in this partial alphabetic phase are still incomplete, as individuals still have no use of decoding skills, and rely on predicting and memorizing words from initial letters and context cues (Ehri, 2014). In this phase, an individual's sight word reading is developing yet will often include errors when presented with similar spelled words (e.g., words with similar initial and final constants, like swim and stem; Ehri, 2014). Jake and Cole, as well as the participants in Caron et al. (2018), fit the description of this phase. These individuals needed half the number of exposures (or less) to acquire their target sight words, in comparison to Nate and Curt, and some of the individuals from Mandak et al. (2019). Although letter sounds seem to help in terms of rate of acquisition, and these individuals may need fewer exposures or repetition to acquire words, this knowledge is not a prerequisite for use of the T2L feature as demonstrated by gains made in Mandak et al. and Nate and Curt in this study.

Limitations and Future Directions

There are a number of limitations that should be considered when interpreting the results. First, the study included only a small number of participants (i.e., four). Future research should investigate the effects of the T2L feature with a larger number of participants, as well as individuals across ages and communication needs. In addition, the study targeted a small, closed set of choices that included only symbols for words targeted within the study, only one other word with the same initial letter as the targeted word, varied word lengths, and a limited array of response options (i.e., a choice from four photographs). The closed set of responses may have simplified the reading task (Barker et al., 2012); future research is required to investigate varied sets of words, the impact of foil choices, and larger word sets to determine the effectiveness of T2L features.

The words selected for the study were primarily nouns and they were words often described as high-frequency words (e.g., want, yes, no, like). Additional research is needed to understand the implications of the app on the learning of these types of words that are often communicated and read in connected text. This

study isolated the introduction of the AAC app with T2L features as the independent variable in the study. The study design does not allow comparison of the effectiveness of AAC apps with and without T2L features, as well as the relative effectiveness or efficiency of different design considerations (e.g., animation speech, size of text, the color of the word). Future research and development are required to investigate these considerations, as well as the effects of traditional AAC apps (i.e., the static pairing of symbols and text) on single word learning as compared with the effects of the AAC app with dynamic T2L features.

Furthermore, to investigate the effects of the AAC app as the independent variable, no additional literacy instruction with these words was provided. This is not best practice but was required as the first step in a research line to isolate the effects of the T2L feature. The use of the T2L feature does not provide the same benefits of explicit literacy instruction, including teaching the participants to decode and encode. Therefore, the AAC app with T2L features is designed to supplement, not replace, literacy instruction, and future research is required to determine the effects of the AAC app with T2L features when used in this manner. In addition, the app was also introduced in a highly structured task. The app contributed to the acquisition of the target words in this structured implementation, but future research is required to investigate the effects of the T2L feature on literacy acquisition when utilized in daily communication interactions; the feature may be best to support literacy during use in a more structure learning task.

This study also focused on an isolated skill, single-word reading. Single-word reading is a skill that is important to literacy development; however, learning to read and write requires a complex process of integrating and applying a wide range of component skills and knowledge, as well as integrating background experience, knowledge, and language understanding (Mirenda & Erickson, 2000). Therefore, future research and development are required to investigate the effects of the T2L feature on other literacy skills, like letter-sound knowledge and decoding (Light et al., 2019).

In this study, the symbols were not faded and generalization measures were not collected on if the participants could communicate with text-only grid displays. Future research and development are required to investigate how to support the transition to traditional orthography from symbol-based AAC displays. This may include investigating the number of exposures required for acquisition and the total number of words to target during instruction. With built-in system features, the AAC system could prompt service providers to test the acquisition of the word and offer the option for removal of the graphic icon, thus slowly fading graphic icons and supporting the transition to more of an orthographic system.

Finally, limited social validity data were collected for the study. Consent was not given to use videotapes of sessions beyond the research team and questionnaires only were completed by four professionals who worked closely with the participants. Future research should include more robust social validity measures and investigate some implementation variables related to the use of the T2L feature. These variables might include the likelihood of adoption, acceptability of application and procedures, and feasibility of the intervention. Social validity information could also contribute to a better understanding of how this feature could be used to be a part of a larger literacy intervention.

Conclusion

Literacy skills are vital for all individuals. Many individuals who have minimal or no speech have been viewed as incapable of developing literacy skills (Morgan et al., 2011), thus contributing to poor literacy outcomes. Yet once an individual can read even a few words, this skill can open doors to more meaningful communication, education, and literacy experiences. Once a set of single words are mastered, these words can serve as a foundation for further literacy development and can support the beginning of a transition from an AAC system that utilizes mainly graphic symbols to orthography (Caron et al., 2018). This study provides preliminary evidence that redesigning AAC apps with T2L features (i.e., dynamic text with speech output upon selection of graphic symbol) results in improvements in single-word reading for individuals with severe ASD who have minimal or no speech and who have had limited literacy opportunities or success. With mandates that schools improve outcomes in reading for all students, including those with severe disabilities and minimal or no speech, research with innovative solutions like the T2L feature provides one potential solution to contribute toward accomplishing this important goal.

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Effects of a Collaborative Planning and Consultation Framework to Increase Participation of Students with Severe Disabilities in General Education Classes

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Abstract

Although many students with severe disabilities are enrolled in general education classrooms, general educators rarely receive strong training and guidance on supporting the academic and social participation of these students. A multiple probe across participants design was used to evaluate the effectiveness of a collaborative planning and consultation framework on the academic engagement of four middle school students with severe disabilities and the instructional behaviors they receive from their general educators. The intervention package increased each focus student's academic engagement with classwide instruction and changed the types of instructional behaviors some general educators directed toward these students. Recommendations are offered for research and practice aimed at engaging general educators in the design and delivery of inclusive interventions.

Keywords

collaborative planning, severe disabilities, inclusion, middle school

Long-standing legislation supports the rights of students with severe disabilities to access strong instruction within general education classrooms (Individuals with Disabilities Education Improvement Act, 2004). Moreover, the benefits of well-supported inclusive experiences have been studied extensively (e.g., Agran et al., 2020; Copeland & Cosbey, 2008). Although many students with significant cognitive impairments spend at least some portion of their school day in general education classrooms (Kleinert et al., 2015), the quality of instruction and support they receive can be a concern. Observational studies in general education classrooms often report that secondary students with severe disabilities have few interactions with either general educators or peers and experience low levels of academic engagement (e.g., Carter et al., 2008; Chung et al., 2012, 2019). Therefore, it is important to strengthen the instruction and supports these students receive in general education classrooms.

Within general education classrooms, general educators are important leaders and provide the majority of instruction to enrolled students (Goldhaber, 2016). General educators have the primary responsibility for the instruction of all students attending their classes, including those who have severe disabilities. They serve as a linchpin for services—bridging the individual needs of a student with severe disabilities to the

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general curriculum. As general educators are usually the only certified teachers in their classrooms and often lack sufficient preparation in this area (Zagona et al., 2017), research-based practices are needed to help them take a more active role in teaching students with severe disabilities.

A recent systematic review of 40 studies indicates that general educators typically have very limited or peripheral roles in the implementation of interventions designed to support the inclusion of students with disabilities (Kuntz et al., in press). General educator involvement was often very modest, such as when they helped plan an intervention, provided feedback on the intervention, or suggested ways in which peers might be involved (e.g., Brock & Carter, 2016; Chung & Carter, 2013). However, a smaller number of studies illustrate how general educators can be more involved in delivering instruction to students with severe disabilities. For example, McDonnell and colleagues (2001) examined general educators' use of a classwide peer tutoring intervention and its impact on students with moderate and severe disabilities. This research underscores the potential impact general educators could have on the instruction of students with severe disabilities.

Furthermore, increasing the involvement of general educators in the instruction of students with severe disabilities would better reflect recommended practice in inclusive education (Jorgensen et al., 2010; Kurth & Gross, 2015). Ryndak and colleagues (2014) recommended that general educators participate in the design, implementation, and evaluation of instruction for students with disabilities. One means of increasing involvement is through collaborative planning. General educators can work with special educators and other service providers (e.g., paraprofessionals) to develop strategies individualized to students with severe disabilities enrolled in their classes. Previous studies have explored collaborative planning and reported positive outcomes for both the general educators and students. For example, Hunt and colleagues (2003) investigated the effectiveness of collaborative planning between a general educator and a special educator on the social and academic participation of elementary school students with severe disabilities. Results indicated a decrease in unengaged time for all six focus students and an increase in their interactions with teachers and peers. Likewise, Biggs and colleagues (2017) evaluated the efficacy of collaborative planning and peer support arrangements to increase peer interactions and augmentative and alternative communication (AAC) use with middle school students with complex communication needs. The intervention produced increases in student and peer communication and peer support behaviors. In both of these studies, members of the student teams viewed the collaborative planning process as beneficial and important.

Collaborative planning often requires educators to apply and generalize support behaviors across a range of instructional situations that may not have been explicitly addressed in the initial plan. A collaborative planning intervention may benefit from an added element of support for the implementer. Ongoing consultation could assist educators who implement support plans to apply and generalize important student supports within their weekly lessons. This consultation could come from a special educator or a district instructional or inclusion coach. Previous research on collaboration has not often included ongoing consultation after the initial planning meetings (e.g., Biggs et al., 2017; Brock et al., 2016). In contrast, Hunt and colleagues (2003) held monthly meetings to create and then assess a Unified Plan of Support for elementary students with severe disabilities in general education classrooms. Although implementation of the plan was measured through self-report each month, teams reported that 42 of the 52 student supports were *moderately* or *fully implemented* across focus students at the first follow-up meeting and 67 of the 69 supports by the final meeting. Additional research is needed to further explore how such ongoing consultation could be folded into other intervention approaches.

Despite federal mandates requiring the involvement of general educators on Individualized Education Program (IEP) teams and research supporting collaborative planning, no study has evaluated the effects of collaborative planning focused on guiding general educators to implement instruction for students with severe disabilities in their classes with ongoing consultation. In addition, no studies have focused on secondary (i.e., middle or high) school educators who often work as part of larger school teams and teach multiple classes of students. It is unclear what impact this type of educator support could have on the academic engagement of students with severe disabilities in general education classes. The purpose of this study was to evaluate the effects of collaborative planning with ongoing consultation for general

educators serving students with severe disabilities in general education classes. Three questions were addressed:

1. Does the academic engagement and interactions of students with severe disabilities increase when their general educators deliver lessons using the collaborative planning with consultation (CPC) process?
2. Does the introduction of the CPC process lead to changes in the percent and types of interactions general educators have with students with severe disabilities?
3. How do general educators view the social validity of the CPC process?

Method

Participants

After receiving institutional review board approval, we recruited participants. Each general educator (a) had at least one student with severe disabilities enrolled in at least one class, (b) taught at the middle or high school level, and (c) taught their class using traditional instructional approaches (e.g., direct instruction, guided practice, and independent practice) that could accommodate a planning framework aligned to these approaches. Focus students had to (a) attend a public middle or high school; (b) have a severe disability, as evidenced by participation in the state's alternate assessment for students with the most significant cognitive disabilities; (c) attend at least one general education class; and (d) have a current IEP with at least one academic goal. Four teacher–student pairs met the inclusion criteria, provided consent or assent, and participated. In addition, the two special educators who also served the focus students consented to participate in an initial planning meeting. Table 1 includes participant descriptions. Carolina attended Ms. Carpenter's class, Austin attended Ms. Adams's class, Bridget attended Ms. Brown's class, and Daria attended Ms. Davenport's class. All names are pseudonyms.

General educators. Table 1 displays information on the teacher–student pairs (i.e., dyads). Ms. Carpenter was an African American female who taught sixth-grade English language arts (ELA). She had 8 years of teaching experience—three of which included students with severe disabilities. Ms. Adams was a White female who taught seventh-grade social studies. She had one previous year of experience and no experience teaching students with severe disabilities. Ms. Brown was a White female who taught sixth-grade science. She had 18 years of experience—three of which included students with severe disabilities. Ms. Davenport was an African American female who taught fifth-grade ELA. She had 5 years of experience—two of which included students with severe disabilities.

Student participants. Carolina was a 12-year-old female who attended Ms. Carpenter's class. She was diagnosed with autism and a seizure disorder. Austin was a 13-year-old male who attended Ms. Adams's class. He was diagnosed with autism, intellectual disability, and a visual impairment. Bridget was a 13-year-old female who attended Ms. Brown's class. She was diagnosed with an intellectual disability, language impairment, and Down syndrome. Daria was a 10-year-old female who attended Ms. Davenport's class. She was diagnosed with an intellectual disability and an unspecified chromosomal disorder.

Special educators. Ms. Williams was Austin's and Bridget's special educator. She was an African American female who served students primarily with severe disabilities. Ms. Johnson was Carolina's and Daria's special educator. She was an African American female who also served students primarily with severe disabilities. Special educators participated in one planning meeting but did not participate in ongoing consultations due to limited availability and scheduling conflicts.

Intervention coach. The first author, a White female, who had a master's degree in special education and was a doctoral student in special education at the time of the study, served as the intervention coach. She was a

Table 1. Demographic Information for General Educators and Students with Disabilities.

Information	Dyad 1	Dyad 2	Dyad 3	Dyad 4
Class subject	Sixth-grade English language arts	Seventh-grade social studies	Sixth-grade science	Fifth-grade English language arts
Total students	25	27	24	20
General educator	Ms. Carpenter	Ms. Adams	Ms. Brown	Ms. Davenport
Race/ethnicity	African American	White	White	African American
Sex	Female	Female	Female	Female
Degree	Master's in educational leadership	Bachelor's in American politics	Master's in curriculum and instruction	Master's in literacy
Licensure	Elementary ed.	Middle social studies	Elementary ed.	Elementary ed.
Teaching experience	8 years	1 year	18 years	5 years
Inclusion experience[a]	3 years	0 years	3 years	2 years
Student	Carolina	Austin	Bridget	Daria
Age	12	13	13	10
Sex	Female	Male	Female	Female
Race/ethnicity	Hispanic	White	Asian	Hispanic
Disability	Autism, seizure disorder	Autism, intellectual disability, visual impairment	Intellectual disability, language impairment	Intellectual disability, chromosomal disorder
IQ	59[b]	57[c]	—	53[d]
Communication	Single words, short phrases, EL	Full sentences	Gestures, Vocalizations, single word approximations, EL	Brief, simple sentences, EL
Challenging behaviors	Occasional noncompliance (not observed)	None indicated	None indicated	None indicated
Other general education classes	Art	Science, related arts	Social studies, related arts	Math, related arts

Note. EL = English learner.
[a]Inclusion experience was defined as teaching a class with one or more students with severe disabilities. [b]Comprehensive Test of Nonverbal Intelligence–Second Edition. [c]Wechsler Intelligence Scale for Children–Fifth Edition. [d]Stanford–Binet Intelligence Scales–Fifth Edition.

licensed teacher, a board certified behavior analyst (BCBA), and had previously served as an instructional and behavior coach in a public school district.

Setting

The study took place in two middle schools in a large, metropolitan school district in the southeastern United States. Both public schools served students in Grades 5 through 8. Austin and Bridget attended the same middle school, which enrolled over 600 students—one third of whom were classified as economically disadvantaged and about 4% were English learners. The school served students of varied ethnic and cultural backgrounds (approximately 50% White, 33% African American, 10% Hispanic, and 5% Asian) and had included students with severe disabilities in general education science, social studies, and related arts classes for more than 7 years. Carolina and Daria attended a different middle school, which enrolled nearly 700 students—over 40% of whom were classified as economically disadvantaged and about 20% were English learners. The school also had a diverse student body (approximately 44% Hispanic, 35% White, 19% African American, and 3% Asian) and started to include students with severe disabilities in core content classes within the previous 3 years.

Experimental Design and Procedures

We used a multiple probe across participants design (Gast & Ledford, 2014) to evaluate the effectiveness of the CPC process. We graphed data to examine any changes in each primary dependent variable (i.e., academic engagement, teacher interactions with the focus student) and used visual analysis (i.e., level, trend, overlap, and variability) to determine a functional relation. We also measured student interactions and types of instructional behaviors to assess any changes upon implementation of the intervention, but did not analyze these variables to determine a functional relation. General educators were aware of the focus of the observations during both baseline and intervention conditions.

Baseline. During the baseline conditions, all general educators provided instruction in the same manner as prior to the study. General educators received copies of the focus students' IEP from the special educator at the beginning of the school year but did not collaborate regularly with the special educator outside of school-wide faculty meetings. All four focus students received paraprofessional support. Paraprofessionals typically sat at the same table or desk as the focus student and either directed the student to attend to class-wide instruction or repeated the general educator's instruction. Focus students sat at tables similar to, but separate from, peers without disabilities. We did not provide directions or restrictions about how general educators were to plan or deliver instruction or how they were to utilize the paraprofessional. General educators often provided whole-group instruction and independent work activities in their classes, had copies of the students' IEPs prior to the study, but did not plan anything supplemental in relation to the student with severe disabilities.

CPC intervention. This intervention had two distinct elements: (a) one Student Support Plan meeting to gather important information about the focus student and develop general instructional and support strategies for the classroom routines, and (b) regular Quick Plan meetings to specify the strategies for daily lessons. The intervention coach used a Planning Guide with detailed steps and scripted questions to complete each element in the same manner across teachers. The Planning Guide and planning forms are available from the first author by request.

Student support plan meeting. After baseline data were collected, the intervention coach facilitated an initial planning meeting with the general and special educator of each focus student. The initial planning meeting, which consisted of 17 components, lasted 60 min and took place in an empty classroom after school. During the meeting, the team created a Student Support Plan using a one-page form adapted from Jorgensen (2018) and Kurth and Gross (2015). The form addressed five areas—(a) focus student's strengths

and interests, (b) focus student's present levels of performance in core academic skills, (c) helpful strategies for the general educator to support the focus student, (d) an academic goal for the general education class, and (e) participation in classroom routines.

In Step 1 of the Planning Guide, the intervention coach presented the goals of the CPC intervention, the steps involved, and the role of each team member (i.e., general educator, special educator, and intervention coach). In Step 2, the special educator shared information pertaining to the focus student's strengths, interests, present levels of academic performance, and other helpful strategies for working with the student (e.g., seating and lighting arrangements to reduce the impact of the student's visual impairment). In Step 3, the general educator identified the expectations for seven types of routines in her class—(a) the beginning/end of class, (b) whole class instruction, (c) whole class discussion, (d) small group work, (e) independent work, (f) class presentations, and (g) tests/quizzes—with input from the special educator about the supports the focus student would need to engage in the routines as described, if any. The purpose of this information was to broadly address how the focus student could participate in class activities and what supports would be needed to promote independence.

Quick plan meetings. Approximately, each week, the general educator and the intervention coach met for 30 min to use the Student Support Plan to create a Quick Plan specific to the focus student. The one-page written plan was adapted from Jorgensen (2018). This Quick Plan was based on the upcoming lessons that general educators already had planned for their class and consisted of 20 components. General planning for the class did not occur during the Quick Plan meetings. As the Quick Plans were based on the general educator's existing plans, the level of detail for the Quick Plans was directly related to the extent to which the general educator had planned for the upcoming classes. If plans for the week were not finalized by the Quick Plan meeting, the teacher emailed the additional materials and plans to the intervention coach when ready. This only occurred for Ms. Adams and Ms. Davenport who regularly used templates for daily notes and warm-up activities. Focus students' supports were the same across these materials (e.g., changing short essay responses to fill-in-the-blank statements) and applied by the intervention coach as the new content was emailed.

Step 4 of the Planning Guide addressed the Quick Plan meetings. It consisted of questions aimed at incorporating the supports indicated on the Student Support Plan into each lesson. This included directions for paraprofessionals and adaptations to lesson materials (e.g., enlarging the text on teacher worksheets, ensuring the availability of screen reading technology, and shortening assignments to focus on key ideas). For each lesson, the Quick Plan identified four main elements of each class period: (a) the details of the day's lesson, including which class routines would be used; (b) how the focus student would participate in each activity and any needed adaptations, if participation differed from the rest of the class; (c) the materials that the focus student would use, including any adapted materials; and (d) supports the focus student would need (e.g., assistive technology, peers, and paraprofessional). Although paraprofessionals did not partake in any planning meeting, they were discussed as a potential support for the focus student during some activities. Ms. Carpenter and Ms. Adams participated in six Quick Plan meetings each. Ms. Brown participated in five meetings, and Ms. Davenport participated in three.

Dependent Variables

We used interval recording to record the dependent measures concurrently (i.e., observers recorded data on each variable at the same time). All measures and definitions were drawn from prior studies addressing the inclusion of students with severe disabilities (e.g., Biggs et al., 2017; Carter et al., 2016). Observers used a pencil-and-paper data collection sheet to capture all measures live. Data were collected during scheduled class times 2 to 4 times per week for approximately 11 weeks.

Student measures. Dependent variables for the focus student included (a) academic engagement, and (b) student interactions. Academic engagement and student interactions are widely used as important indicators

of learning, particularly when more direct measures of knowledge and skill acquisition are difficult to obtain consistently over the course of an entire semester.

Academic engagement. Observers recorded the academic engagement of the student, displayed at the end of each interval, using a 1-min momentary time sampling recording system. Academic engagement was defined as actively attending to, looking at, or following along with instructional activities that were assigned by the teacher or a paraprofessional. Indicators of academic engagement included looking at materials (e.g., textbook, worksheet, and whiteboards) related to assigned activities, looking at the teacher as he or she provides instruction, writing related to the assigned activity, following teacher instructions/directions, raising one's hand, or asking questions of the teacher about instructional activities. Three codes were possible: *aligned engagement, unaligned engagement*, and *not engaged* (Carter et al., 2016, 2017). Aligned engagement was coded when the focus student was academically engaged in instructional activities that were consistent or aligned with the content provided to the majority of the class (i.e., identical or appropriately modified from the class curriculum). Examples we observed included working with peers on an assignment, watching the teacher present a lecture, and writing responses on adapted worksheets. Unaligned engagement was coded when the focus student was academically engaged in instructional activities that were *not* consistent or aligned with the content provided to the majority of the class (i.e., not identical or appropriately modified from the class). Examples we observed included unrelated coloring activities and reading unrelated books assigned by the teacher or paraprofessional. *Not engaged* was coded when the focus student was overtly not attending to, looking at, or following along with any instructional activities or when the focus student was engaged in activities that were not assigned by a teacher or paraprofessional. Examples we observed included doodling in a notebook and folding origami.

Student interactions. Interactions were defined as verbal or nonverbal behaviors from or to the focus student regarding instruction, behavior, or other topics and appeared to have communicative acknowledgment (e.g., gaining the partner's attention, looking at the partner, and responding to a partner; Biggs et al., 2017; Carter et al., 2016). We coded student interactions with four different categories of partners—general educators, paraprofessionals, peers, or other partners. Interactions were recorded using a 1-min partial-interval recording system. For each interval, if the focus student interacted with one or more peers, "peer" was indicated for the corresponding interval on the data sheet. If the focus student also interacted with a paraprofessional, "peer" and "paraprofessional" were indicated for the interval. If the focus student did not interact with anyone during an interval, "no interaction" was indicated for the interval.

General educator measures. Dependent variables for the general educators included (a) teacher interactions with the focus student, and (b) types of instructional behaviors.

Teacher interactions with focus student. Observers recorded the occurrence of an interaction between the general educator and the focus student. An interaction was defined as verbal or nonverbal behaviors directed to the focus student regarding instruction, behavior, or another topic (Chung et al., 2012). Examples included asking the focus student a question or giving the student a smile and thumbs-up. A teacher interaction directed toward all members of a small group (i.e., eight or fewer students) that included the focus student was recorded as an occurrence of a general educator interaction. General educator's interactions directed to the whole class (including the focus student) or other students in the classroom were not coded. Teacher interactions with the focus student were recorded using a 1-min partial-interval recording system, indicating the presence or absence of one or more general educator interactions.

Types of instructional behaviors. For each interval with the occurrence of a teacher interaction with the focus student, observers categorized the type of instructional behavior directed to the focus student. Types of instructional behaviors included the (a) presentation of a work task to the student, (b) reinforcement/praise of the student, (c) error correction of the student, (d) seating arrangement or grouping of the student,

(e) peer arrangement for the student, (f) behavioral plan for the student, and (g) other noninstructional behaviors. Behaviors were coded using a 1-min partial-interval recording system, and more than one type of instructional behavior could be coded in an interval.

The presentation of a *work task* could be coded as same, adapted, or alternate as it related to the content presented to the general class. To be coded as *same*, the presented task, direction, or comment was the same as the instruction of the entire class in content, materials, product, and other attributes. For the presentation of the work task to be coded as *adapted*, the presented task, direction, or comment was adapted from the instruction of the entire class in content, materials, product, or another attribute by supplementing or simplifying the task of the general class (Janney & Snell, 2006). For the presentation of the work task to be coded as *alternate*, the presented task, direction, or comment was different from the instruction of the entire class in content, materials, product, or another attribute by changing the content or type of skill completely (e.g., daily living skill vs. academic skill; Janney & Snell, 2006).

Reinforcement/praise was a comment or exclamation of approval from the general educator directed toward the focus student and was coded as academic or nonacademic. The comment or exclamation could be verbal or nonverbal and could include gestures (e.g., thumbs-up) or vocalizations (e.g., "woo hoo!"; Brock & Carter, 2016; Brock et al., 2016). *Error correction* was a comment or signal from the general educator directed toward the focus student with the intent to change the student's work or behavior and was coded as academic or nonacademic (Brock & Carter, 2016; Brock et al., 2016).

For *seating/grouping* to be coded, the general educator explicitly assigned the focus student to a desk/table in the classroom or to a group of students related to an assignment or activity. For *peer arrangement* to be coded, the general educator assigned a peer to support the focus student either academically or socially in the context of a work task or transition outside of classwide group work. For *behavioral support* to be coded, the general educator utilized a behavior support strategy with the focus student as outlined in the student's individualized behavior plan or the teacher's classwide management plan. For *other behavior* to be coded, the general educator engaged in a noninstructional interaction not otherwise specified in the previous categories. Seating/grouping, peer arrangement, and behavior support behaviors were only coded when the teacher discussed the arrangement with the focus student and were not coded in any subsequent intervals in which the arrangements continued.

Observer Training and Interobserver Agreement (IOA)

For each participating teacher–student pair, direct observations during the selected class period took place approximately 2 to 4 times per week during the baseline and intervention conditions. The length of the observations corresponded with the length of time the focus student was present in the class (M = 40 min, range = 7–63 min). During observations, observers sat quietly in the classroom where the focus student could be seen and heard but where they were not obtrusive (e.g., sitting to the side or back of the class) or a distraction (e.g., they did not talk with individuals in the class) to other students.

Observer training. Prior to the start of the study, we trained three observers on the observational measurement system. Two observers were graduate students pursuing doctoral degrees in special education; one was pursuing a master's degree in special education. All observers participated in two instructional trainings (averaging 2 hr each) to become familiar with the observational data collection manual, including operational definitions, examples, and non-examples for each variable. At the end of the second training, the knowledge of the coding manual, definitions, and rules was assessed on a written assessment. Before coding during live observations, all observers scored above 90% on the written assessment and exceeded 90% agreement with the primary coder on a novel practice video (approximately 10 min).

IOA. IOA data were collected across all study conditions for each focus student. A second observer observed with the primary observer in 37.5% of all observations and each observer recorded data independently. IOA observations were conducted randomly and balanced across students and study conditions—with the exception of the first tier's baseline condition. This was due to observer training and student absences. Overall,

IOA was calculated shortly after each IOA observation to have a discrepancy discussion and conduct retraining specific to the variable. IOA was calculated using overall point-by-point agreement by dividing the number of intervals in which the primary and secondary observer codes matched by the total number of intervals and multiplying by 100. Regarding teacher interactions, IOA was 98.7% for *work tasks*, 99.6% for *reinforcement/praise*, 98.8% for *error correction*, 99.8% for *seating/grouping*, 100.0% *for peer arrangements*, and 97.2% for *other* behaviors. In addition, IOA was 88.1% for student interactions and 82.6% for academic engagement. Although overall agreement was within acceptable levels (i.e., above 80%; for example, Gast & Ledford, 2014), academic engagement was occasionally lower when there were slight differences in observers' visibility. For example, one observer may have observed the focus student writing on an assigned worksheet (i.e., aligned engagement), whereas the second observer saw that the student was actually doodling on that worksheet rather than completing her work (i.e., not engaged).

Procedural Fidelity

Procedural fidelity was assessed at two levels of implementation of the collaborative planning framework—the development of the Student Support Plans and the consultation regarding weekly lesson plans through the Quick Plans. We used a set of pencil-paper checklists and written notes to assess procedural fidelity. We provided no support, advice, or suggestions to any general educator regarding classroom instruction or supports to the focus student during the baseline condition. At the introduction of the intervention, we used a checklist for the Student Support Plan meetings that consisted of 17 items mirroring the components on the document. Fidelity during Student Support Plan meetings was calculated by dividing the number of completed items by the number of possible items and multiplying by 100. Each item was addressed across all four students' meetings, and fidelity was 100%. During the intervention condition for each student, we used a checklist for the Quick Plan meetings that consisted of 20 possible items. This checklist was completed based on the applicable components of the plan each week. Applicable components were based on the lesson preparations of the general educator (i.e., the days the teacher had plans prepared) and fidelity consisted of the provision of support for each prepared lesson. Class periods in which the general educator did not provide plans to the researcher were not factored into procedural fidelity. Across participants, Quick Plan fidelity averaged 92.1%, and applicable components averaged approximately 17 out of 20 items. By participant, average Quick Plan fidelity was as follows: Carolina (94.8%), Austin (91.0%), Bridget (90.7%), and Daria (91.4%).

We did not collect data on how closely the teacher implemented her initial plans as originally written. First, we recognized there would be day-to-day variability in these classrooms based on ordinary (e.g., unfinished instructional activities spilling over to subsequent days, students grasping instructional content sooner or slower than expected) and unanticipated (e.g., fire drills, student or teacher absences) factors. Second, we did not have the resources to observe each teacher every day for the entire class period throughout the semester. Third, our interest was in assessing the effects of the CPC process on our defined variables specifically and did not assess such factors as lesson planning or lesson delivery.

Social Validity

We assessed social validity by examining general educators' perspectives on the acceptability, feasibility, and impact of the intervention 5 weeks after data collection ended. Each general educator also participated in an interview and completed a 17-item survey (see Table 2). Response options were as follows: *strongly disagree* = 1, *disagree* = 2, *neutral* = 3, *agree* = 4, and *strongly agree* = 5. A different doctoral student who had no previous interactions with the general educators conducted the interviews. Interviews consisted of several open-ended questions addressing the feasibility and acceptability of the intervention, how they felt the intervention helped them meet the focus student's needs, how the intervention impacted their existing lesson planning and delivery, how their behaviors changed as a result of the intervention, and the supports/resources needed to continue the intervention (interview protocol available by request). Interviews took place in general educators' classrooms, lasted between 10 and 25 min, and were audio recorded and then transcribed.

Table 2. Social Validity Ratings From General Educators.

Social validity item	Ms. Carpenter	Ms. Adams	Ms. Brown	Ms. Davenport
The amount of time required for the CPC process was reasonable.	SA	A	A	SA
I feel I was effective in my responsibilities.	SA	A	A	A
I would need ongoing consultation to continue the CPC process.	N	A	N	D
Developing the Student Support Plan as a team was important to the success of creating the Quick Plan lessons.	SA	A	SA	N
Consultation was important to the success of developing the Quick Plan lessons.	SA	A	A	N
I could use what I learned to incorporate other students with severe disabilities into my lessons.	SA	SA	SA	SA
I could use what I learned to teach other educators how to incorporate students with severe disabilities into lessons.	SA	A	A	A
I am motivated to continue using the CPC process to incorporate students with severe disabilities into my lessons.	SA	A	A	SA
I am *not* interested in using the CPC process again.	SD	D	N	SD
The CPC process was a good way to address the instruction of students with severe disabilities in inclusive classes.	SA	SA	A	SA
The CPC process gave me clarity on how to support the student with severe disabilities in my class.	SA	SA	A	SA
The CPC process aligns with the goals of the school in supporting students with disabilities.	SA	N	A	A
I would know what to do again if I was asked to plan instruction for a student with severe disabilities in inclusive classes.	SA	A	A	SA
The student with severe disabilities benefited socially from the CPC process.	SA	A	A	A
The student with severe disabilities benefited academically from the CPC process.	SA	SA	A	SA
The CPC process *negatively* impacted other students in the class.	SD	D	D	D
Overall, I enjoyed participating in this project.	SA	SA	A	A

Note. CPC = collaborative planning with consultation; SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree.

Table 3. Descriptive Summary by Teacher–Student Pair and Study Condition.

	Ms. Carpenter and Carolina		Ms. Adams and Austin		Ms. Brown and Bridget		Ms. Davenport and Daria	
Variable	Baseline	CPC	Baseline	CPC	Baseline	CPC	Baseline	CPC
Teacher interactions	7.1	31.8	7.6	11.4	2.3	3.8	15.2	15.9
Work task								
Same	0.0	2.7	3.2	0.8	0.2	0.8	0.2	3.1
Adapted	0.0	9.0	0.0	5.7	0.0	1.3	1.4	5.1
Alternate	0.0	0.0	0.0	0.0	0.2	0.0	1.7	0.0
Reinforcement/praise								
Academic	0.0	11.3	0.3	2.0	0.0	0.2	1.4	2.9
Nonacademic	0.0	0.0	0.0	0.3	0.0	0.2	1.4	0.0
Error correction								
Academic	0.0	4.7	1.2	1.8	0.0	0.4	1.3	4.9
Nonacademic	0.0	2.6	1.3	1.1	0.0	0.0	2.4	0.3
Seating/grouping	3.8	1.5	0.3	0.0	0.0	0.0	0.8	0.4
Peer arrangement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Behavior plan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	4.2	15.2	2.5	4.1	2.1	1.1	7.8	3.6
Academic engagement								
Aligned engagement	9.7	51.0	15.8	69.2	2.7	36.4	36.1	78.9
Unaligned engagement	0.0	9.8	4.8	0.0	4.5	6.0	9.9	0.0
Not engaged	90.4	39.2	79.4	30.8	92.8	57.7	53.9	21.1
Student interactions								
Paraprofessional	46.5	68.1	20.5	36.9	27.3	35.4	41.7	14.3
Peer	3.0	10.0	7.1	1.2	15.3	10.3	28.0	22.2
Other	0.9	0.4	1.6	0.6	3.7	0.2	6.3	5.7
Instructional format								
Whole class	36.0	27.0	39.8	52.4	8.5	14.1	28.9	53.6
Small group	0.0	4.0	20.9	28.8	1.2	19.8	12.7	6.5
Individual	0.0	45.5	12.6	7.5	10.3	17.5	16.3	24.0
No instruction	64.0	23.2	26.7	10.8	80.1	48.6	41.6	15.9

Note. CPC = collaborative planning with consultation.

Results

Table 3 has descriptive information for all variables across participants and conditions.

Academic Engagement

Figure 1 displays the percentage of intervals with academic engagement aligned with the instruction of the class for each observation. As may be expected in a classroom with ever-changing content and activities, academic engagement varied across focus students and conditions. All students increased their levels of academic engagement as a result of the CPC process. With the exception of the third day when the class watched a video, Carolina's academic engagement was low and stable in baseline (M = 9.7%) and had a large increase in the CPC condition (M = 51.0%). Austin's academic engagement was low and variable in the baseline condition (M = 15.8%) but increased immediately above baseline levels in the CPC condition (M = 69.2%). Bridget's academic engagement was very low in the baseline condition (M = 2.7%) and had large increases in the CPC condition (M = 36.4%). Daria's academic engagement varied greatly in the baseline condition (M = 36.1%) and was most elevated when Ms. Davenport assigned silent reading for the

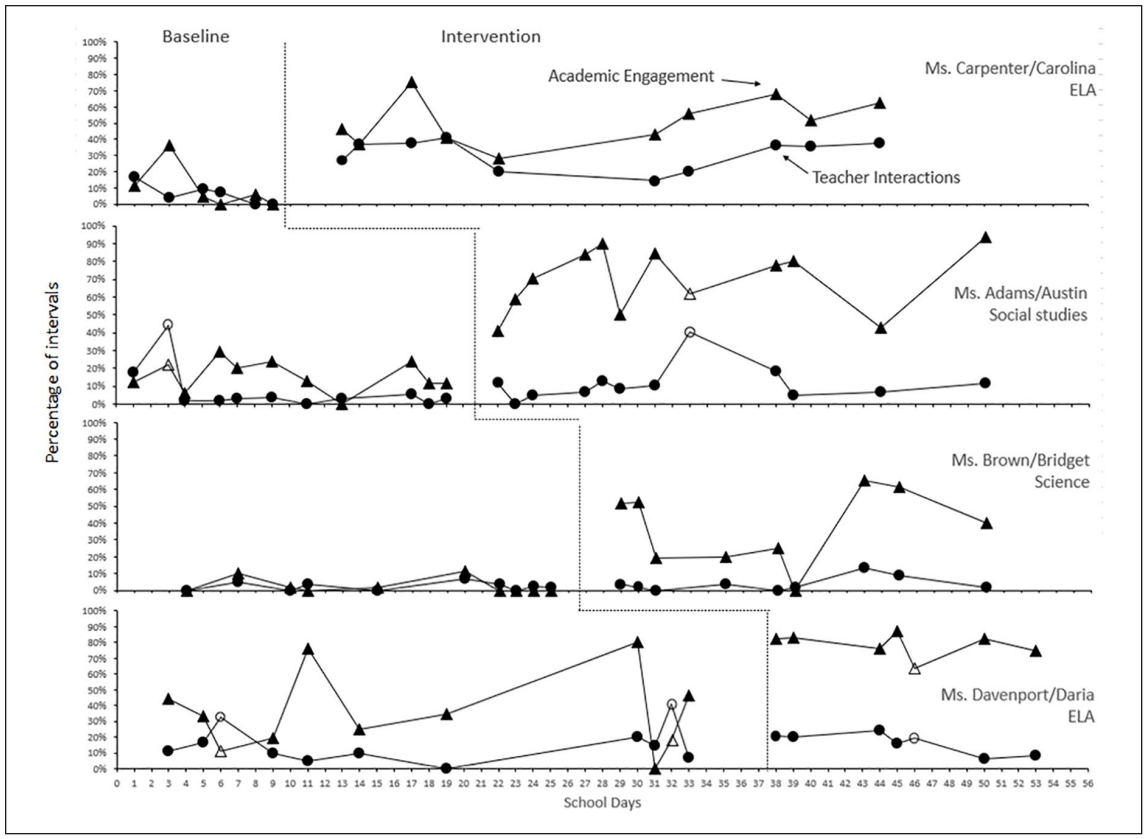

Figure 1. Teacher interactions and student academic engagement across intervention conditions and focus students.
Note. Teacher interactions are represented by closed circles. Student academic engagement is represented by closed triangles. Open icons indicate sessions in which the paraprofessional was absent from the class. ELA = English language arts.

morning work (i.e., School Days 9 and 30). However, her percentage of academic engagement increased immediately and remained stable in the CPC condition (M = 78.9%).

Teacher Interactions with Focus Student

Figure 1 displays the percentage of intervals with at least one teacher interaction directed toward the focus student. We observed inconsistent changes in overall levels of teacher interactions with the focus student as a result of the CPC process. Ms. Carpenter had large increases in her percentage of interactions with Carolina (from 7.1% to 31.8%). Increases were smaller for Ms. Adams (7.6%–11.4%) and Ms. Brown (2.3%–3.8%). No changes were found for Ms. Davenport (15.2%–15.9%). In the baseline condition, most interactions addressed noninstructional topics. In the CPC condition, however, all four general educators used a greater variety of types of instructional behaviors with the focus students (e.g., assigning work tasks, providing praise, and delivering prompts), reflecting a shift from noninstructional to instructional interactions.

Student Interactions

Although focus students' interactions with others were not a primary focus of this study, we were interested in their social involvement across conditions. Table 3 displays the percentage of student interactions by interaction partner. Carolina had few interactions with peers (3.0%) in the baseline condition but more than

tripled her peer interaction (10.0%) in the CPC condition. Interactions with the paraprofessional also increased from 46.5% to 68.1%. Interactions with peers decreased for Austin—from 7.1% in the baseline condition to 1.2% in the CPC condition. His interactions with the paraprofessional increased from 20.5% in baseline to 36.9% in the CPC condition. Bridget also had more interactions with peers in the CPC condition (15.3%) as compared with the baseline condition (10.3%). Bridget's interactions with the paraprofessional slightly increased from 27.3% to 35.4%. Like Austin and Bridget, Daria's interactions with peers decreased from the baseline condition (28.0%) to the CPC condition (22.2%). Daria's interactions with the paraprofessional also decreased from the baseline condition (41.7%) to the CPC condition (14.3%).

Social Validity

Table 2 displays general educators' ratings of social validity survey items. All general educators agreed or strongly agreed with 11 of the 15 positive statements regarding the intervention. We reviewed postintervention interview transcripts for general perspectives and attitudes toward the intervention. Ms. Carpenter stated,

> When I tell you it really made a difference, it really did. I don't think that I would have gotten as close to Carolina if we didn't have that because I really didn't know how to . . . I just didn't know.

Ms. Adams detailed,

> For me it was powerful too to realize how little gen ed students had expected of my inclusion students up until that point. And how that changed so dramatically when my special education students had materials that were the same information just reflected in a different way.

Ms. Davenport acknowledged,

> Of course, I have attended her IEP meeting. I feel like a lot of times those are very general and not really specific. But [the intervention] allowed me to know specifically what she needed and how what I was doing could match up with what she needed.

The general educators reported that (a) the CPC process provided them clarity on how to include the focus student into lessons, (b) the focus students benefited from the intervention, and that (c) they learned ways to include students with severe disabilities in lessons.

Discussion

Creating general education environments where teachers have the tools to be active instructors for students with severe disabilities—and where those students receive equitable instruction to be actively engaged participants—requires careful planning. We evaluated the effectiveness of a collaborative planning framework with ongoing consultation to increase the academic engagement of students with severe disabilities and teacher interactions with these students. We also examined the views of participating general educators on this intervention package. Our findings indicate a functional relation between the CPC intervention and academic engagement but yield mixed findings for teacher interactions with the focus students. These results extend the literature by providing new insights into the implementation and impact of a collaborative planning intervention.

Prevailing practices—as depicted in our baseline or "business as usual" conditions—may not be sufficient for ensuring a quality education for students with severe disabilities in general education classes. With the exception of Bridget, the focus students had attended their class for nearly 2 months prior to the study. Despite having access to each student's IEP and periodic communication with special educators, general educators seldom interacted with the focus students prior to introducing the intervention. When interactions did occur during baseline, they were often noninstructional in focus (i.e., social-related). Moreover, all four

students were rarely engaged academically. This finding is consistent with both descriptive studies (e.g., Carter et al., 2008; Chung et al., 2019)and the baseline patterns of prior intervention studies carried out in general education secondary classrooms (e.g., Brock & Carter, 2016).

This study shows some beneficial impacts of a collaborative planning intervention with ongoing consultation. Drawing upon similar support strategies found to be effective with younger students (e.g., Hunt et al., 2003), we introduced an intervention package to middle school general educators focused on increasing their interactions with their focus student, while also measuring the academic engagement of focus students and their interactions with their teachers and classmates. As in the study by Hunt et al. (2003), we found that academic engagement increased across all students. The CPC process offers another model for educators to collaborate efficiently and effectively.

We also found that teacher interactions with the focus students encompassed a broader range of instructional behaviors across all teachers. Few prior studies have equipped general educators to function as primary instructors of students with severe disabilities in general education classes. For example, Biggs et al. (2017) established collaborative planning as a method to increase peer supports for middle school students with disabilities who used AAC devices. However, they did not involve the general educator beyond the initial planning meeting. We found that general educators can take an active role in planning and delivering supports to students with severe disabilities to promote academic engagement and to alter the focus of their interactions.

The intervention package was not without challenges. Although this study suggests that collaborative planning with ongoing consultation can have some impact on students' academic engagement and teacher interactions with these students, several elements require closer consideration. Each class included a paraprofessional assigned to support the focus student. When the paraprofessional was absent, teacher interactions with the focus student were often much higher than sessions in which the paraprofessional was present. This finding aligns with previous research suggesting that paraprofessionals assigned to support a student with severe disabilities specifically can inhibit general educator interactions (e.g., Giangreco et al., 2001). Clarifying roles and responsibilities in collaborative planning could alleviate this effect by empowering general educators as the primary instructor for students with disabilities and reinforcing paraprofessionals as a supplemental and secondary support. We also found that student academic engagement seemed to depend on the extent to which general educators engaged in lesson planning for *any* of the students in their class. When the general educator did not provide instruction to the class, it was not possible for students with severe disabilities to be engaged.

Feedback from participating general educators affirmed the acceptability and social validity of this intervention within middle school general education classes. General educators said the time required to collaborate was reasonable, the collaboration allowed them to be effective in their responsibilities, the collaboration process was a good way to address instruction for students with severe disabilities, and that students benefited academically and socially from educator participation in the collaboration. All four general educators reported that their planning and instruction benefited from the intervention. These findings suggest that general educators may be motivated stakeholders in developing more inclusive education.

Limitations and Future Research

Several limitations of this study are important to consider. First, the lead author served as the interventionist by providing collaboration and ongoing consultation to the general educators. Although special educators who attended the Student Support Plan meetings contributed important information about the needs of the focus student during the initial planning process, they were not involved in the subsequent meetings with the general educators. A growing number of districts now employ "instructional coaches" or "inclusion coaches" who might readily serve in the same role as the researcher. Indeed, the lead author had previously served in such a role prior to her doctoral studies and designed the planning process with this application in mind. Because we were piloting a brand new approach to collaboration and consultation, we wanted to first examine its impact when implemented with a high degree of fidelity. With the promise of this intervention now demonstrated, future studies should next focus on the ways special educators or

district inclusion coaches could be trained and supported to undertake these responsibilities. Second, generalization and maintenance data were not collected formally. We noticed that general educators used adapted materials and engaged with other students with severe disabilities in the class, but we did not measure generalization specifically. However, during observations on days not discussed in Quick Plan meetings, general educators continued to provide supports to and adapted materials for the focus students. In future research, generalization and maintenance data should be measured formally to assess the extent to which general educators continue the use of the plan. Third, we did not collect normative data on teacher interactions with other students in the class or on the academic engagement of classmates. This makes it more difficult to situate our findings in relation to the experiences of students without severe disabilities enrolled in the same class. Fourth, we did not measure the skill acquisition in the focus students. Future research should assess acquisition of content-based skills to make certain that students are progressing in the general curriculum as fully integrated members of the class. Fifth, the content area of each of the classes varied. Some classes are more social or interactive than others, which could have implications for the interactions and academic engagement of participant students. Sixth, none of the focus students exhibited significant problem behaviors and all communicated using verbal speech. Future research should examine how the CPC intervention might be applied with students who exhibit challenging behaviors, who use AAC, and/or who have more extensive support needs. Additional consideration of these issues may need to be incorporated into the planning process. Seventh, we only collected social validity data from general educators. Future studies should ask focus students and their classmates for input that could inform future refinements to this intervention. Finally, general educators planned with varying levels of detail. This variance may account for differences in teacher interactions with focus students and student academic engagement.

Implications for Research

The results of this study have important implications for researchers in the field of inclusive education. First, there is a need for better measures of procedural fidelity for highly individualized interventions like the one used in this study. Fidelity measures should accommodate the variable conditions (e.g., schedule changes, varying day-to-day activities) when conducting applied research in general education classes. We noticed that educators planned their lessons with widely varying degrees of detail. In future research, fidelity measures that accommodate individualized interventions could help to identify specific factors that led to any positive changes through collaboration. Second, despite most of the teachers' prior experience of having students with severe disabilities in their classes, we noticed that little, if any, collaboration or communication was occurring with their special educators. General educators knew very little about the focus students' abilities and needs and often left instruction entirely to the paraprofessional. Future research should focus on viable avenues for increasing the *ongoing* collaboration among special and general educators. Third, it is important for the generalizability and sustainability of the intervention to include the existing special educators in providing consultation to the general educators. To carry out this pilot evaluation of a collaborative planning framework in secondary-level general education classes, researchers provided consultation to general educators in the role of the special educator. Future research should include the current special educator in the ongoing consultation to generalize across more students and sustain positive outcomes.

Implications for Practice

Findings from this study have several implications for practice. First, collaborating teachers could benefit from the low-cost and low-effort strategies used to adapt lessons for students with severe disabilities. As mentioned previously, frequent adaptations used in the Quick Plan meetings included enlarged or bold font, visual supports for the content, and simplifying the type of responses. In addition to training on adaptations and differentiated instruction, teachers need specific support on applying these concepts to their own lessons.

Second, the lesson planning of general educators can have an impact on the opportunities for teachers to interact with students and for students to engage and interact within the class. In classes where instruction was planned no more than 2 days in advance and seemed sporadic, we observed fewer teacher–student interactions and less time the focus student was academically engaged (less instructional time in general). Well-planned, classwide instruction of the general education curriculum (often called Tier 1 instruction) is foundational to supporting the instruction of students with severe disabilities who are a part of the class.

Third, general educators are not the sole support for students with severe disabilities in general education classes. Across all four general educators, teacher interactions with the focus students were periodic as they attended to all students in the class. To support students who may need more than occasional assistance in a general education class, general educators can tap into supplemental supports such as paraprofessionals and/or peer support arrangements (e.g., peers providing academic and/or social support guided by a paraprofessional or special educators). Results of this study indicate positive changes in dependent variables when only targeting the general educator. Future practice may see greater change by combining collaboration with the general educators with previously identified interventions such as paraprofessional training (e.g., Brock & Carter, 2013) and peer support arrangements (e.g., Brock & Huber, 2017).

Fourth, district administrators should support collaboration among general and special educators by providing overlapping planning time dedicated to co-planning. With external support, general educators were able to apply Student Support plans to their ongoing lesson plans and increase student engagement in their classes. However, this collaboration did not occur with the current special educator as none of the general educator–special educator pairs had a common planning time. In practice, administrators need to provide educators with support for conducting collaborative planning meetings (e.g., resources, inclusion coach) and the time to collaboratively plan (e.g., ongoing and scheduled, so both teachers are able to attend).

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Brief Report

Delivering Interventions Via Telehealth: Functional Communication Training with a Child with Autism as a Case Example

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Abstract

In this article, we provide a case example of how telehealth can be used by care providers in their homes to access empirically validated procedures such as functional communication training. As shown in the case example, complex assessment and intervention procedures were implemented successfully by care providers in their homes while receiving real-time coaching by behavior analysts who were located in a hospital in a different city. This case example is representative of the results we obtained thus far; substantial improvements in challenging and adaptive behavior occurred. Given these results obtained to date with telehealth, in terms of both outcomes of interventions and rated acceptability of the procedures by care providers, further and more widespread application of telehealth is warranted.

Keywords

telehealth, functional communication training, access to services, in-home supports

We are inspired by the successes we see every day by persons with severe disabilities and dismayed by the lack of access so many people have to supports and services that would facilitate further community involvement. More services and improved interventions are needed, but of equal concern is that the services, supports, and interventions that have already been empirically validated are not routinely available. Although organizations such as TASH have advocated for full inclusion for people with disabilities to live in community settings (TASH Resolution on Deinstitutionalization, adopted in 1979; TASH, 2020), and specifically for children to live with their families (TASH Resolution for Life in the Community, adopted in 2000; TASH, 2020), needed services and interventions are still commonly offered only in centers or clinics.

One example of an intervention that should be routinely available in home settings is functional communication training (FCT; Carr & Durand, 1985; Reichle & Wacker, 2017). FCT is an intervention that replaces challenging or interfering behaviors, such as self-injury, with socially acceptable communication responses. These communication responses replace problem behavior for two reasons: (a) they serve the same function (e.g., to receive attention, preferred items, or breaks from demands), and (b) only the socially

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acceptable communication response results in the preferred outcome. For example, social attention is provided following the child signing "please" rather than after they bite their hand.

FCT has been repeatedly shown to be an effective intervention for behaviors such as self-injury (Lindgren et al., 2020; Schieltz & Wacker, 2020). Parents rate the procedures as highly acceptable (Wacker et al., 1998) and have shown that they can successfully implement FCT in their homes with coaching from behavior specialists (Suess et al., 2016). Many parents we encounter in our outpatient challenging behavior clinics and programs have heard of FCT and indicate that they are excited to try it but have no access to ongoing expert consultation when they want to implement the procedures in their homes.

The challenge of access to needed expertise is not unique to the area of disability but is instead a concern in health care in general (National Center for Health Statistics, 2016). The current COVID-19 pandemic, which has severely limited in-person health care services across the United States, has made the health care access barriers more salient than ever (King, 2020). Telehealth, which is defined as the provision of services using communication technologies for the purposes of enhancing health care, public health, and health education, provides one possibility of increasing access to important supports and services (Center for Connected Health Policy, 2020). Access to telehealth-delivered supports and services increases the community options that a family may pursue (e.g., conducting an intervention in their home in addition to or rather than a center-based program). It is for this reason that we have been evaluating the application of telehealth-delivered programs. Telehealth provides for one method of increasing access to supports and services. However, the "success" of telehealth will ultimately be related more to the supports and services that are delivered via telehealth, rather than to telehealth itself. Thus, telehealth permits access to highly effective approaches to intervention, and the results of those programs or interventions can then facilitate the community options of persons with severe disabilities.

Beginning in the 1990s, researchers at the University of Iowa began using telehealth to provide behavioral services for individuals with disabilities (Barretto et al., 2006). These studies were conducted in two phases: In the initial phase of studies (Barretto et al., 2006; Suess et al., 2016; Wacker, Lee, Padilla Dalmau, Kopelman, Lindgren, Kuhle, Pelzel, Dyson, et al., 2013; Wacker, Lee, Padilla Dalmau, Kopelman, Lindgren, Kuhle, Pelzel, & Waldron, 2013), caregivers conducted functional analyses (FAs; Iwata et al., 1982/1994) and FCT in a clinic setting with coaching from a behavior analyst in a remote clinic location. These studies demonstrated similar outcomes (i.e., identification of behavioral function and reduction of problem behavior) to studies in which these services were provided in vivo. In the second phase of studies (Lindgren et al., 2016, 2020), caregivers conducted all procedures within their homes via coaching from a behavior analyst in a remote clinic site. Once again, similar results were obtained in comparison with both in vivo and clinic-to-clinic telehealth models. Moreover, the clinic-to-home assessment and treatment model resulted in substantially lower costs than the other two models, and caregiver acceptability was statistically similar (Lindgren et al., 2016). Based on the success of these studies, and similar findings at other sites (Benson et al., 2018; Machalicek et al., 2016; Tsami et al., 2019), our current and future research are no longer focused on telehealth as an independent variable, but as a route to connect individuals with disabilities with the expert consultation they may need.

The purpose of this article is to provide a case example of the use of telehealth from our research projects to deliver highly effective interventions to individuals with disabilities who routinely struggle to access such services within their communities. We provide one case example from our research projects at the University of Iowa, followed by a brief summary of research results to date.

Case Example: A Young Child with Autism in Rural Iowa

In the following case example, we describe our current use of telehealth to deliver FA plus FCT to families in their homes (see Wacker et al., 2016, for a more complete description of the procedures). Table 1 provides the most common general steps and the associated core telehealth features as described by Wacker et al. (2016) that were followed for all of our clinic-to-home telehealth studies. Gibson was a 3-year-old Native American girl diagnosed with autism and moderate intellectual disability. She was nonverbal and did not have any communication system (e.g., communication device, picture exchange). Gibson lived

Table 1. General Steps for Conducting FCT via Telehealth.

Step	Timeline	Activity	Core telehealth features and rationales
1	Pre-enrollment	Parent and child are referred to research study by health care provider (e.g., pediatrician, psychologist, behavior analyst).	Parent and child are screened for eligibility criteria (e.g., severe problem behavior displayed at home) by research team member.
2	Week 1	Behavior analyst contacts parent via telephone to discuss equipment needs, review the study procedures, and schedule first telehealth appointment.	*Determining equipment needs*: All equipment needs are fulfilled via lending library and delivered by mail. Parent is asked to test internet speed to ensure adequate connectivity.
3	Week 1	Instructions for logging on to Vidyo™ teleconferencing software are provided to parent via email. A telehealth manual is also provided to explain the assessment and procedures and the expected timeline.	
4	Week 2	Initial telehealth appointment.	*Initial meetings*: The purposes of the initial appointment are to assess the connection, troubleshoot any technology challenges, provide guidance on appropriate locations for intervention, and initiate an ABC interview.
5	Week 3	Second telehealth appointment.	*Initial meetings*: In the second appointment, the ABC interview is completed and a brief observation of the child in free play context is conducted. The purposes of the free play sessions are to (a) ensure the technology is able to capture the child's behavior and (b) reduce reactivity of observation. Guidance is provided on safety procedures (e.g., blocking self-injury).
6	Beginning at Week 4. Typically lasts 3 to 5 weeks.	FA is conducted by parent(s) with coaching from behavioral analyst.	*Evaluation procedures*: The FA conditions are tailored to the child based on the information gathered in the ABC interview. These appointments are divided into three parts: (a) "check in" and review of previous week's assessment sessions; (b) FA sessions; and (c) discussion of FA findings and answer questions.
7	Following completion of FA.	Review of FA results and goal-setting with parent.	*Evaluation procedures*: The FA results are discussed with the parent. Based on the assessment results, the behavior analyst and parent collaborate to develop goals for FCT. FCT procedures are described in detail.
8	Typically lasts 5 to 10 weeks.	FCT is delivered by parents with training by behavior analyst. FCT continues until established goals are met.	*Evaluation procedures*: Each appointment is divided into three parts: (a) "check in" and review of previous week's appointment; (b) FCT sessions; and (c) feedback on parent implementation of procedures.
9	6-month post intervention	Maintenance probes are conducted.	*Evaluation procedures*: The purpose of the 6-month follow-up is to assess maintenance of FCT and to provide additional consultation as needed.

Note. ABC = antecedent–behavior–consequence; FA = functional analysis; FCT = functional communication training.

with her parents and older brother in a small town in rural Iowa, which was 145 miles (233 km) away from the behavior analysts at the University of Iowa. Problem behaviors included physical aggression (i.e., hitting, kicking, biting), self-injury (i.e., hand-to-head hitting, head-to-surface banging, hand biting), and property destruction (i.e., hitting and kicking items). Gibson received 9 hr of special education preschool weekly, but no other services or therapies were available locally. Her family home was farther than 90 miles (145 km) from the nearest behavioral service agency. Gibson's parents reported numerous adverse consequences of her problem behavior, including limiting community visits, reducing demands on Gibson, and increasing family stress.

Gibson and her parents enrolled in our most recent telehealth project involving weekly 1-hr telehealth appointments.[1] A doctoral-level behavior analyst with 3 years experience providing telehealth services served as their consultant. Based on parent work schedules, Gibson's father conducted the telehealth sessions from their home with coaching from a behavior analyst at the University of Iowa. Gibson's father was 38 years old and a high school graduate. Prior to this project, Gibson's father never participated in telehealth services for Gibson or for himself. Although Gibson's family had adequate internet connectivity, they lacked the necessary equipment to conduct the telehealth appointments. Thus, a laptop computer with a webcam was provided to the family (Step 2 in Table 1) for the duration of their participation.

Prior to each weekly meeting, Gibson's father received an email with a link to the online videoconferencing meeting room (using Vidyo™ teleconferencing software; Step 3). The meetings were structured such that the initial 10 min of the 60-min appointment were dedicated to a "check in" to review the previous week's meeting and discuss any questions or concerns since that meeting. Next, most meetings included four to six 5-min FA or FCT sessions. The remaining balance of the appointment (usually 10–15 min) was used to provide Gibson's father with feedback and answer any additional questions (Steps 6 and 8).

A trained graduate student collected data on target problem behaviors and independent requests for preferred items and activities. A second trained graduate student collected reliability data on 30% of assessment and treatment sessions, and interobserver agreement (IOA) was calculated based on mean occurrence per interval. IOA for problem behavior was 97% (range = 90%–100%) and IOA for requests was 99% (range = 95%–100%). Procedural fidelity data were collected on parent delivery of antecedents and consequences for 30% of assessment and treatment sessions. Fidelity scores were calculated by dividing the number of correct deliveries by the total number of opportunities and multiplying by 100. Mean procedural integrity was 98% for assessment and 94% for treatment.

Results and Discussion

Gibson's father identified the problem behaviors of concern to the family (i.e., physical aggression, self-injury, and property destruction), the desired communication (i.e., requests for play using a picture card), and adaptive behavior (i.e., following parent directives) to be addressed during assessment and intervention. The FA, which was conducted over the course of 4 weekly appointments, indicated that Gibson's problem behaviors were maintained by escape from demands (i.e., putting nonpreferred toys in a toybox) and access to preferred toys (Figure 1, FA). Gibson did not complete any of the demands presented during the escape sessions and did not use any appropriate communication. Based on the assessment results, Gibson's father and the behavior analyst developed the following intervention goals: (a) decrease problem behavior by 90%, (b) achieve 100% task completion with 10 presented work tasks, and (c) develop independent requests for preferred items/activities using picture cards. FCT (see Wacker et al., 2011, for a more complete description) involved (a) Gibson's father presenting Gibson with a small amount of work (e.g., pick up three toys and place them in the toybox), (b) Gibson's father setting a picture card that showed "play" on the table following task completion, (c) Gibson handing her father a picture card to request preferred play activities, and (d) Gibson playing with her father for 2 min. The end of the play time was signaled by a timer, and 30 s before the timer sounded, Gibson's father prompted her that play was about to end. When the timer sounded, Gibson's father instructed her to go to the work area where additional work tasks were presented in the same sequence as described earlier. Demand fading was used such that three consecutive sessions without problem behavior resulted in a small increase in the amount of work and continued until the terminal goal of 10 work tasks was reached.

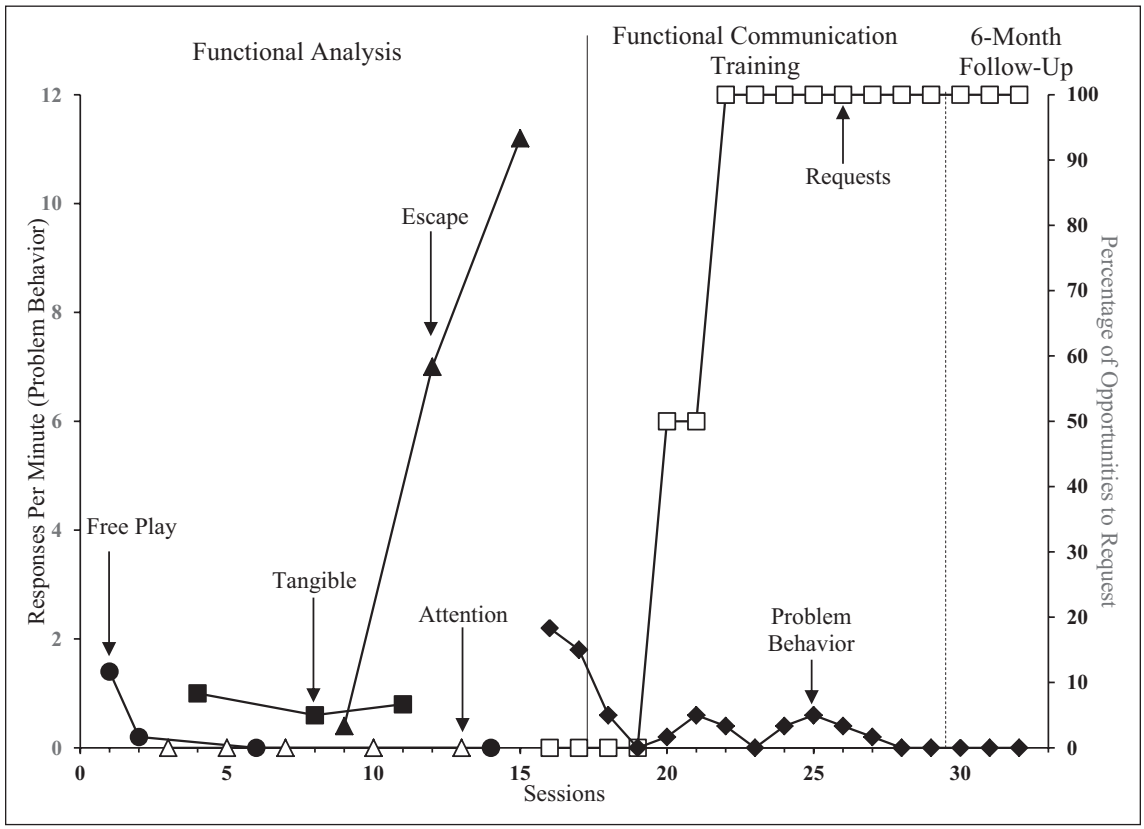

Figure 1. Results of functional analysis and functional communication training with Gibson.
Note. Data on requests are only included in the Functional Communication Training condition and 6-Month Follow-Up phase. Data on problem behavior are plotted according to the primary *y*-axis on the left of the figure (responses per minute) and data on requests are plotted according to the secondary *y*-axis on the right of the figure (percentage of opportunities).

The behavior analyst taught Gibson's father to safely and neutrally block all forms of aggression and self-injury and to ignore other problem behavior. Thus, he blocked severe problem behaviors (e.g., aggression, self-injury, destruction) and ignored crying, screaming, and flailing, all while the demand remained in place and scheduled prompting continued. During play, Gibson's father ignored crying, screaming, and flailing, but severe problem behaviors resulted in the termination of play and a return to work.

As shown in Figure 1, FCT led to an immediate reduction in Gibson's problem behavior, and by the fourth FCT session, problem behavior decreased to zero. Problem behavior then remained low for the duration of the intervention. Gibson met the intervention goals rapidly, requiring only five 1-hr appointments. Task completion (not shown in Figure 1), was at or near 100% for the entirety of the intervention. During the initial four FCT sessions, Gibson failed to independently request her preferred play items; however, she displayed some independent requests in the fifth and sixth sessions, and by the seventh session, until the end of the intervention, she independently requested during 100% of the opportunities. Once Gibson reached the intervention goals, Gibson's mother was trained to conduct the intervention and generalization was achieved immediately (not shown in Figure 1). At the conclusion of FCT, Gibson's father rated the FCT intervention as highly acceptable on the Treatment Acceptability Rating Form–Revised (TARF-R; Reimers et al., 1991).

We conducted a follow-up appointment 6 months after the completion of the intervention (Figure 1, 6-Month Follow-Up). Maintenance occurred as evidenced by Gibson displaying zero problem behavior for all three sessions, independent requesting for 100% of the opportunities, and 100% task completion of the goal (i.e., 10 tasks). Gibson's parents reported feeling more comfortable taking Gibson out into the

community and there was reduced family stress. In addition, they were placing more demands on Gibson (e.g., toothbrushing, getting dressed) and she began making some vocal requests.

If Gibson and her parents had been required to attend appointments in person at our outpatient challenging behavior clinic, travel would have totaled nearly 3,000 miles and 50 hr of driving. This would have been challenging for the family, would have decreased the time the family had to spend together at home or on family outings, and would have required that the parents generalize the intervention procedures from clinic to home (see Lindgren et al., 2016, for further cost analyses). The use of telehealth not only saved the family valuable time and resources, it also provided them with access to an expert consultant who helped them implement the procedures in their home. By providing our services using a clinic-to-home, parent-mediated telehealth model, intervention could be delivered in the most naturalistic context possible for this child, supporting full inclusion of this family in their community.

Brief Summary of Project Results and General Discussion

The results from the case example of Gibson and her family are consistent with the overall results achieved within our research projects (e.g., Lindgren et al., 2020). Each of the previous projects has focused on reducing severe and challenging behavior in young children with autism and other developmental disabilities via an FA + FCT program. In our telehealth projects involving FCT, the observed reductions in problem behavior for young children with disabilities (*M* reduction = approximately 94%) have been comparable with FCT delivered in vivo (*M* reduction = approximately 95%) and treatment acceptability remains very high (Lindgren et al., 2016). Moreover, the costs associated with delivering FCT via telehealth have been substantially lower than when FCT is delivered in person (Lindgren et al., 2016). Schieltz and Wacker (2020) recently conducted a review of 18 studies involving FA and/or FCT procedures conducted via telehealth for 128 participants and reported that only in rare cases was a function not identified for the target behavior(s) or a treatment failed to result in reduction of the target behavior(s). Although more than half of the participants in the reviewed studies were involved in projects at the University of Iowa, studies from other research groups showed similar outcomes.

The case example and project summary presented in this article demonstrates that effective assessment and intervention procedures for children with challenging behavior can be conducted successfully via telehealth. In our example, expert behavior analysts met at least weekly with families to discuss, explain, and coach the parents as they implemented the procedures. We are not sure what schedule of coaching is best, but providing a consistent and predictable level of coaching has proven to be effective in our projects. The timing, amount, and level of coaching needed to be successful are only a few of the numerous questions remaining to be addressed in follow-up projects involving telehealth (Lindgren et al., 2016).

We find ourselves simultaneously pleased by the results of these and other home-based projects and concerned by the lack of access so many people have to supports and services that facilitate community involvement. Increased community involvement requires that professionals effectively support their students/clients to use empirically validated procedures such as FCT. Our success with the families, working with one family at a time via telehealth in homes, although positive, is insufficient to promote further community involvement in a widespread manner. Through projects at the University of Iowa, we have been able to work with hundreds of families, but there are thousands more within our state that would benefit from this support. In addition to greater application of telehealth, we need to strongly advocate for the provision of services and supports that will help to maintain the positive results that are obtained. We advocate for the use of telehealth because it can increase the access families have to effective services and interventions and provide a successful alternative to in-person services. The COVID-19 pandemic provides additional motive to consider the use of telehealth for delivering important intervention services. Although we need to continue to make advancement in the hardware and software used in telehealth programs, the maintenance of intervention gains in the community will occur only if families receive the services, supports, and consultation they need to continue to implement and to modify the interventions over time within their homes and in the community.

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Declaration of Conflicting Interests

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Note

1. All procedures in this case example are more fully described by Wacker, Lee, Padilla Dalmau, Kopelman, Lindgren, Kuhle, Pelzel, Dyson, et al. (2013); Wacker, Lee, Padilla Dalmau, Kopelman, Lindgren, Kuhle, Pelzel, and Waldron (2013), and Lindgren et al. (2020).

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