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Focusing on individuals with autism, intellectual disability and other developmental disabilities

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Address is supplied for author in boldface type.
Abstract: A phenomenological study was conducted to investigate the social experiences and perceptions of friendship among three adolescents with an Autism Spectrum Disorder (ASD) engaged in online videogame play in the context of a massively multiplayer online role-playing game (MMORPG). Semi-structured interviews with three participants, diagnosed with ASD between the ages of 16–21 years, yielded four themes that illustrated the social experiences of participants in this study. Emerging themes and participant comments identified in this study parallel those identified in the most recent research literature that has also sought to identify experiences and attributes that may lead to successful interpersonal relationships for individuals identified with ASD. Participants in this study articulated the desire to socialize, interact, and frequently communicate in a virtual environment; challenges with being misunderstood; issues with identification and perceptions of friends; and awareness of rules specific to face-to-face and virtual environments.

A review of the current research literature related to adolescents with Autism Spectrum Disorder (ASD) revealed a focus on adolescent social challenges and language development as well as strategies to increase the acquisition of functional social skills. However, there was a notable absence of research on the social and relational impact of the use of virtual environments and online gaming for individuals with ASD. The focus of this study was the examination of the social interactions of adolescents with ASD as they engaged in massively multiplayer online role-playing games (MMORPG).

This article begins by providing context for the development of the study rationale through a review of the extant literature on individuals with ASD and participation in virtual environments and online gaming. Next the study’s purpose is connected to the documented social and relational needs of individuals with ASD and the potential of virtual environments and online gaming to meet those needs. A description of the research study and methodology follows along with a summary of results and implications for individuals with ASD. Concluding remarks address the potential implications of an expanded research effort in this area on the postsecondary outcomes of adolescents and young adults with ASD.

Autism Spectrum Disorder

A defining characteristic of ASD is the lack of appropriate social skills, lack of appropriate responses during a conversation, limited social interactions, low to no maintained friendships or interactions outside of school or work that include phone calls or face-to-face interactions (Gihak, 2011; Seltzer, Greenberg, Floyd, & Hong, 2004). An increasing number of individuals are being diagnosed with ASD. Current estimates indicate that 1:68 individuals have some form of ASD (Center for Disease Control, 2014). This increase in prevalence has lead to revision and refinement in
definitions of ASD including these that describe the disorder as:

- A developmental disorder of the human nervous system, (Mintz, Branch, March, & Lerman, 2012) that currently affects 1% of the global population (Charman & Gotham, 2013).
- A developmental disorder categorized by deficits in social interactions and communication skills as well as the presence of stereotypic and repetitive behaviors (American Psychiatric Association, 2013).
- A complex disorder (Schafer et al., 2013) with the degree of challenge individualized and specific to each person – with severity ranging from mild to severe impairment (National Institute of Mental Health, 2012).

In addition to social challenges, individuals with ASD also experience challenges with awareness and emotional recognition that leads to debility of self (Duff & Flattery, 2014). Unaware of how others think and perceive them, individuals with ASD have ever-present difficulties with socialization that often result in social rejection, that follows them throughout their lives, resulting in barriers and challenges in education, postsecondary education, and other aspects of daily living (Carrington, Papinczak, & Templeton, 2003). The purpose of this study was to (1) describe the social interactions of adolescents with ASD in the context of a virtual environment, (2) identify if they are socializing, and (3) describe how they socialized and related information pertaining to their daily living.

**Absence of Interventions for Adolescents and Young Adults with ASD**

As early as elementary school, educators and other practitioners attempt to remediate social skill difficulties in individuals with ASD. Much of the current research focuses on the impact of early intervention, through techniques such as Discrete Trial Training, for basic communication skills. The National Professional Development Center (2014) and National Research Council have identified 27 evidence-based practices used to support social and behavioral challenges for individuals with ASD. Of the 27, 19 have been evidence based for adolescents and 11 for young adults with ASD up to the age of 22 years. However, these strategies have not proven to be as successful in helping adolescents and young adults with high functioning ASD engage with peers, learn complex communication, and achieve transition post-high school (Schall & McDonough, 2010).

Although childhood research is valuable, research on social skill and communication development beyond this period has been neglected (Schall & McDonough, 2010). Few studies discuss the need to reach adolescents; and even fewer studies have targeted those with high functioning autism as defined by the DSM-V (2014) who would require level one support.

**Social and Relational Deficits**

Adolescents with ASD have social and relational deficits that differ dramatically from students with other disabilities. Adolescents with ASD are significantly more likely to never see friends outside of school (43.3%), never get called by friends (54.4%), and never be invited to activities (50.4%) “when compared to those with other disabilities such as intellectual disabilities, speech and language impairment, or learning disabilities” (Shattuck, Orsmond, Wagner, & Cooper, 2011, p. 5). In addition, adolescents with ASD are less likely to participate in social activities with friends, or community activities with peers than those in other disability categories (Shattuck et al., 2011).

Social challenges remain problematic through adulthood affecting their postsecondary transitions to college and careers (Church, Alisanski, & Amanullah, 2000). For example, nearly 85% of individuals with ASD live with a family member (NLTS-2 W-5, 2009), only 54% graduate high school (Shattuck et al., 2011) and as a result only 13% go onto postsecondary education, which contributes to having the lowest average wage amongst all other disability categories at $8.70/hr (Wei et al., 2013).

**Transition to Adulthood**

A large population of individuals with ASD is maturing into adolescence and adulthood; however, there exists a paucity of research on
postsecondary supports and interventions to support success in postsecondary settings (Shattuck et al., 2011). Due to their unique characteristics, individuals with ASD often possess strengths in the area of complex problem solving, attention to detail, the ability to hyper focus on a given task, conceptualization of solutions to often complex problems, and are often high achieving in the areas of science, technology, engineering, and mathematics (STEM) (Baron-Cohen, Wheelwright, Burtenshaw, & Hobson, 2007; Fessenden, 2013; Shattuck et al., 2011; Wei et al., 2013). Adolescents and young adults with ASD choose majors in STEM at a much higher rate than their typically developing peers, yet fail to achieve commensurate with their peers (Wei et al., 2013). As a result of the persistent deficit in social communication and interactions within a group, individuals with ASD hold the third lowest matriculation rate to college and are the lowest of all diverse populations in the area of STEM.

Science, Technology, Engineering, and Mathematics

Predisposed to experience persistent challenges in social skill and soft skill development, individuals with ASD possess a high level of interest and hold the potential to contribute to future science breakthroughs in STEM (Grandin, 2012). However, reports on postsecondary outcomes for individuals with ASD indicate these students have the third lowest matriculation rate (into college) and as a result, are chronically underrepresented in STEM careers (Wei et al., 2013). Many of the characteristics of ASD that often present challenges in social situations can benefit students with ASD in STEM areas. For example, their ability to hyper focus on a specific analytical task and critically and systematically conceptualize solutions to complex problems (Wei et al., 2013) all can enhance their acquisition of STEM knowledge. Despite their demonstrated aptitude for STEM fields, individuals with ASD are not being assimilated into STEM professions (Grandin, 2012). Postsecondary outcomes for individuals with ASD remain grim (Shattuck et al., 2012).

One contributing factor in poor postsecondary outcomes is a persistent deficit in social skills that impedes the ability of adolescents with ASD to socially connect and develop supportive friendships; a highly desirable soft skill that predicates success in securing and maintaining employment (Alpern & Zager, 2007; Baron-Cohen et al., 2007; Fessenden, 2013; Wei et al., 2013). Soft skills are necessary to support effective communication and social interaction in college and careers. These skills are particularly important in STEM fields.

Virtual Environments and Online Gaming

Over the past several decades, researchers have demonstrated that individuals with ASD are more apt to successfully acquire skills when instruction occurs in community-based and/or naturalistic settings (Alpern & Zager, 2007). The continued evolution of technology and digital communication continues to grow the number and types of collaborative virtual environments (CVE) that serve as platforms for virtual communities that may support the acquisition and use of communication and socialization skills (Moore, Cheng, McGrath, & Powell, 2005). These virtual mediums include a wide range of web-based applications and social media and include platforms such as: email, Skype, Google+, Facebook, Instagram, Twitter, Second Life, MMORPG and countless others that provide opportunities for virtual interactions and socialization.

Virtual environments such as a massively multiplayer online role-playing game (MMORPG) provide unique opportunities to engage socially without the risk and challenges of face-to-face situations and allow participants to freely develop social connections (Casey & Evans, 2011). Social and communication skills learned by individuals with ASD in a MMORPG may generalize to other environments including face-to-face situations (Bricker & Bell, 2012; Craft, 2012; Gee, 2007; Granic, Lobel, & Engels, 2014; Parsons & Cobb, 2011; Yee, 2006). Despite a desire for friendships and opportunities to socialize through the use of technology, individuals with ASD fail to recognize and accurately interpret social cues or verbal and nonverbal behaviors (Iovannone, Dunlap, Huber, & Kincaid, 2003). Difficulties with interpreting emotions, body language, and facial expression of
peers frustrate individuals with ASD (Morrison & Blackburn, 2008). Teaching social skills in virtual environments provides opportunities for children with ASD to develop their social communication skills without the challenges of real-world extraneous variables such as the unpredictable face-to-face interactions of others that could increase anxiety (Baker et al., 2009; Beauchamp & Anderson, 2010; Cobb, 2007; Leonard, Withers, & Sherblom, 2011; Parsons, Leonard, & Mitchell, 2006a). In addition MMORPGs provide countless opportunities to interact and replicate social situations through the virtual environment.

Massively Multiplayer Online Role-Playing Games

Social interaction including collaboration and communication are critical components of successful gameplay in MMORPG. These web-based games combine aspects of both role-playing video games and massively multiplayer games creating a virtual environment where large numbers of players interact with one another. The majority of MMORPGs have a variety of tools to facilitate communication between players including chat boxes, webcam rooms, voice chats, and forms of video-chat that can be used to connect participants. Using these players engage in complex dialogues as they collaborate to problem-solve, strategize, and socialize, engaging in the very skills they lack in face-to-face environments (Prensky, 2007; Yee, 2006).

Virtual environments include any digital medium in which individuals are represented as avatars interacting with other avatars or computer agents (Fox et al., 2014). Agents are computer-controlled avatars. While agents respond to the moves and decisions of human-controlled avatars, player-participants do not directly control the responses or movements of agents. In contrast, in virtual environments, human participants control the actions of avatars. These actions simulate real-world situations and dialogue mimicking human expression and body language in the virtual environment. Online gaming environments generally include both computer-controlled agents as well as human-controlled avatars. Massively multiplayer online role-playing games include computer-controlled agents as well as human-controlled avatars that represent each of the game participants. The large number of player-participants in MMORPGs provides opportunities for players to form and build relationships and alliances that can be advantageous in achieving common goals, completing game challenges, and ultimate victory in the game.

Participants, through their avatars, interact with both agents or computer mediated interactions, and other avatars in the online game environment. Social influence plays a role in the responses and decisions of player-controlled avatars as they take offensive and defensive actions based on their perceptions of allies and enemies in the gaming environment. Social influence has been described as change in an individual’s cognitions, attitudes, physiological responses, and behaviors resulting from the belief that another person is present (Allport, 1985). Avatars have a greater social influence on participants in games as compared to the influence of computer-controlled agents (Fox et al., 2014). Avatars elicit a suspension of disbelief on the part of the player, which in turn increases player engagement and the belief that another person is present in the virtual environment (Dieker, Rodriguez, Lignugaris, Hynes, & Hughes, 2013).

Individuals who choose to interact with other players make connections and communicate through their personalized avatars. Players have the option to choose how, when, and how much interaction they want to have with other players through their avatars, which provides a measure of control over extraneous variables that often seem to be unpredictable in real-world situations.

The virtual environment, along with various interaction options, creates a “safe” opportunity for social risk taking and supports increased levels of engagement and social interaction when compared to social interaction by the same participants in real-world environments (Baker et al., 2009; Barrett, 2011; Beauchamp & Anderson, 2010; Bellini & Akullian, 2007; Cobb, 2007; Leonard et al., 2011; Nefdt, Koegel, Singer, & Gerber, 2010; Parsons et al., 2006a).

Collaborative virtual environments have the potential to help individuals with ASD under-
stand social constructs, such as facial recognition and emotional inferences, based upon facial expressions of avatars in the games (Moore, Cheng, McGrath, & Powell, 2005). These virtual environments provide an opportunity for individuals with ASD to independently interact socially with others, receive and respond to feedback, and develop new social/communication skills outside of an often-intimidating face-to-face environment (Cheng, 2005; Mitchell, Parsons, & Leonard, 2011).

The Role of Virtual Environments in Friendships

Massively multiplayer online role-playing games offer an innovative medium where individuals as well as those with ASD can communicate and interact with peers. Several researchers note that when given an opportunity to engage in an environment that does not require constant face-to-face interaction, communication skills that support socialization can be developed by individuals with ASD (Cheng, 2005; Cheng & Huang, 2012; Mitchell et al., 2011). Virtual environments that embed videogame principles such as immediate feedback and player collaboration, hold the potential to support social communication skills (Cheng & Huang, 2012; Fullen, 2012; Schafer et al., 2013) and may transcend into the development of meaningful relationships (Yee, 2006).

Implications for Online Virtual Environments and Videogames

Videogames provide opportunities for people to engage in conversation, assume leadership roles, collaborate, and build social connections with others in a virtual community (Gee, 2007; Fullen, 2012; Yee, 2006); however, little is known about the dynamics of socialization in an MMORPG or virtual environment for individuals with ASD.

The work of early researchers in this area focused on basic communication and task completion skills but provided a glimpse at the potential of these environments to support the development of social and communication skills of individuals with ASD (Moore et al., 2005). To date no study examines the use of virtual environments as a MMORPG to develop meaningful social relationships for individuals with ASD. Examining the social implications of videogames will support the understanding of new opportunities to engage socially; further examination will set the foundation to develop opportunities for individuals with ASD to become socially engaged by utilizing innovative technology and virtual immersive environments such as a MMORPG.

The purpose of this research study was to examine social interactions of adolescents with ASD as they engage in a virtual environment. Understanding the social nature of videogames as a method to engage in a dynamic social community could lead to supporting the development of a platform on a computer or handheld device that could be used specifically for educational use (Craft, 2012; Gee, 2007).

Method

The researchers employed a phenomenological study that used interpretative sociology and emergent coding to describe in detail the meaning of social interactions for three adolescent/young adult boys with a formal diagnosis of ASD. Semi-structured interviews were used to glean information from the participants (n = 3). This approach allowed the participants to freely describe their own experiences. Questions were reevaluated to ensure that participant responses would engender answers specific to the research question. Due to the nature of the participants, they often provided information not related to the questions asked; this information was important to understanding the social experiences and therefore will also be discussed. The goal of this phenomenology study was to understand the experiences of this specific group of adolescents as they constructed meaning from their social experiences (Creswell, 2013).

Participants and Setting

This study was conducted through observations of local gaming events in a Central Florida mall, interviews with participants at a local library, and group observations/focus groups to corroborate the information gathered. Participants were adolescents or young adults.
(16-21 years) currently enrolled in high school, diagnosed with high functioning ASD, who would fall into category one of the DSM-V, requiring minimum support. Three levels of severity have been defined by the DSM-V (2014); level one includes those individuals that require minimum support, level two includes individuals that require substantial support, and level three includes individuals that require very substantial support for social interactions. Prior to the revisions of the DSM-V, Asperger’s syndrome was recognized as a more mild form of ASD and often considered “high-functioning” ASD; however, Asperger’s Syndrome has since been removed. For the purposes of this study adolescents with high functioning ASD were defined as those that fall into level one as defined by the DSM-V (2014).

No two individuals with ASD are alike, and currently there is no consensus as to the definition of high functioning ASD (Lai, Lombardo, Pasco, Ruigrok, & Wheelwright, 2011; Ozonoff, South, & Miller, 2000). “The DSM provides a categorical approach to low and high-functioning and several explanatory models for symptoms exist, yet they do not provide a full explanation for the multiplicity of clinical presentations for ASD or for all the core symptoms” (Tyson & Cruess, 2011, p. 1477). Each participant had a documented deficit in social skills and relationship development. While attending high school, all participants had an Individualized Education Program (IEP) with social goals and received special education services in the context of an inclusive classroom.

**Austin**

Austin is an individual with high functioning autism. Austin is in grade 11 and is 18 years old with an IQ > 100. He attended 70% of his day in a general education inclusive classroom and 30% in a self-contained class working on social personal skills and English class. Austin enjoys playing video games by himself and with his friends. He stated that he has 20 or 30 friends but maybe only three or four. His justification was many people know him and he enjoys talking to them; however, they find him annoying. Austin also enjoys playing with dinosaurs and writing stories, after school he spends time alone at home and only can play videogames when his mother turns on the Internet. On weekends, Austin enjoys volunteering at the zoo. Austin’s mother hopes he will live independently but is unsure of his ability to socialize and maintain appropriate conversations with people in a face-to-face environment. Austin is capable of holding virtual conversations through Skype, Facebook, FaceTime, or Oovoo; however, he does not enjoy using the telephone and struggles with group and individual face-to-face conversations. Austin has a friend Auden, they are able to get together when their mothers can connect their schedules.

**Auden**

Auden is 16 and in grade 10 with an IQ > 90 and has been diagnosed with ASD. Auden attends school full-time in an inclusive setting; he takes one social personal class that is considered part of his Individualized Education Program (IEP). This social personal class is intended to help develop his social and functional communication skills. Auden enjoys videogames, playing matchbox cars, and taking apart computers. Auden stated that he has between two and nine friends but most everyone at school does know him, but realistically he has two friends. Auden spends time after school playing videogames and enjoys talking on Skype with people he met while playing the videogame *Minecraft*. The people he interacts with, he has never met face-to-face, and he only knows them from the virtual world. Auden stated two of his online friends are now from school; however the majority of his friends are from Canada and London. Auden describes talking about cars with his friends in the virtual worlds and building structures in Minecraft. Auden primarily plays in the MMORPG, World of Warcraft and enjoys working with others to complete quests and battles. Auden, similar to Austin, does not like to talk to people face-to-face and finds it easier to talk to people over a virtual medium. Auden also uses Skype, Facebook, FaceTime, or Oovoo; he will use a telephone if his mother “demands it”, but prefers other methods of communication.
Taylor

Taylor is a young adult with Asperger’s Syndrome; he identifies himself as an “aspie”. Taylor is 21 years old with an IQ > 100, and despite being enrolled in high school, he currently does not attend school. He informed the researcher that, “there was no functional purpose to high school for him”. Additionally Taylor does not hold a job. Taylor stated that people do not understand him well enough to manage to talk to him, so it has stopped him from getting a job, completing high school, or continuing on to college. Taylor emphasized during the interview that his only friends are gamers, and he frequently speaks to people all over the world in the context of his MMORPG game.

Taylor recently started spending time at the game shop located in a mall in an urban setting. During his visits to the mall he described interacting face-to-face with some of his friends from his local guild in the MMORPG. Taylor has been able to develop friendships online over the game and now feels comfortable to go to the game shop and attend gaming events such as Mega-con held in Orlando. Taylor does not use the telephone often and prefers to talk to people over Skype, Facebook, FaceTime, or through the game chat room.

Research Questions

The study focused on the perceptions of adolescents and young adults with ASD participating in online gaming. The overarching research question was: What are the social identities, interactions, and agendas for participants with ASD playing a MMORPG? A secondary goal was to describe the social interactions that occur between the participants and their friends during game-play.

Procedure

The Institutional Review Board (IRB) at a large urban university approved the study, and the researcher conducted interviews, observations, group observations and discussions with adolescents with ASD. A series of open in-depth interviews, structured interviews, and observations of gaming events that include four or more participants was conducted.

The qualitative design included participants enrolled in an urban high school setting. All participants actively participated in online videogame play using virtual environments (3+ hours a week) (Granic et al., 2014; Yee, 2006) in a MMORPG. In-depth interviews and observations were the primary method of data collection. The interview process began with the researcher conducting a series of open-ended and structured interview questions. The focus of the questions was intended to describe the social experiences of gaming and the correlates to social relationships for young adults with ASD (a copy of the questions can be obtained by contacting the authors). The information obtained subsequently formed the basis for the overall findings of the study. To support the findings from the in-depth interviews, participants completed a review of the transcripts through member-checking and confirmed the transcripts and initial codes with the researcher. Coding categories were developed and refined on an ongoing basis, guided by the study’s conceptual framework. In addition, various strategies were employed, including a search for discrepant evidence, inter-coder reliability in the coding process, and peer review at different stages as the study progressed.

Using emergent coding, themes were developed from the initial codes that describe the social structure and social cultural norms, and tensions between real life and virtual life were recorded. Perceptions of friends and how they differ from a virtual gaming environment to a face-to-face environment and the tension between acceptable conversation and social rules as they differed from gaming to face-to-face encounters were presented. Twelve initial codes were identified, the primary codes included social rules, social norms, social acceptance, social justification, and social diversion. Key themes were identified and developed into overarching themes.

A sample of specific interview questions and prompts included the following:

- Can you describe your friends at school and your social interactions? How many friends do you have?
- Describe how you feel when you game
Describe your interactions online with people would you rather interact online or face-to-face. Why?
Describe your socialization with people you know face-to-face and those you have never met.
Discuss your perspective of the gaming community and socialization that occurs in the game.
Describe how you socialize in the game and your sense of being part of a social group.

Data Analysis and Emergent Themes
Using emergent coding, four themes were initially identified in the data: comfort and overcoming barriers, socialization with friends and making new friends in the virtual environment, awareness of self and others with recognition of emotions, and learning to interact in a virtual environment and generalizing skills to a face-to-face setting. See Table 1 for details.

Socialization in a Virtual Environment: Comfort and Overcoming Barriers
As noted in the extant literature, a persistent struggle with social skills remains problematic through life transitions for individuals with ASD (Shattuck et al., 2012). Social skills challenges are augmented by face-to-face environments that present situations that potentially cause anxiety which lead to discomfort and anxiety when socially interacting. Through the comments from all three participants involved with this research, it is evident that they struggle with interactions, bullying, and are acutely aware of their challenges and differences. However, all participants described using a virtual environment to interact that allowed them to overcome barriers to socialization and successfully interact with others, develop friendships, and develop an awareness of self and others.

All of the participants described using a virtual environment as places to comfortably interact. The comfort is achieved by the level of anonymity that comes by interacting through the use of an avatar. An avatar is a digital representation of a character that personifies whom the individual would like to portray in the game. For example, that the player can personify his/her ideal self and then interact with others comfortable through his/her avatar. In addition, the virtual space removes extraneous variables that often augment challenges during socialization for individuals with ASD. All participants discuss a feeling of having more control over with whom they interacted and how they interacted in a virtual space using their avatar. A topic that was emphasized by participants was using the MMORPG to interact only with people that did not make them uncomfortable or bully them. For example, one participant stated:

“You know, people don’t pick on me online... um well we all can be kind of mean sometimes but we don’t mean to be a bully it is just if they bully me I can delete them or close the chat log. Because then they would like me for who I am and we would be doing the same things Auden and I can be our special names and then everyone likes us.”

Common Topics
Another sub-theme included the use of a MMORPG to identify common topics and engage with people that have the same interests. All the participants (100%) describe enjoying interactions within the MMORPG because they were focused on topics of interest to all players. In addition, the participants noted how the virtual environment would alleviate the need to try to develop common ground because it was already there in the form of a game. For example, Austin discussed hanging out with his friend while playing the game. Austin identified this as an important part of their friendship so they have the same thing to talk about. “I like to play with James (pseudonym) because then we do something we both like and we can talk about it”. Two of the three participants, Austin and Taylor emphasized that the majority of their friends and people they interact with find them annoying. However, in a game they can say what they want, such as discuss cars or physics in depth, because they describe the game as a place where people do not judge others for their particularities and do not get annoyed as easy. “As if social rules are different in a virtual environment. People don’t care who I am in the game.
<table>
<thead>
<tr>
<th>Initial Codes</th>
<th>Total Tally</th>
<th>Themes</th>
<th>Justification</th>
<th>Aggregate Theme Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort and safety of socialization</td>
<td>28</td>
<td>Comfort and overcoming barriers</td>
<td>The internet was used as a safety net to develop social skills and interact with friends while avoiding bullying.</td>
<td>47</td>
</tr>
<tr>
<td>Barriers to socialization and interaction</td>
<td>14</td>
<td>Bullying</td>
<td></td>
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</tr>
<tr>
<td>Socialization in the game</td>
<td>29</td>
<td>Socialization with friends and development of new friends through virtual connections</td>
<td>The virtual environment served as a platform to socially engage, spend time with friends from all over the world, and communicate with people. The participants developed an understanding of communication and friendships.</td>
<td>62</td>
</tr>
<tr>
<td>Perceptions of social communication and technology to communicate</td>
<td>7</td>
<td>Perceptions of new friends through virtual connections</td>
<td></td>
<td></td>
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<tr>
<td>Friendships</td>
<td>10</td>
<td>Perceptions of social communication</td>
<td></td>
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<tr>
<td>Friendship perceptions</td>
<td>11</td>
<td>Perceptions of social communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Recognition</td>
<td>20</td>
<td>Emotional Recognition</td>
<td>Majority of literature notes challenges with self-awareness, emotional recognition, rule and role identification, and self-perceptions. Participants expressed their understanding of emotions, self, and others while interacting in defined roles.</td>
<td>75</td>
</tr>
<tr>
<td>Social Acceptance</td>
<td>6</td>
<td>Others with recognition of emotions</td>
<td></td>
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<tr>
<td>Awareness of rules/roles</td>
<td>22</td>
<td>Recognition of others perceptions</td>
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<tr>
<td>Awareness of others perceptions</td>
<td>11</td>
<td>Self-perceptions of interaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaboration/Skills learned</td>
<td>6</td>
<td>Learning to interact in a virtual environment and generalizing skills to a face-to-face setting</td>
<td>Even though this category is small the researcher felt that learning skills in the virtual environment and transferring them to other settings supported their self-advocacy and increased participation in the general education class and with the community.</td>
<td>10</td>
</tr>
<tr>
<td>Self-advocacy</td>
<td>4</td>
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or that I’m weird, they just like me and we play.” The findings from this rich research demonstrate that this homogeneous group of individuals with ASD have an awareness of self and others and are more comfortable interacting in a virtual environment. As a result of an increased comfort level and self-awareness that was developed in a MMORPG, all of the participants were able to develop and sustain friendships both in the MMORPG and face-to-face settings.

Socialization with Friends and Development of New Friends through Virtual Connections

Based on the data, the researchers described findings that this group of individuals with ASD actively sought friendships, recognized emotions, and understood roles within the game and real life. All participants identified at least one friend or acquaintance in a face-to-face environment; however; online they identify thousands of other players that they interacted with all around the world. All participants identified between five and eight friends they considered close friends even if they had never met them in real life. One interviewee, Taylor stated:

Well, gaming is my only source of friends. The only people I talk to are gamers in and out of the game. I have had social goals my whole life [in school] but I have lots of friends in the game and we get together in real life too. I can have more friends online and socialize just like you do [emphasized with a louder voice]; we get together at cons like the mega-con that was just here in Orlando. I also use to play with my brother and we were friends but now he does not like gaming and has moved away, we still talk but not as much.

All three participants discussed the number of friends they had in a virtual environment and how comfortable they were talking with friends. All participants sought out friendships and described wanting to socially interact. All participants described being acutely aware that many of their peers in school found them to be annoying, weird, or different; these perceptions of self compounded their challenges with socializing and developing friendship. It was interesting that Taylor emphasized that because of the relationships he had developed online he was able to have the courage to go meet the people face-to-face.

Emerging research has begun to focus on interpersonal relationships and friendships for individuals considered to have high functioning ASD. Researchers have noted that young adults with ASD possess a desire to establish friendships (Bauminger & Kasari, 2000); however, they fail to recognize and accurately interpret social cues to include verbal and nonverbal behavior (Iovannone et al., 2003).

Feelings of exclusion associated with a persistent challenge with social skills can contribute to the dropout rate in a postsecondary setting and job loss in a business/employment environment, especially for young adults with ASD (Fessenden, 2013). However, given the changes occurring with digital communication and socialization, it may be possible to integrate young adults with ASD into a virtual community that may support greater communication in a face-to-face setting (Cheng, 2005).

Awareness of rules related to self and others with recognition of emotions. Within the defined rules and social norms of social interactions in society, some individuals with ASD develop patterns and ritualistic behaviors to ensure that they adhere to them (Cihak, 2011). The rules specific to this group considered interactions in school, the mall, and on public transportation. All participants described learning to interact within a game and transferring those skills to a face-to-face setting. Additionally, by understanding the rules, the participants all described recognizing their emotions as well as the emotions of others. For example, one participant, Austin appeared to struggle with a foot fetish; he really enjoyed feet and had been given a rule by his mother that he could only ask to see people’s feet while playing a videogame, ensuring that interactions were in the form of an avatar. Austin was aware that asking to see feet in a face-to-face setting was inappropriate; however, during the game it was acceptable because feet were individually designed and the armor on the feet was part of the game. During one of the interviews with Austin, a tension between acceptable rules in the online
environment versus the face-to-face environment was experienced and discussed. His mother had discussed appropriate social rules with him, especially when he has a desire to discuss feet. Austin enjoyed developing characters that had neat feet and exotic shoes or footwear and he also enjoyed asking to see other characters’ feet; Austin recognized that he could not ask in a face-to-face setting because it was inappropriate. However, when discussing the MMORPG with the researcher Austin asked to see the researcher’s feet. “Because I like feet and feet are cool, like all my characters have neat feet and maybe you do too,” Austin went on to describe why he had asked the researcher about feet and related it to the gaming discussion. He also became uncomfortable when he realized the situation was only a discussion of the game and it was not acceptable to ask to see the researcher’s feet. This explanation demonstrated that he realized that he was wrong to ask the question about feet; however, could identify when he was permitted by his mother to look at feet. This demonstrates that he could identify delineations between the virtual environments at the face-to-face setting. An example of this is demonstrated through his rationalization, for example:

I can’t paint mine because I am a boy but in my stories and my videogames all my characters have neat feet and cool toenails. I can’t ask to see peoples feet because we are humans and it is not ok but in my game I can and I ask to see peoples shoes, sandals, and feet because it is a game and it is ok. So I shouldn’t ask to see your feet because you are a human and we are not in a game but we are talking about games so maybe it is ok . . . (pause) but I can tell you all the bones in your feet because I learned them from a game.

The researcher diverted foot conversation by noting that Austin could name all the bones in his foot and asked Austin if he wanted to name them. Austin then attempted to reframe the conversation about feet realizing that it was not acceptable in person by asking to move on with the interview. Many individuals with autism are very rule oriented and have a tendency to be rigid and inflexible when rules are presented (Cihak, 2011). All participants discussed having an awareness of rules and how they impact daily living.

In addition to recognition of rules, all participants described their maladaptive behaviors and their behavioral strategies that were in response to a challenging situation that augmented their anxiety. Further, they described using the behavior to overcome their anxiety. They were able to recognize that the behavior was not socially acceptable. For example:

I have to be quite because the bus driver said so because when I get scared or mad I growl like a dinosaur, want to see? Grrrrrrrr – that is a velociraptor they have a claw that digs into your skin and will rip it open and cut you in half. We don’t talk about that as if I were killing you because we are humans and it is not ok but in a game I can pretend to be a dinosaur and it is ok. I can roar and scare people and do all the things dinosaurs do but not in real life.

Austin’s response identifies that he understands the rules provided by others and social rules required for interactions in a face-to-face setting.

Learning to interact in a virtual environment and generalization of skills. A small but significant finding was identified through emergent coding: all participants were recognizing and describing interactions in a virtual environment and how they influenced their face-to-face interactions. For example Auden said, “I like to play with my friends in a virtual environment, then at school we have something to talk about.” All the participants were able to describe using the virtual environment as a common topic to support greater interactions in a face-to-face setting. All participants described their social interactions and how they differed from a face-to-face setting. For example, Taylor said: “To game and have friends you have to have a whole different set of “social skills” [he hand quoted in the air]. Taylor was a perfect example of recognizing that interactions within the virtual environment can be different but also hold some similarities to the real world.

Taylor in particular described how he learned to take turns while speaking because his other team members in the game would
just delete him if he did not let them speak. A virtual environment was described as a comfortable setting to interact and engage with friends and not just local friends.

I get to meet people from all over the world, everyday which is really cool. Not many people have friends in 10 countries like I do, that they talk with daily and complete quests or goals as you might think of it.

The information provided by the rich data gathered from the researcher presents findings for all participants and their desire to seek friendships in the comfort of the virtual environment, socialize with friends, recognize emotions, and understand rules within the game and real life. Through the rich description of participants and their interactions the researchers present insight into virtual interactions for adolescents with ASD that support community involvement and friendships in a virtual environment that hold the potential to support friendships and communication skills that will ultimately support greater access to postsecondary education and persistence in STEM related courses and careers. The research described lays the foundation for continuing research using virtual environments to support interpersonal relationships that may support greater postsecondary outcomes.

Summary and Implications

The results presented align with previous research by Gee (2007) with gaming described as a highly social interaction between player, game, and other participants. Additionally, the rich descriptions and findings lay the foundation for continuing research using virtual environments to support interpersonal relationships that may support greater postsecondary outcomes.

The data presented a picture of the relationships of three individuals with ASD. Participants described the challenges of developing and maintaining friendships. All three participants reported attending a regular high school in inclusive classrooms. Their responses indicated that they did not interact with peers during the school day except when required by the classroom teacher. All three reported that they maintain online friendships with multiple people in countries around the world but they have few (one to three) people they identify as friends in face-to-face situations. Outside of meeting someone at a game-shop or inviting them to their home for gaming, the participants report that they do not interact with others outside of school, over the phone, or in face-to-face social situations.

The primary purpose of this study was to gain an understanding of the perceptions adolescents with ASD about the socialization that occurs within a MMORPG. Participants reported trying to interact with others socially in face-to-face situations but not getting a response from peers. For example, Austin initially said the he had several friends, but then corrected himself saying “not really”, noting that when he talked to people at school peers would not talk back and he felt they found him annoying. All three participants reported socially interacting with other players in MMORPGs outside of school.

Social rules were found to be one of the most challenging parts of social interaction for the participants. For example, during the interview Austin struggled with appropriate conversation. Austin understood he had a foot fetish and knew he was not allowed to ask people to see their feet in a face-to-face setting, he also knew that during the game play he was able to ask to see feet. Austin engaged in self-talk to help him understand if the interview was an appropriate place to discuss feet or not. Austin rationalized the difference between virtual world and real world and struggled with his responses to interview questions because study questions had a focus on videogames, and he considers those games not real.

One aspect of this study was the investigation of the perceptions about friendships of three individuals’ with ASD. This area focused on the participants’ perceptions of their friends and friendships and how those differ when they are in a virtual gaming or face-to-face environment. Additionally the study explored participant perceptions of the tension between acceptable conversation and social rules as they differed in those environments. Taylor advocated for individuals with ASD to use gaming as a social construct to help individuals like him become more comfortable
communicating. This conversation demonstrates that individuals with ASD can learn social rules and delineate between real-world and virtual worlds. Additionally what is learned in a virtual world may help individuals with ASD rationalize and understand how to engage in social communication that can support social interaction in face-to-face settings.

Taylor, Austin, and Auden all brought up challenges with developing friendships and discussed the social goals related to developing friends and interacting with others that were part of their Individual Education Programs (IEP) at school. In contrast to their documented social deficits was the emergence of a theme in this study that indicated that all participants reported a large network of friends in their virtual gaming environments and that they engaged socially with their friend’s avatars daily within the gaming community.

Virtual environments can assist individuals with social communication challenges in circumventing social barriers and developing meaningful relationships. In this environment the perceived constraints of social/communicative disorders like ASD do not inhibit effective communication or relevant social interactions. The universal proliferation of technology and the exponential growth in MMORPG provides an individual with social communication challenges the opportunity for typical social and participatory interactions for individuals participating in that type of gaming environment.

Implications for Future Research

This study is just a modest beginning to a large-scale exploration by researchers in the field on the impact of participation in online environments (including MMORPGs) on the college and career outcomes of individuals with ASD. There are countless questions to be answered: What percentage of individuals with ASD is participating in online environments such as MMORPG? What are the characteristics of those individuals? What is the impact on the face-to-face relational interactions of participants? How does the acquisition of social and communication skills in the virtual environment impact postsecondary outcomes for these individuals? The questions are endless and the need is critical as this growing population of students with ASD approach their most critical transition, high school graduation and postsecondary college and career choices. How can educators and researchers help these individuals to be better prepared for their independence and responsibilities as productive members of society?

References


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Abstract: This study investigated the effects of task analytic instruction, systematic prompting and graphic organizers on two students’ ability to compose informational text. Participants were provided with information articles from which they identified the key ideas and supporting details. Participants were then used to complete a writing template. Depending on the nature of the skill, both a traditional and modified system of least prompts was used during the intervention. Both students increased their ability to accurately compose a permanent product in response to text. Implications for future research and practical implications are discussed.

Writing is important for communication, problem solving, and learning (Koppenhaver & Williams, 2010). Written expression is an essential skill that extends to almost every aspect of individuals’ daily life, both as cognitive and social interaction processes. In schools, students use written language to demonstrate their acquisition of academic content (Mercer & Mercer, 2005). Employers want applicants who can demonstrate proficient writing skills upon entry to the workforce (National Commission on Writing, 2004). Most social networks require that members interact using electronic written messages (e.g., e-mail and texts).

The Common Core State Standards for English Language Arts & Literacy (CCSS-ELA) have defined literacy and communication expectations for all students. While the standards are divided into Reading, Writing, Speaking and Listening, and Language strands for conceptual clarification, the processes of communication are connected (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Writing is not an isolated skill, but builds upon a broad basis of prerequisite literacy skills. For example, many of the writing standards require students to write in response to text. Beginning at grade 4 and continuing through grade 12, writing standard W.9 requires students to “draw evidence from literary or informational texts to support analysis, reflection, and research” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

While there has been research on developing writing knowledge and skills for students with disabilities (e.g., Harris, Graham, & Adkins, 2014; Harris et al., 2012), there is limited research on writing for students with intellectual disabilities (ID), especially in response to text. For students with ID, writing is additionally complicated by reading level. Some
students with ID required to participate in alternate assessments based on alternate achievement standards (AA-AAS) will be early readers with limited comprehension and writing skills. The new generation of AA-AAS will require students write in response to text. Although teachers will need to prepare their students for this requirement, few models exist beyond those that focus on mechanics (e.g., spelling).

Research on Writing for Students with ID

Research supports that students with ID can use written expression in daily activities (e.g., calendars) by responding to directed reading, spelling activities and group activities that modeled writing components (Erickson & Koppenhaver, 1995). In contrast, most researchers have focused on either simple mechanics of writing or functional use. A review of practices on teaching writing by Katims (2000) suggested that most writing instruction has been functional in nature with students learning to write for a specific purpose, such as addressing envelopes or writing checks. Pennington, Delano, and Scott (2014) found that most interventions targeted basic writing skills, such as spelling (Stromer, Mackay, Howell, McVay, & Flusser, 1996; Stromer, Mackay, McVay, & Fowler, 1998), sentence writing (Yamamoto & Miya, 1999), and adjective use (Rousseau, Krantz, Poulson, Kitson, & McClannahan, 1994). Similarly, in Knight, Browder, Agnello, and Lee’s (2010) limited review of academic writing instruction for students with severe disabilities, research in writing lagged behind research in reading and mathematics for students with ID.

Research on writing for other students with developmental disabilities, like autism spectrum disorders (ASD), has yielded similar limitations. Early research demonstrated that students with ASD could make requests by using cards depicting written texts (LaVigna, 1977) and improve the quality of conversations when they typed their responses (Forsey, Bird, & Bedrosian, 1996). Stromer, MacKay, Howell, McVay, and Flusser (1996) demonstrated that individuals with ASD could generalize spelling skills to handwritten responses using computer-assisted instruction (CAI) and delayed word construction procedures.

Basil and Reyes (2003) evaluated the effects of a computerized software package (i.e., Delta Messages) on sentence construction skills and found that students could acquire targeted responses, demonstrate additional gains in handwritten responses and show measures of phonological awareness. Yamamoto and Miya (1999) also used CAI to teach sentence construction tasks to students with ASD, with results indicating that students acquired computer-based target responses, but also demonstrated generalized gains across handwritten and vocal topographies.

Fewer studies have focused on composition in writing. In an early study, Rousseau et al., (1994) helped students with autism improve their narrative writing skills using AAC devices, story maps, storyboards, and adult modeling. In joint writing activities, the students also increased their use of adjectives, number of words used, and interactions with their peers. Trela (2008) created an I Write NOW strategy for writing opinion paragraphs. After instruction using templates, students were able to compose opinion-based paragraphs that progressed in a logical order.

Pennington (2010) used an intervention for modeling, self-monitoring, prompting, and feedback on cover-letter writings for individuals with mild and moderate ID and found that individuals increased writing performance when provided systematic instruction. Taken together, these three studies offered promise that individuals with developmental disabilities are able to move beyond mechanics to compose writing.

None of the studies identified to date focused on teaching students with ID to write in response to text, a skill emphasized in the CCSS. One option to teach students to do so may be the use of graphic organizers, which have been effective in teaching writing to other populations (Capretz, Ricker, & Sasaki, 2003; Gersten & Baker, 2001).

Graphic organizers are visual arrays that show relationships among concepts (Smith & Okolo, 2010). For writing tasks, a graphic organizer is a method to support translation of ideas to text as students categorize information into demands of the text structure. The effective use of graphic organizers for improving writing has been documented in multiple studies. These studies demonstrated students
with high incidence disabilities were able to increase participation in writing instruction that responded to the demands of the general education curriculum (James, Abbot, & Greenwood, 2001), improve their focus, organization, and quality of supporting details (Capretz et al., 2003) and improve performance on tests of writing skills (Meyer, 1995). The need exists to determine if graphic organizers might be useful to help students with ID write in response to text. Trela’s (2008) work provided a potential application in that students followed a template to compose their opinion. Similarly, in teaching students to respond to text, the graphic organizer might provide the template students need to compose their response. Knight et al. (2008) note that an evidence-based practice for teaching academics to students with developmental disabilities is systematic instruction including task analyzing the responses to complete an assignment and providing systematic prompting and feedback for each step of the task analysis. These strategies offer a potential approach to teaching students to use a graphic organizer.

The purpose of the current study was to examine the effect of task analytic instruction using least intrusive prompting (LIP) and graphic organizers on the ability to gather and organize information and complete a written product. The research questions under consideration were:

1. What are the effects of task analytic instruction using LIP on identifying key ideas from an informational article?
2. What are the effects of task analytic instruction using LIP on accurately completing a graphic organizer with key ideas and details from an informational article?
3. What are the effects of task analytic instruction using LIP on students’ ability to create a cohesive written product using a graphic organizer and sentence starters?

Method

Participants and Setting

Participants included two middle school age students in a large urban school district who were classified as having an intellectual disability and who participated in the AA-AAS. The two students received special education services in a self-contained classroom. Inclusion criteria for participants included (a) a diagnosis of an intellectual disability, and/or autism, (b) participation in the AA-AAS, (c) emerging written expression, (d) hearing and vision within normal limits, and (e) the ability to respond intentionally (e.g., speaking, pointing). The classroom teacher was asked to select two students that met the above.

Garth was a 14-year old male student, diagnosed with an intellectual disability. Based on the most recent WISC, Garth had an IQ of 60. Garth communicated verbally and read at a low 2nd grade level. He had some emergent writing skills including copying text and writing familiar sight words with a model to support correct spelling. Written expression was tedious for Garth, as he needed to look at each letter in a word before writing it. Garth had IEP goals related to answering comprehension questions, recalling details and sequencing information. Although Garth could answer basic comprehension questions, he struggled with identifying the main idea and author’s purpose. When given a writing prompt, he would dictate complete sentences to the teacher who scribed them, with some prompting to restate and elicit further details. He would stay on topic if it was interesting to him. Given a model, he could copy with nearly 100% accuracy, sometimes omitting ending punctuation or transposing letters. Garth would attempt to write independently, but struggled with spelling and sentence structure. Garth had difficulties remaining on task. He required multiple prompts throughout an activity to remain on task and continue working.

Kevin was a 12-year old male diagnosed with autism. Based on the most recent WISC, Kevin had an IQ of 70. He communicated verbally, however he engaged in self talk that was off topic from the task at hand (e.g., naming the characters from an episode of Sponge Bob). Kevin’s IEP goals in ELA focused on answering comprehension questions and writing sentences that remained on topic. Kevin decoded at a low 4th grade level, but he had difficulties answering inferential questions and determining the author’s purpose. When asked a comprehension question that he did not know the
answer to, he would repeat the question or say “no.” When given a topic, Kevin could compose up to four sentences independently with correct spelling, grammar, and punctuation. In contrast, his sentences would deviate from the topic by the end of his composition. Kevin had some challenging behaviors when work became too difficult. He would push items away, point his finger, and say “no thank you.” He was beginning to learn to use a “one more try” strategy when challenged. He would state “try again?” and keep repeating it until the adult responded with affirmation or help.

The special education teacher served as the interventionist in this study. She had 12 years of experience, held a PhD in Special Education and was recommended by state level administrators. The participating teacher had been a long standing member of the state’s Community of Practice (CoP) and served last year on the CoP Leadership team. All sessions took place in the students’ regularly assigned classroom at the scheduled English-language arts time. Instruction was provided in a small group format at a classroom table with the teacher and the two students. A barrier was placed on one side of the table as other students worked with paraprofessionals. Since the skills being taught built on one another, the sessions took longer as skills two and three were added to intervention. When all three skills were instructed, the sessions took approximately 45 minutes.

Materials

This study included 11 sets of materials. Each set included an original informational article, a graphic organizer, and a writing template with sentence starters related to the topic of the informational article. The informational articles were written by a member of the research team and were based on a variety of age appropriate topics (e.g., sports, community involvement). The articles were written at a low sixth grade level. An illustration was added at the beginning of each paragraph. In general, the illustration represented the content of the paragraph (see Figure 1). The same graphic organizer, a basic organizer that provided students with a place to write the topic, three key ideas and three supporting details, was used across all sets of materials (see Figure 2). Each writing template included sentence starters and a formulaic structure for composing informational text (see Figure 3). One set of materials was used by the teacher to model the skills. The remaining 10 sets were used during baseline and intervention. In addition to student materials, the teacher was provided with two task analysis for each skill (i.e., identify key ideas, identify supporting details, complete graphic organizer, use a template to compose informational text). The teaching materials used during baseline included a teacher script for providing the instructional cue, how the student was expected to respond, as well as a section for data collection. The materials used during intervention included a script for delivering instructional cues, how the student was expected to respond, a script for delivering systematic instruction (i.e., least intrusive prompts) as warranted by student responses, and finally, a section for data collection.

Dependent Variables

The researchers developed a task analysis for each of the three dependent variables. The first dependent variable was the number of independent correct responses on an eight-step task analysis for identifying key details. The second dependent variable was the number of independent correct responses on a ten-step task analysis for identifying supporting details and recording information on a graphic organizer. The third dependent variable was the number of independent correct responses on a ten-step task analysis for composing informational text. See Figure 4 for the task analysis for each of the three dependent variables. The interventionist recorded the students’ responses to each step on the three task analyses. For the purpose of instruction, the interventionist recorded the level of prompt required for each step, however, only unprompted correct (+) responses were graphed.

Procedural Fidelity

Procedural fidelity was recorded by the same member of the research team who collected student data using the steps of the task analysis, noting whether each step of the task anal-
ysis was correctly implemented by the teacher and if each skill was prompted according to the established procedures. Procedural fidelity observation occurred for 22% of sessions. Procedural fidelity for delivery of all three skills was 100%. Inter-observer agreement was computed using an item-by-item method. A member of the research team observed about one fourth of the baseline and intervention sessions. Sessions were observed via Skype. A laptop was placed at the table so that the students were in clear view of the researcher. After the session concluded, the interventionist took her laptop into a private room where the researcher was able to view the graphic organizer and written product. Inter-observer agreement was 96% for Student 1, and 100% for Student 2.

Experimental Design and Procedure

A multiple probe single-case design across skills was used to evaluate the functional relationship between the intervention and students’ responses (Gast, 2010). The design was replicated concurrently with a second student. During baseline, the interventionist followed the task analysis for the three dependent variables with both students in a small group format, but did not prompt responding. Once a stable baseline was established for all three skills (identifying key ideas, identifying the supporting details, completing a graphic organizer), intervention began for skill 1 (i.e., identifying key ideas). Once both students demonstrated a change in trend or level in graphed data for skill 1, baseline probes for

Soccer is Super!

Soccer is a very popular sport. In 2014 more than 3 million kids played organized soccer. In the south, Texas has the most kids playing soccer followed by Florida, who has the second most kids playing soccer. I bet you like soccer too!

Lots of kids love soccer.

Soccer has been played for thousands of years. A game very similar to soccer was played by the Chinese in 400 BC! Soccer didn’t come to the United Stated until the mid-1800s.

Lots of kids love soccer.

There are a lot of reasons to love soccer. Soccer is fun for all ages and is a good way to stay healthy. If you want to learn more about soccer, visit: www.usyouthsoccer.org

Figure 1. Sample informational text.
conducted for skills 2 and 3. When the additional probes were stable both students entered intervention for skill 2 (i.e., identifying the supporting details, completing a graphic organizer). When graphed data for skill 2 showed an increase in trend and level, baseline probes were conducted for skill 3. When the additional probes were stable, both students entered intervention for skill 3 (i.e., composing informational text).

**Baseline phase.** In preparation for the baseline assessment, the teacher received all of the specified materials (i.e., 11 sets of materials including an informational article, a graphic organizer, and a writing template; a scripted task analysis for each skill that could also be used to record data). One set of materials was used per baseline session. Each set of materials included a) three copies of the informational article, one for each student and one for the teacher, b) two copies of the graphic organizer, and c) two copies of the writing template. The task analysis used for baseline included a script used for introducing the activity, what the teacher would say and/or do for each step, what the student was expected to do, and boxes for data collection. During baseline the teacher read script to introduce

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**Topic:** Soccer

**Key Idea:** Soccer is a very popular sport.

**Supporting Detail:** In 2014 more than 3 million kids played organized soccer.

**Key Idea:** Soccer has been played for thousands of years.

**Supporting Detail:** A game very similar to soccer was played by the Chinese in 400 BC.

**Key Idea:** There are a lot of reasons to love soccer.

**Supporting Detail:** Soccer is fun for all ages and is a good way to stay healthy.

Figure 2. Sample graphic organizer.
In this essay I will tell about soccer. My purpose is to inform. There are lots of reasons to love soccer.

First, soccer is a very popular sport.

For example, in 2014 more than 3 million kids played soccer. (supporting detail #1)

Second, soccer has been played for thousands of years.

For example, a game very similar to soccer was played in ancient China. (supporting detail #2)

Finally, there are lots of reasons to love soccer.

For example, soccer is fun for all ages, and is a good way to stay healthy. (supporting detail #3)

In conclusion, there are lots of reasons to love soccer.

First, soccer is a very popular sport.

Second, soccer is being played for thousands of years.

Finally, there are lots of reasons to love soccer.

Figure 3. Sample writing template.

Intervention phase. During intervention, the teacher followed a similar scripted task analysis for each skill. The script used during intervention included an additional column with explicit instruction for how to use a hierarchy of least to most prompting for each step of the task analysis (e.g., verbal prompt, specific verbal prompt, model). After introducing the activity, the teacher began by reading the informational article and asking what the topic of the article was. The teacher would continue by reading the first paragraph of the article and asking the student to identify the key idea. If the student said or pointed to the key idea in the first paragraph, the teacher would record an “I” for independent and move to the next step on the task analysis. If the student did not respond, the teacher provided the first level of prompt (e.g., verbal prompt) by saying “Remember, the key idea tells you what the paragraph is about. Listen again.” Reread paragraph. “What was/Point to the key idea?” The student was given an opportunity to respond correctly. If a correct response occurred, the teacher recorded the prompt level (e.g., V for verbal prompt) in the data collection section and moved to the next step in the task analysis (e.g., highlight or underline the key idea in the first paragraph). If a correct response did not occur, the teacher continued to the second level of prompt within the hierarchy (e.g., specific verbal prompt) by rereading the key idea and saying “What was/Point to the key idea?” If a correct response occurred, the teacher recorded the prompt level (e.g., SVP for specific verbal prompt) in the data collection section and moved to the next step in the task analysis (e.g., highlight or underline the key idea in the first paragraph). If a correct response did not occur, the teacher continued to the third level of prompt within the hierarchy (e.g., model) by pointing to the key idea in the paragraph and saying “Here is the key idea. It says... What was/Point to the key idea?” The teacher then recorded the prompt level (M for model) and moved to the next step in the task analysis. Each step on the task analyses were completed in this fashion. However, the least to most prompting levels were individualized to fit what was required of the student. For example, a step that asked a student to identify a key idea was prompted by a series of verbal prompts and a model whereas...
the prompt hierarch for a step that required a student to write specific information on the graphic organizer was a verbal prompt plus a visual cue, then a model, and then a physical cue.

Social validity. The classroom teacher, who also served as the interventionist, was asked to assess the social validity of the study. Using a five-point Likert scale, survey questions were developed to gather the teacher’s perspective on the importance of the skills included in the intervention, the appropriateness of the materials, and the overall effectiveness of the intervention. The students also completed a measure of social validity. The student measure consisted of three yes/no questions and one open ended question (i.e., Tell me what you liked about the lesson . . . ).

Results

Garth. Figure 5 shows the number of steps completed correctly across skills. In baseline for skill 1, identifying the key idea in a paragraph, Garth’s responses ranged from 0 to 4 ($M = 3.5$). Once in intervention, Garth showed an immediate increase in trend, with responses ranging from 4 to 8 ($M = 7.2$). In baseline for skill 2, identifying a supporting detail in a paragraph and completing a graphic organizer, Garth’s response ranged from 0 to 2 ($M = .8$). After entering intervention, Garth’s responses showed an immediate increase in trend and level with responses ranging from 6 to 10 ($M = 9.25$). In baseline for skill 3, composing informational text using a template, Garth’s responses ranged from 0 to 2 ($M = 1.3$). An increase in trend and level was seen in Garth’s responses during intervention for skill 3 with responses ranging from 3 to 10 ($M = 5.4$).

Kevin. Figure 6 shows the number of steps completed correctly across skills. In baseline for skill 1, identifying the key idea in a paragraph, Kevin’s responses ranged from 0 to 1 ($M = .25$). Once in intervention, Kevin showed an immediate increase in trend, with responses ranging from 5 to 8 ($M = 7.3$). In baseline for skill 2, identifying a supporting detail in a paragraph and completing a
Figure 5. Data across skills for Garth.
Figure 6. Data across skills for Kevin.
graphic organizer, Kevin’s response ranged from 0 to 5 (M = 2). After entering intervention, Kevin’s responses showed an immediate increase in trend and level with responses ranging from 7 to 10 (M = 9.4). In baseline for skill 3, composing informational text using a template, Kevin’s responses ranged from 0 to 9 (M = 3.7). During baseline an accelerating trend was noted as Kevin was able to generalize skills 1 and 2 to skill 3. However, an increase in trend was seen in Kevin’s responses during intervention for skill 3 with responses ranging from 8 to 10 (M = 9.25).

**Maintenance**

Maintenance data were gathered at one and two weeks post intervention. Both students maintained identifying key ideas and supporting details, completing a graphic organizer and composing informational text. Maintenance data for identifying the key idea in a paragraph were: Garth, range 7 to 8 (M = 7.5); Kevin, range 8 to 8 (M = 8). Maintenance data for identifying the supporting detail and completing the graphic organizer were: Garth, range 10 to 10 (M =10); Kevin, range 10 to 10 (M =10). Maintenance data for composing informational text using a template were: Garth, range 9 to 10 (M =9.5); Kevin, range 9 to 10 (M =9.5).

**Social Validity**

**Teacher’s social validity responses.** Teacher responses indicated that the intervention was appropriate and effective. The teacher indicated strong agreement with the following items: there were meaningful increases in the students’ ability to (a) identify important information in a text, (b) use a graphic organizer, and (c) create a written product. The teacher indicated agreement with the difficulty level, and appropriateness of the materials used. The teacher also agreed with statements such as (a) the skills can be generalized across content areas; (b) I am considering continued use of this instructional package with these students; and (c) I am considering continued use of this instructional package with other students.

**Students’ social validity responses.** Both students indicated that they liked the informational articles read, liked learning to write better, and that using the graphic organizer helped them improve their writing. When asked what they liked about the lesson, one student wrote: “I Like to write. Good Awsome great job.” The second student wrote: “it was Good.”

**Discussion**

In the current study, a functional relation was found for the intervention package and students ability to write in response to text. Several reviews of research on writing for students with developmental disabilities have noted how limited the interventions have been to date with an overemphasis on the mechanics of writing (Katims, 2000; Pennington et al., 2014). This is the first study to teach students with developmental disabilities to write in response to text, a skill that is emphasized in the CCSS. The study provides promise that students may be able to learn this type of writing with the type of intensive intervention demonstrated in this study.

The first component of the intervention was the use of a graphic organizer. Some other studies on literacy have found graphic organizers to be beneficial in teaching students with ASD to comprehend text (Browder, Root, Wood, & Allison, in press; Zakas, Browder, Ahlgrim-Delzell & Heafner, 2013). Although graphic organizers also have been found to help students with high incidence disabilities compose writing, the only application found in the literature that approximated this for students with developmental disabilities was the template used by Trela (2008). The lack of prior use of graphic organizers is probably related to the focus on the mechanics of writing. In contrast, when students need to compose passages of text, they need a way to organize and link their conceptual thinking. Graphic organizers provide a means to do so. Visual supports also have been found to be an evidence-based practice for students with ASD (Wong et al., 2015). In the current study, the students were able to use the visual support of a simple outlining graphic organizer to identify the key detail, list supporting details, and then compose their text.

A second component of the intervention
was the use of informational passages that were accessible to the students’ current reading level. Several studies have shown that students with developmental disabilities can learn to comprehend text from their assigned grade level when it is rewritten at a simpler level (Hudson & Browder, 2014; Mims, Hudson, & Browder, 2012). In the current study, these passages also were composed to contain the essential information needed and a few distractions. In contrast, additional research is needed on whether students would be able to generalize from these passages to other informational literature on their reading level.

A third component of the intervention was the use of systematic prompting and feedback to teach each step of a task analysis to perform the written assignment. Strong evidence exists for the use of task analysis and systematic prompting in teaching academic content (Spooner, Knight, Browder, & Smith, 2012). The challenge for teachers is in determining the exact steps of the task analysis and how exactly to prompt each step. The current task analysis was developed by the researcher by performing the assignment and writing down each response. The prompting was a modified system of least intrusive prompting. Several studies on teaching listening comprehension have used a modified system of least intrusive prompting to help the student find the answer in the text (Hudson, & Browder, 2014; Mims et al., 2012). One study extended this for emergent readers, using a prompt hierarchy that included using the WH (e.g., who, where) word definition to understand the question being asked, rereading the sentence that contained the answer, and finally, reading the answer itself (Browder, Hudson, & Wood, 2013).

Similarly, in the current study, the first prompt given was a verbal reminder statement (e.g., “Remember, the key idea tells you what the paragraph is about.”). The second level prompt continued to stay at the verbal level but was more specific and included re-reading the sentence with the answer. Finally, a model prompt was provided if the specific verbal prompt did not elicit a correct response.

Limitations and Recommendations for Future Research

Although this multicomponent intervention produced the desired results in written composition, the contribution of each component needs further analysis. For example, it may be that the students would have been able to compose their response to text without the structure of the writing template. They also may have been able to learn the steps of the task analysis using other prompting methods like time delay. Much more research is needed to determine the most effective and efficient intervention components to teach students with developmental disabilities to write in response to texts.

This study also was limited by the number of participants and their specific characteristics. In single-case design, multiple studies are needed to demonstrate an intervention as evidence-based (Horner et al., 2005). The current study is the first to evaluate an intervention for teaching students with developmental disabilities to write in response to text and offers promise that this population can do so with the intensive supports provided. It should be noted that these students already had some emerging writing skills including the mechanics to compose a sentence. This intervention might not generalize to students with fewer reading and writing skills who might need additional supports to write. For example, Knight et al., (2008) suggest that students with moderate and severe developmental disabilities might need to use AAC to select responses to fill in sentence starters.

Finally, research is needed in general on teaching students with developmental disabilities to compose a written passage whether informational or narrative. When considered with the studies by (Pennington, 2010; Trela, 2008), there seems to be promise that students with developmental disabilities can learn more than the mechanics of writing, but much more research is needed to determine what and how to teach in this academic area. This research is urgently needed as states begin to require students in alternate assessments to compose written responses so that teachers will have models to help students meet these increasing expectations.
Implications for Practice

A number of implications for practice emerged from the findings of this study. Overall, the findings suggest students with ID can identify important information in an informational article, organize that information and then use that information to compose text.

Although further modification may be needed to the materials (e.g., providing students with prewritten sentences), the results of the current study indicate that this intervention may be effective with a wide range of students, such as those who are not currently traditional writers. The use of a graphic organizer and a writing template make this intervention applicable to students with varying abilities. Additionally, the format of the materials used in this study could be changed to electronic, allowing them to be used on an interactive whiteboard (IWB). The use of an IWB may also increase the effectiveness with a range of students.

The intervention and materials used have considerable implications for the classroom. The graphic organizer used in this study is applicable across content areas and could be used to organize science or social studies content. The CCSS emphasize referring to evidence found within the text, both informational and narrative. The graphic organizer used in this study is applicable to both types of literature. This study used a writing template with sentence starters to support the task of composing informational text. The use of sentence starters may increase language skills and provide an example of correct grammatical sentences (e.g., use of capitalization and punctuation). Similar to the graphic organizers, the use of sentence starters is a support that can be used across content areas. Additionally, the use of sentence starters may allow students to interact with and compose more complex text than would otherwise be possible.

In summary, this study contributes to the small body of literature on writing for students with ID. This study was the first to evaluate the use of systematic instruction and graphic organizers on the ability to compose written text in response to informational articles, a skill that is emphasized in the CCSS. Using this intervention, students were able to identify key ideas and supporting details within an informational article and then compose a written product based on the text. Written expression is an essential skill that is applicable to daily living, successful employment and social interaction (Koppenhaver & Williams, 2010; National Commission on Writing, 2004). This study offers promise that when provided with instructional supports, students with ID may be able compose written passages in response to text.

References


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Effects of iPod Touch™ Technology as Communication Devices on Peer Social Interactions across Environments

G. Richmond Mancil
Autism Learning Partners

Elizabeth R. Lorah and Peggy Schaefer Whitby
University of Arkansas

Abstract: The purpose of the study was to evaluate the use of the iPod Touch™ as a Speech Generated Device (SGD) for Functional Communication Training (FCT). The evaluation of the effects on problem behavior, the effects on generalization and maintenance of the acquired communication repertoire, and the social initiations of peers between the new SGD (iPod Touch™) and traditional devices were conducted. The study demonstrated that the iPod Touch™ produces higher levels of peer interactions when compared to the Dynavox. These effects maintained and generalized for all three participants. Additionally, the use of the iPod Touch™ as a SGD is effective for the use of FCT. Finally, the study offered support for the social validity of the use of the iPod Touch™ and application GoTalk as a SGD, as all teachers and student participants demonstrated preference for the device when compared to the Dynavox as a SGD.

Addressing communication for children with autism is a top clinical and educative priority, as the inability to functionally communicate may lead to the demonstration of problem behavior (Mancil & Boman, 2010). Communication deficits can range from a person who is completely non-vocal to those who use speech but demonstrates impairments in complex communication such as conversational skills (APA, 2013). Furthermore, it is estimated that 30% of individuals with a diagnosis of Autism Spectrum Disorders (ASD) fail to develop vocal output capabilities (Wodka, Mathy, & Kalb, 2013), thus necessitating the use of an Alternative and Augmentative Communication (AAC) systems to use while they are developing functional speech.

Children who do not acquire spoken language and are not taught how to communicate his or her needs are at a high risk for developing problem behaviors such as self-injury and aggression (Bott, Farmer, & Rhode, 1997; Chung, Jenner, Chamberlain, & Corbett, 1995; Durand & Carr, 1992; Mancil, Conroy, & Haydon, 2009; Sigafoos, 2000). To address the issue of both communication and the demonstration of problem behavior, Functional Communication Training (FCT) is often used (Carr & Durand, 1985; Wacker et al., 1990). Functional Communication Training involves assessing the function of a behavior via functional analysis, and then replacing the problem behavior by teaching a communicative response (i.e., manding) that serves the same function as the problem behavior (Durand & Carr, 1987).

Functional Communication Training has been identified as an evidence-based intervention for teaching children with autism (National Center for Autism, 2015). Given the prevalence of individuals with ASD who fail to develop functional vocal behavior, the targeted replacement behavior in FCT often relies on the use of an AAC, such as manual sign (e.g., Fisher et al., 1993) and speech-generating devices (Durand, 1999). FCT can also involve the training of vocalizations as the primary communication topography (e.g., Durand & Carr, 1992).

As previously mentioned, the use of an AAC for an individual with a diagnosis of ASD who does not demonstrate functional speech is standard educational and clinical practice. One such method of AAC is a speech-gener-
ating device (SGD). A SGD is an electronic device that transmits a digitized vocal output when activated, typically by pressing a button or switching a lever. Dozens of SGD exist and they range greatly in cost and technological capabilities (Lorah, Parnell, Whitby, & Hantula, 2014).

The use of SGD as AAC has received much attention in the literature. For example, the use of a SGD has been demonstrated as effective in the acquisition of a mand (requesting) repertoire for individuals with a diagnosis of ASD (e.g., Lancioni, et al., 2007; Lorah et al., 2013; Sigafoos, et al., 2009; Son, Sigafoos, O’Reilly, & Lancioni, 2006). Furthermore, the collateral behavioral effects of the use of SGD as AAC on decreasing problem behavior and increasing social initiations are also indicated.

For example, Durand (1999) evaluated the effectiveness of a SGD in five children, aged 3.5-15 years old, diagnosed with a developmental disability to mand (request) wanted or needed items and activities. Following the successful mand training Durand noted significant decrease in the demonstration of problem behaviors of all five participants. Similarly, Olive, Lang, and Davis (2008) found mand training with the use of a SGD as an AAC decreased the demonstration of challenging behavior in a young child with ASD. Dicarlo and Banajee (2010) examined the effects of SGD training on the initiations for communication in two young children diagnosed with a developmental disability. Results of this investigation found an increase in initiations of 41% and 27%, respectively.

More recently, advances in technology in terms of portability, access, and cost have sparked a renewed interest in the use of SGD as an AAC (Lorah et al., 2014). For example, a recent review of the literature on the use of table computers and portable media players as a SGD indicated 17 studies have been published between 2007 (the year the iPod Touch™ was released) and March of 2014. A total of 57 participants were included in those 17 studies, and of those 57 participants, 93% (or 53) participants acquired the targeted communicative repertoire (Lorah et al., 2014). Thus, current research findings demonstrate that portable media technology as a SGD, such as the iPad™ or iPod Touch™, may be a viable and preferable option for teaching communication.

Given what is known about the use of traditional SGD as a method of AAC and the effectiveness of new SGD as a method of AAC, the current investigation intends to extend the literature base by a) evaluating the use of the iPod Touch™ as a SGD for FCT; b) the collateral decrease in the demonstration of problem behavior; c) evaluating the generalizability and maintenance of the acquired communication repertoire; and d) offering a comparison in terms of the social initiations of peers between new SGD and traditional devices.

Method

Participants

As indicated in Table 1, three participants, two male and one female, ranging in age from 4-5 years were recruited from a public, general education preschool in the southeastern United States. These students were selected at random from a group of 30 children diagnosed with ASD who exhibited lack of peer social interaction. For example, they often sat by themselves at recess and other activities.

Each child had a diagnosis of ASD obtained independently from a physician or licensed psychologist. The Autism Diagnostic Interview-Revised (ADI-R; LeCouteur, Lord, & Rutter, 2003) was administered to obtain additional scores indicating a diagnosis of ASD. A doctorate level teacher educator and autism specialist trained to conduct the assessments for research purposes administered both instruments to all participants in the study. In addition, the Mullen Scales of Early Learning (MSEL; Mullen, 1992) was administered to determine current developmental level, particularly in the area of communication to rule out developmental functioning level as a possible confounding variable.

John. John was an African-American male with a chronological age of 5.0 years who screamed and cried. Diagnosed at the age of 4, he received services from a psychologist (1 hour, every 2 weeks) and a speech therapist (30 minutes per week). John was non-vocal and used a Dynavox for communication. According to the Mullen Scales of Early Learn-
ing. John functioned at the level of a 42 month old. According to teachers, parents, and the speech therapists, John did not socially interact with peers. The deficit in social interaction was confirmed during direct observations across environments (e.g., playground, lunchroom, classroom).

Sarah. Sarah was an African-American female with a chronological age of 4.0 years who pinched peers. She was diagnosed with ASD at the age of 2, and had been in therapy with a speech pathologist (30 minutes per week) and occupational therapist (1 hour per week) for the past year. Sarah was non-vocal and used a Dynavox for communication. According to the Mullen Scales of Early Learning, Sarah functioned at the level of a 31 month old. According to teachers, parents, and the speech therapists, Sarah did not socially interact with peers. The deficit in social interaction was confirmed during direct observations across environments (e.g., playground, lunchroom, classroom).

Ben. Ben was a Caucasian male with a chronological age of 5.0 years who hit peers. He was diagnosed with ASD at the age of 3 when he did not begin to speak. He had therapy with a speech pathologist (1 hour a week) and an occupational therapist (1 hour per week). John was non-vocal and used a Dynavox for communication. According to the Mullen Scales of Early Learning, John functioned at the level of a 36 month old. According to teachers, parents, and the speech therapists, John did not socially interact with peers. The deficit in social interaction was confirmed during direct observations across environments (e.g., playground, lunchroom, classroom).

Peers. The peers chosen for the study were picked at random from each child’s classroom. The random selection involved the names of each student within the classroom being written on a piece of paper and selected from a jar, by an individual not associated with the study.

Materials

The materials required for the intervention included a Dynavox and an iPod Touch™. The iPodTouch™ was a 3rd generation with 16GB of memory. The application used on the iPod Touch™ was GoTalk. The device was 4.8 inches by 2.3 inches and weighed 3.10 ounces. The cost of the iPod Touch™ was 400 US Dollars, including cost of applications. The iPod Touch™ has the capability of internet access, email, and text messaging as well as a camera. Multiple programs for communication are available from a simple user interface to more complex.

TABLE 1

<table>
<thead>
<tr>
<th>Participant</th>
<th>Diagnosis</th>
<th>Chronological Age</th>
<th>ADI-R</th>
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<td>Repetitive Behavior 9</td>
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<td>31 months</td>
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<tr>
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<td>Communication 14</td>
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<td>Ben</td>
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</table>
The DynaVox Vmax™, is what the school district supplied to all children who required an AAC. The DynaVox™ is a full Windows OS computer with internet access, email, and text messaging. It has a 12.1 inch touchscreen display and weighs 6 lbs 5 oz. The cost for each device was $9,000.

Settings

For the iPod Touch™ condition, sessions were conducted within the participant’s schools twice a week on Tuesday and Thursday’s for 11 total sessions. Sessions for the peer social interaction comparison data were conducted on the participants’ respective playground with peers for 12 total sessions each, 3 days a week on Monday, Tuesday, and Wednesday. Two weeks following these sessions, maintenance and generalization probes were conducted. Maintenance sessions were conducted in the same locations as initial sessions. Generalization sessions occurred on the same playground as training, but with different peers than those used for training. Further generalization was assessed in each participant’s respective classroom and lunchroom.

Target Behaviors

The target behaviors for the three participants were identified during observations and teacher interviews. Target behaviors consisted of duration of peer social interaction (i.e., primary dependent variable). That is, the duration of time the peer talked and/or engaged with the participant was the primary target behavior/dependent variable. For example, if the peer were talking to the participant and/or within 3 feet and engaged in the same activity, social interaction would be recorded as occurring.

General Procedure

Functional analysis. A functional analysis was completed to identify the function of each subject’s aberrant behavior to assist in the modified mand training for the new SGD. The lead author and research assistant conducted the functional analysis in the participants’ home settings using the procedures outlined by Iwata, Dorsey, Slifer, Bauman, and Richman (1994) with the addition of a tangible condition.

The functional analysis (FA) was conducted by manipulating consequences such as escape from demands, contingent attention, and contingent tangible items to determine the function of the behavior. To identify a primary function, the relative effects of contingent reinforcement were compared to the other conditions (i.e., tangible, free play, escape, attention). After completing the FA, a tangible function was identified for each participant (see Figures 1, 2, & 3).

Mand training. Prior to the onset of the study, local Speech Language Pathologist (SLP) issued a Dynavox to each participant. Additionally, data were collected to determine that each child could independently use the Dynavox for basic mands. The subjects were then taught to use the iPod Touch™ in their respective schools using modified milieu training procedures outlined by Mancil et al. (2009). The procedures included identifying the function of the problem behavior as indicated by the functional analysis, which was a tangible function for each participant. Next, a mand/ model was used along with time delay to teach the mand as a functionally equivalent replacement behavior for the aberrant behaviors identified in the functional behavior assessment. Following the mand training, the researcher trained the classroom teachers using behavior skills training to 100% fidelity, who then provided training to their respective students. To ensure treatment integrity, 35% of the teachers’ training sessions were selected at random and evaluated. The treatment integrity for these sessions had a mean of 95% (range, 93–100%). Sessions were coded and then graphed using a multiple probe format. After ensuring each participant could use the iPod Touch™ for communication, the social interaction study began.

Experimental Design

A comparative intervention design, specifically an alternating treatment design with initial baseline and final best practice, was implemented to evaluate which strategy was most effective (Gast, 2010). During the first four sessions, baseline data were collected to obtain a minimum of three stable data points and establish the cur-
rent peer social interaction with the Dynavox. Following baseline sessions, treatment sessions were alternated between the participant using the Dynavox and the iPod Touch™ for communication on the playground. The final sessions involved a best practice and maintenance phase using the communication device that had the highest level of peer social interaction in the alternating comparisons.

**Interobserver Agreement**

All sessions were then coded and calculated independently by a research assistant and si-
multaneously coded by the first author to check for interobserver agreement (IOA) for 40% or greater of all sessions across all study phases. The teaching assistant who was trained to observe and tally the occurrences of the target behavior conducted these reliability checks. Total agreement was calculated for each measure and was determined by calculating the scores for these sessions and counting the number of agreements between the two observers divided by the number of agreements plus disagreements multiplied by 100 (Gast, 2010). The mean IOA across all study phases was 95% (range, 92% to 100%), 94% (range, 93% to 96%), and 97% (range, 95% to 100%) for John, Sarah, and Ben, respectively.

**Independent Variable**

The independent variable for this study was the communication devices, the Dynavox and the iPod Touch™. During the iPod Touch™ condition, the application used was the free version of GoTalk™.

**Dependent Variable**

The dependent variable for this study was duration of peer social interactions. Peer interaction was scored if a peer made unprompted verbal or nonverbal contact with the participant on the playground. The timer for interaction was started at the first moment of verbal or gestural initiation. The timer was stopped when the peer or participant moved farther than 3 feet while visually disengaging and/or stopping verbal interaction. Total duration per session was used. Peer interaction was scored only if no teacher prompt occurred. Observations of peer social interactions were synonymous with those described by Boyd, Conroy, Mancil, Nakao, and Alter (2007). In addition, frequency of interactions was used as a variable in the generalization setting as described below. Frequency of interactions was calculated by counting the number of interactions per minute with each peer in the generalization setting.

**Data Analysis**

This study focused on direct observations of individuals with ASD interacting with peers in different environments. Baseline data were collected using behavioral coding of the child’s observed social interaction across 16 initial sessions. These data were collected during 30 minutes of observation per day, 3 days...
per week (Monday, Wednesday, Friday). Each session was videotaped and coded immediately following the observation. The staff implemented the various interventions, while the lead author collected data during the specified time sequences. Behaviors were coded using real time collection procedures on the iPad™ Touch. The data analysis was completed using Microsoft Excel. Data points were graphed for each intervention, and presented in time-series graphs for each participant. Data analysis was based on visual inspection of the trend of data lines and magnitude and rate of behavior change between conditions (Gast, 2010). Summative data were reported on the fidelity of treatment data.

Results

Overall peer social interaction was highest in duration for the iPod Touch™ condition. In addition, peer social interaction was maintained and generalized across peers and environments (i.e., classroom, lunchroom). The results are depicted in Figures 4, 5, 6, 7, 8, and 9.

John. As depicted in Figure 4, John’s baseline with the Dynavox sessions produced durations of interaction with a peer on the playground that averaged 1.5 minutes during a 30-minute period (range, 1–2 minutes per 30 minute session, see Figure 4). Visual inspection of the data indicates a decreasing trend. This is substantial considering his interaction averaged only 5% of the total time on the playground with peers. His interaction with peers increased in magnitude during the iPod Touch™ condition, with interactions lasting an average of 7 minutes (range, 5–9 minutes per 30-minute session). There is a clear increasing trend during the iPod Touch™ conditions. During the maintenance phase with the iPod Touch™, duration of interactions remained high at an average of 8.5 minutes (range, 8–9 minutes). When compared to typical peers on the playground, the duration of interaction during maintenance was commensurate with the average time across other peers, which had a mean of 9 minutes (7 minutes to 10 minutes) across six other peers.

Following the maintenance condition, generalization probes with the iPod Touch™ were conducted across three peers and in all three environments (classroom, playground, and lunchroom) during 30-minute sessions (see Figure 7). During these conditions, frequency of interactions were also collected. The addition of these data were
included because certain environments are not inductive to prolonged interaction such as the classroom and lunchroom. During the classroom condition, John’s frequency of interactions averaged 8.5 (range, 8–9) with a duration average of 2.8 minutes (range, 2.5–3). During the playground generalization condition, his duration average was 9.25 minutes (range, 8–15 minutes). The generalization duration average and ranges were higher than during the initial intervention and maintenance conditions.
The frequency of peer interaction on the playground averaged 2.25 (range, 2–3). During the lunchroom condition, John’s frequency of peer interaction averaged 5.5 (range, 5–6) with an average duration of 1.75 minutes (range, 1–2). Conducted prior to the generalization data. Compared to the frequency of the classroom, the playground frequency decreased however, the decrease in frequency is directly tied to the longer duration of interactions, which inhibit having high frequency counts.
Sarah. As depicted in Figure 5, baseline data indicate that during the Dynavox condition, Sarah’s duration of interaction with a peer on the playground averaged 1 minute during 30-minute periods (range, 1–2 minutes per 30 minute session). Visual inspection of the data depicts a decreasing trend. This is substantial considering her interaction averaged less than 4% of the total time on the playground with peers. During the alternating intervention phase, Sarah’s duration of interaction remained near 5% of the total time on the playground with peers during the Dynavox condition. Specifically, her duration of interaction with a peer on the playground averaged 2.5 minutes (range, 2–3 minutes per 30 minute session). Her interaction with peers increased indicating a high magnitude during the iPod Touch™ condition, during which the duration of interaction with a peer averaged 8.5 minutes (range, 5–12 minutes per 30-minute session). As such, an increasing trend during the iPod Touch™ conditions is evident. During the maintenance phase with the iPod Touch™, duration of interactions remained high at an average of 11.25 minutes (range, 10–12 minutes). When compared to typical peers on the playground, the duration of interaction during maintenance was commensurate with the average time across other peers, which had a mean of 8 minutes (6 minutes to 9 minutes) across six other peers.

Following the maintenance condition, generalization probes with the iPod Touch™ were conducted across three peers and in three environments (classroom, playground, and lunchroom) during 30-minute sessions (see Figure 8). During these conditions, frequency of interactions were also collected. The addition of these data were included because certain environments are not inductive to prolonged interaction such as the classroom and lunchroom. During the classroom condition, Sarah’s frequency of interactions averaged 11.25 (range, 1–12), with a duration average of 6.5 minutes (range, 4–8 minutes). During the playground generalization condition, her duration average was 11.25 minutes (range, 9–13 minutes). The generalization duration average and ranges were higher than during the initial intervention conditions and similar to the maintenance conditions conducted prior to the generalization data. Compared to the frequency of the classroom, the playground frequency decreased however, the decrease in frequency is directly tied to the longer duration of interactions, which inhibit having high frequency counts. The frequency of peer interaction on the playground averaged 3 (range, 2–4). During the lunchroom condition, Sarah’s frequency of peer interaction averaged 6.5 (range, 5–8) with an average duration of 4 minutes (range, 3–6).

Ben. As depicted in Figure 6, during baseline, Ben never engaged with a peer on the
playground. As such, visual inspection indicates a level trend at zero. This is substantial as there were no instances of peer interaction. During intervention, Ben’s duration of interaction with a peer on the playground remained at or below 4% of the total time on the playground with peers during the Dynavox phase. Specifically, his duration of interaction with a peer on the playground averaged 0.5 minutes (range, 0–1 minutes per 30 minute session). Visual inspection indicates a high magnitude of change during the iPod Touch™ condition. During which the duration of interaction with a peer averaged 6.5 minutes (range, 3–9 minutes per 30-minute session). As such, there is an increasing trend during the iPod Touch™ conditions. During the maintenance phase with the iPod Touch™, duration of interactions remained high at an average of 7.5 minutes (range, 7–8 minutes). When compared to typical peers on the playground, the duration of interaction during maintenance was commensurate with the average time across other peers, which had a mean of 7 minutes (5 minutes to 9 minutes) across six other peers.

Following the maintenance condition, generalization probes with the iPod Touch™ were conducted across three peers and in three environments (classroom, playground, and lunchroom) during 30-minute sessions (see Figure 9). During these conditions, frequency of interactions were also collected. The addition of these data were included because certain environments are not inductive to prolonged interaction such as the classroom and lunchroom. During the classroom condition, Ben’s frequency of interactions averaged 7.5 (range, 7–8) with a duration average of 2.25 minutes (range, 1–3). During the playground generalization condition, the duration averaged 11 minutes (range, 9–14 minutes). The generalization duration average and ranges were higher than during the initial intervention and maintenance conditions. Compared to the frequency of the classroom, the playground frequency decreased; however, the decrease in frequency is directly tied to the longer duration of interactions, which inhibit having high frequency counts. The frequency of peer interaction on the playground averaged 2 (range, 2–2). During the lunchroom condition, John’s frequency of peer interaction averaged 6.25 (range, 5–6) with an average duration of 2 minutes (range, 1–3).

Social Validity

Social validity was assessed in three ways. First, similar to many studies involving social interaction of children with ASD the teachers completed a social validity scale on their experiences after the conclusion of the study. Teachers report that the intervention was not time consuming and they would use it in the future. In addition, they reported transporting and using the iPod Touch™ device was easier and more preferred, when compared to the Dynavox.

Second, the participants (i.e., children with autism spectrum disorder) were given forced choice preference assessments to determine preference for Dynavox or iPod Touch™. All participants preferred the iPod Touch™ following the intervention. That is, for each of three trials the participants chose the iPod Touch 100% of the time for the entire 5-minute period of each 5-minute trial.

Third, the duration of play on the playground was compared to that of typically developing peers within the same class. The average duration of play on the playground for peers ranged from 5 minutes to 10 minutes. Each participant’s average duration of play fell within that range.

Discussion

The literature has seen an influx of research evaluating handheld portable multimedia players and tablets as speech-generating devices for individuals with autism (Lorah et al., 2014). Despite the promising results of such research there remains many questions within the research base. For example, to date, no research has offered a comparison of new, readily available, portable SGD’s such as the iPod Touch™ and traditional SGD such as a Dynavox. Additionally, the literature base has not investigated these new devices in terms of the effects of such devices on peer interactions or social communication. Further, the literature is lacking evidence that such new technology based SGD are effective at decreasing problem behaviors. The current study offered an evaluation all of these important ar-
eas of need within the research base, by evaluating and comparing the Dynavox and the iPod Touch™ in terms of the duration and frequency of social interactions for learners with autism and the effects of such communication training in decreasing problem behaviors.

The results of this study offer support for the use of the iPod Touch™ and application GoTalk as a SGD for learners with autism. The participants obtained efficient use of the iPod Touch™ AAC device within a 2-week period. This is a rapid rate for the acquisition of a communication repertoire for individuals with autism. Additionally, as communication initiations and responses increased for all participants, their aberrant behaviors decreased to zero levels as anecdotally noted. These findings are generally consistent with the research on Functional Communication Training (FCT).

In addition, peer social initiations were greatest for conditions where target students had iPod Touch™ technology in comparison to conditions with the Dynavox. These effects were also found to maintain at follow up. Findings of this study show the utility of an iPod Touch™ as an AAC device to increase peer social initiations in comparison to other devices and maintains. In addition, the duration of interactions increased and environments of spontaneous peer interaction increased during maintenance. Finally, all participants within the current study demonstrated a preference for the iPod Touch™ when compared to the Dynavox. These finding are similar to the results of other studies comparing portable multimedia players and tablet based SGD to other methods of AAC (i.e., Lorah et al., 2013).

One interesting finding is the consistent and increasing trend in the data paths for all participants during the iPod Touch™ conditions. Perhaps this is because, as indicated by Lorah et al. (2014) consumer technologies, such as the iPod Touch™, are a generally preferred product. This preference was clearly demonstrated by the participants during the social validity measures of the research design. Thus, this may also have been the case for the peers included within the study. That is, perhaps the peers also preferred social interaction with the participants when he or she was communicating with the iPod Touch™ SGD, when compared to the Dynavox.

Limitations of the current study include the lack of data collection in terms of peer initiations towards the participants with autism. These data would offer some insight as to what effects the use of these new technologies have in terms of enhancing peer initiations. Second, this study only analyzed computerized selection based communication methods. Future research should seek to rectify these limitations by incorporating participant interactions and multiple communication methods such as sign language or traditional picture based communication into the research design.

Despite the limitations, this study demonstrated that the iPod Touch™ produces higher levels of peer interactions when compared to the Dynavox. These effects maintained and generalized for all three participants. Additionally, the use of the iPod Touch™ as a SGD is effective for the use of FCT. Finally, the study offered support for the social validity of the use of the iPod Touch™ and application GoTalk as a SGD, as all teachers and student participants demonstrated preference for the device when compared to the Dynavox as a SGD.

References


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School-Based Interventions Targeting Challenging Behaviors Exhibited by Young Children with Autism Spectrum Disorder: A Systematic Literature Review

Jose R. Martinez, Brittany L. Werch, and Maureen A. Conroy
University of Florida

Abstract: The purpose of this review was to critically examine and summarize the impact of school-based interventions designed to decrease challenging behaviors in young children with Autism Spectrum Disorder (ASD). Reviewed studies employed a single-case experimental design, targeted challenging behaviors, included children 3–8 years old with ASD, and took place in school settings. Interventions were categorized as antecedent-based, function-based, reinforcement, instructional, or multicomponent. In addition to analyzing articles descriptively, effect size estimates were calculated using the Non-overlap of All Pairs and Tau-U methods. A total of 26 studies including 44 children were reviewed. Individual effect size estimates ranged from weak to strong, but on average, the reviewed interventions were effective in decreasing the target behaviors exhibited by the participants. Findings suggest that interventions implemented in school settings can effectively decrease challenging behaviors exhibited by young children with ASD. Directions for future research and practice are also discussed.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that includes persistent deficits in social communication and social interactions as well as restricted and repetitive patterns of behaviors and interests (American Psychiatric Association, 2013). In addition, individuals with ASD often exhibit challenging behaviors such as physical and verbal aggression, property destruction, non-compliance, and self-injury with more frequency than individuals without disabilities, or with other developmental disabilities (Conroy, Dunlap, Clarke, & Alter, 2005a; Reichow & Barton, 2014). Young children with ASD (i.e., birth to eight years) are at increased risk for developing challenging behaviors because they often lack functional communicative behaviors and thus, use challenging behaviors to communicate their needs and wants (Conroy et al., 2005a). Challenging behaviors interfere with the ability of young children with ASD to attend to and engage in academic activities and/or engage in prosocial interactions with peers and adults (Boyd, McDonough, & Bodfish, 2012; Powell, Dunlap, & Fox, 2006). Consequently, challenging behaviors are considered one of the most significant barriers to these children’s participation in inclusive general education settings, social relationships, and community activities (Dunlap, Iovannone, Wilson, Kincaid, & Strain, 2010). Once challenging behaviors become an established part of children’s behavioral repertoires, these behaviors are not likely to decrease in the absence of timely, effective, and targeted interventions (Conroy et al., 2005a; Reichow & Barton, 2014). As the number of young children with ASD who exhibit challenging behaviors continues to increase, the need to identify research-based interventions (i.e., evidence-based practices [EBPs]) that are effective in decreasing challenging behaviors exhibited by these children becomes evident.

Legal mandates (i.e., Individuals with Disabilities Education Act of 2004 [Public Law 108-446]; No Child Left Behind Act of 2001 [Public Law 107-110]) require teachers to implement EBPs in their classrooms as a means
to improve the academic, behavioral, and social outcomes of the children with ASD that they serve. Additionally, teachers and related service personnel are required by professional standards and ethics (e.g., Council for Exceptional Children [CEC]) to implement EBPs in their classrooms. Schools are the primary or only source of intervention for some young children with ASD exhibiting challenging behaviors (Machalicek, O’Reilly, Beretvas, Sigafos, & Lancioni, 2007). Therefore, there is a critical need to identify school-based interventions for young children with ASD exhibiting challenging behaviors that are supported by scientific evidence (i.e., EBPs). Previous reviews have identified interventions that are effective in decreasing challenging behaviors in children with ASD, but these reviews have included studies conducted in clinical and school settings (e.g., Conroy et al., 2005a; Horner, Carr, Strain, Todd, & Reed, 2002; Odom et al., 2003). Classrooms are more complex settings (e.g., greater number of children and different levels of teacher training in ASD) to implement interventions than clinical settings, so it is difficult to determine from these literature reviews the effectiveness of the reviewed interventions in school settings.

More recently, Machalicek and colleagues (2007) conducted a literature review of single-case research design studies investigating the impact of school-based interventions on the challenging behaviors exhibited by individuals with ASD between the ages of three and twenty-one. The findings suggested that the interventions implemented in the reviewed studies were successful in decreasing or eliminating the participants’ challenging behaviors (Machalicek et al., 2007). However, the authors did not report the outcomes of the studies based on the various age groups of the participants and thus, it is difficult to determine whether or not there were differential effects on the challenging behaviors exhibited by the participants based on their ages. Consequently, to our knowledge little is known about the implementation of interventions in school settings as a means to decrease challenging behaviors in young children with ASD as no review of empirical literature has been conducted to date focusing solely on this population. Given the emphasis in the recent literature of implementing interventions focused on proactive, positive strategies to decrease challenging behaviors (i.e., Positive Behavior Support [PBS]; Conroy et al., 2005a; Dunlap et al., 2010; Reichow & Barton, 2014), this review will be focused on interventions that follow that approach. These are interventions that focus on proactive, positive strategies for preventing, and decreasing challenging behaviors such as environmental arrangements of antecedent stimuli, positive consequences, and use of direct instructional strategies to teach appropriate replacement behaviors (Conroy et al., 2005a; Dunlap et al., 2010; Dunlap et al., 2003).

As the prevalence of young children with ASD exhibiting challenging behaviors in school settings continues to increase, there is greater pressure on schools and practitioners to implement EBPs that are effective in addressing those behaviors. Therefore, there is a need to determine which interventions are effective in addressing challenging behaviors in young children with ASD. The purpose of this review is to examine and summarize the current research in this area to provide direction for future research and intervention. Specifically, the purpose of this article is to: a) conduct a review of the quality of the literature base in this area using the evidence-based standards developed by the CEC (2014); b) calculate effect size estimates of the reviewed interventions using the non-overlap of all pairs (NAP) and Tau-U methods; c) determine which interventions can be considered an EBP; and d) provide direction for future research in this area.

Method

Search Procedures and Study Selection

To identify appropriate studies for review, the Education Resources Information Center (ERIC), PsychINFO, and Education Full Text electronic databases were searched for peer-reviewed articles containing the following search terms: 1) “autism” or “Asperger”; 2) “preschool” or “early childhood”; 3) “problem behavior” or “challenging behavior”; and 4) “intervention” or “early intervention.” Additionally, the reference list of four key literature reviews were examined to identify addi-
tional articles (i.e., Conroy et al., 2005a; Horner et al., 2002; Machalicek et al., 2007; Odom et al., 2003). A total of 335 articles were identified through searching the electronic databases and reference list of the aforementioned literature reviews. After removing the articles that were duplicated, 284 articles remained. The titles and abstracts of those remaining articles were screened to determine if they should be included in the review. If there was insufficient information within the titles and abstracts of the articles, the full texts were read to determine if they should be included in this review. A total of 63 full-text articles were screened for eligibility, 26 of which met the inclusion criteria set for this review.

Included studies that met criteria had child participants three to eight years of age with a diagnosis of ASD (i.e., autism, Asperger’s syndrome, or pervasive developmental disorder-not otherwise specified [PDD-NOS]), implemented an intervention focused on decreasing the challenging behaviors exhibited by the participants, employed a single-case research design to examine the effects of the intervention on the participants’ target behaviors (e.g., multiple baseline design, or reversal design), occurred between 2000 and June 2015 (following previous seminal reviews including Conroy et al., 2005a; Horner et al., 2002; Machalicek et al., 2007), were published in a peer-reviewed journal, and took place in a preschool or elementary school. Studies were excluded if they used non-experimental designs (e.g., AB designs), did not address outcomes related to challenging behaviors, or utilized group designs. Group design studies were excluded due to the expected small number of studies conducted in this area using this design, and to be able to use uniform effect size estimates (i.e., NAP and Tau-U). However, no studies using a group design were found when the search was conducted. Inclusion criteria only had to be met for one of the participants in a study for the study to be included in this review. For example, if the intervention in a study was implemented in multiple settings (e.g., school and home), the study was included in this review, but only the data of the participants who received the intervention in school settings were used.

Data Extraction

Operational definitions and a coding form were developed to record the information extracted from the included studies. The information extracted from each article was coded into four broad categories: characteristics of the participants, characteristics of the studies, type of intervention, and methodological quality of the studies.

Characteristics of the participants. The following characteristics of the participants were coded within this category: a) age, coded as the chronological age of each of the participants; b) diagnosis, coded as autism, Asperger’s syndrome, or PDD-NOS; c) cognitive functioning, coded as above average/average (i.e., an IQ score at or above 70 on a standardized cognitive functioning assessment), below average (i.e., an IQ score below 70 on a standardized cognitive functioning assessment), or cognitive functioning not reported; and d) language/communication skills, coded as above average/average (i.e., a score of 70 or above on a standardized test of communication/language skills, and/or the presence of strong receptive and expressive skills), below average (i.e., a score below 70 on a standardized test of communication/language skills, and/or the inability to use more than two-three word utterances to communicate needs or wants), or language/communication skills not reported.

Characteristics of the studies. The following features of the studies were coded within this category: a) experimental design (e.g., alternating treatments design, reversal/withdrawal design, or multiple baseline design); b) target behaviors, coded as disruptive behaviors (e.g., noncompliance, talking out, out-of-seat behavior), destructive behaviors (e.g., property destruction, aggression, self-injurious behavior), or stereotypic behaviors (e.g., hand flapping); c) intervention setting, coded as natural (i.e., intervention was delivered in an authentic setting/situation), contrived (i.e., intervention was delivered in a situation/setting created by researchers), or combined settings (i.e., the intervention was implemented in a contrived and authentic setting for all of the participants, or implemented in a natural setting for some participants and in a contrived setting for others); d) intervention agent, coded as
teacher or researcher; and e) functional assessment method (i.e., method used to assess the function of the participants’ challenging behaviors), coded as experimental method (e.g., functional analysis), indirect method (e.g., behavioral interview, questionnaire, or rating scale), descriptive method (e.g., direct observation), a combination of functional assessment methods, or functional assessment method not conducted.

**Type of intervention.** The interventions implemented in the reviewed studies were categorized using the following categories: antecedent-based interventions, function-based interventions, reinforcement interventions, instructional interventions, and multicomponent interventions.

Antecedent-based interventions were defined as interventions in which the participants’ environments were altered before they engaged in challenging behaviors to set the occasion for them to engage in different, non-challenging behaviors (i.e., antecedents associated with desirable behaviors were emphasized in these interventions, and antecedents associated with challenging behaviors were reduced or eliminated). These interventions include providing individuals with visual or verbal cues to forewarn them of changes in activities, or providing individuals with highly preferred items prior to an activity in which they exhibit high rates of challenging behaviors. Function-based interventions were defined as interventions in which participants were taught socially appropriate communication responses that could be used to obtain the same reinforcers as their challenging behaviors, while simultaneously withdrawing reinforcers of their challenging behaviors (e.g., functional communication training interventions). Reinforcement interventions were defined as interventions in which reinforcers were delivered when the participants engaged in socially appropriate behaviors and were minimized or eliminated when they engaged in challenging behaviors in order to decrease the participants’ likelihood of engaging in challenging behaviors (e.g., differential reinforcement of other behavior [DRO] interventions). Instructional interventions were defined as interventions in which participants were prompted or instructed to engage in socially appropriate behaviors, or were taught to recognize relevant social and physical cues in certain contexts to help them acquire and use socially appropriate behaviors (e.g., social stories). Multicomponent interventions were defined as interventions that implemented more than one of the aforementioned interventions.

**Methodological quality of the studies.** The evidence-based standards for single-case design research developed by the CEC (2014) were used to evaluate the methodological quality of each reviewed study. In order to examine issues related to internal, external, and ecological validity of the included studies, three additional variables were incorporated in the review. These variables included whether the studies collected and reported generalization data, maintenance data, and social validity data.

The purpose of the CEC’s evidence-based standards is to provide researchers, practitioners, and stakeholders with a guide that can help them identify methodologically sound intervention studies in the field of special education and categorize the evidence base of those interventions (CEC, 2014). There is a set of eight quality indicators within these evidence-based standards that must be met by studies in order for them to be classified as methodologically sound (i.e., without meaningful threats to the validity of the findings): 1) context and setting (i.e., studies provide sufficient information regarding the critical features of the contexts and settings in which they were conducted); 2) participants (i.e., studies provide sufficient information to identify the population of participants to which results may generalize to); 3) intervention agents (i.e., studies provide sufficient information regarding the critical features of the intervention agents); 4) description of the intervention (i.e., studies provide sufficient information regarding the critical features of the implemented interventions so they can be easily understood and replicated); 5) implementation fidelity (i.e., studies assess and report implementation fidelity related to adherence and dosage using direct, reliable measures); 6) internal validity (i.e., studies provide sufficient evidence that the independent variable[s] cause changes in the dependent variable[s]); 7) dependent variables (i.e., outcome measures are applied appropriately.
to gauge the effects of the implemented interventions); and 8) data analyses (i.e., data analyses are appropriately conducted). According to the CEC (2014), the conservative approach of requiring studies to meet all of the quality indicators to be classified as methodologically sound increases the likelihood that only the highest quality and most trustworthy studies are considered when categorizing the evidence base of interventions in the field of special education.

Using a rubric following the criteria specified by the CEC (2014), studies were coded as whether or not they were methodologically sound (i.e., adequately addressed the methodological issues specified by each quality indicator). Methodologically sound studies then were coded as having positive, neutral or mixed, or negative effects. According to the CEC (2014), a study is considered to have a positive effect when a functional relationship is established between the implemented intervention(s) and the target behavior(s) for at least 75% of the participants, it has a minimum of three total participants, and the data for none of the participants show evidence of a functional relationship in a non-therapeutic direction. A study is considered to have negative effects when a functional relationship in a non-therapeutic direction is established between the implemented intervention(s) and the target behavior(s) for at least 75% of the participants, and the study has a minimum of three total participants. Lastly, a study is considered to have neutral or mixed effects when the criteria for neither positive nor negative effects are met (CEC, 2014).

After classifying each reviewed study as methodologically sound or not and determining the effects of the methodologically sound studies, the evidence base of each intervention was categorized (CEC, 2014). Interventions were classified as evidence-based practices (i.e., interventions with at least five methodologically sound studies with positive effects, and at least 20 total participants across studies), potentially evidence-based practices (i.e., interventions with two to four methodologically sound studies with positive effects, with a ratio of studies with positive effects to studies with neutral/mixed effects of more than 2:1), practices with mixed evidence (i.e., interventions with two to four methodologically sound studies with a ratio of studies with positive effects to studies with neutral/mixed effects of less than 2:1, and with a greater number of methodologically sound studies with positive effects than methodologically sound studies with negative effects), practices with negative effects (i.e., interventions with a greater number of methodologically sound studies with negative effects than methodologically sound studies with positive effects), or practices with insufficient evidence (i.e., interventions that do not meet the criteria for any of the other categories; CEC, 2014).

The CEC’s evidence-based standards were selected to evaluate the methodological quality of the reviewed studies due to the focus of these standards on special education research (CEC, 2014). In addition, these standards allow researchers, practitioners, and stakeholders to incorporate the findings of numerous methodologically sound studies into reports that summarize findings across studies, categorizing the evidence base of the interventions implemented in those studies. Other evidence-based standards (e.g., What Works Clearinghouse [WWC] evidence-based practice standards; WWC, 2014) require researchers, practitioners, and stakeholders to mostly focus on judging the evidence of individual studies making it more difficult to summarize findings across studies and categorize the evidence base of the interventions.

Effect Size Estimates

Two nonparametric effect size estimates were calculated to provide an estimate of the magnitude of intervention effect. Effect size estimates were calculated using the NAP (Parker & Vannest, 2009) and Tau-U (Parker, Vannest, Davis, & Sauber, 2011a) methods. According to Brossart, Vannest, Davis, and Patience (2014), effect size estimates have advantages and disadvantages and thus, it is better to calculate more than one effect size estimate when synthesizing the literature. Moreover, it is important to pair effect size estimates with visual analysis of the data because current effect size estimates do not fully address the complexity of single case research design (e.g., autocorrelation, variability, number of available data points; Whalon, Conroy, Martinez, & Werch, 2015). NAP and Tau-U
were chosen because they closely align with visual analysis and do not require test assumptions that are not met in single case research (i.e., random sampling from a population that is normally distributed, samples that are independent from one another, and two or more groups with equal variances; Parker, Vannest, & Davis, 2011b). Both NAP and Tau-U are not as sensitive to outliers and small data points since they include all data points in their calculations (Parker et al., 2011b), and both have been found in the literature to yield stronger statistical power than other nonparametric effect size estimates (e.g., percentage of non-overlapping data; Whalon et al., 2015).

NAP compares each baseline phase data point to each intervention phase data point to obtain a percentage of non-overlapping data that shows improvement (i.e., NAP = [Pos + .5 × Ties] / Total; Parker et al., 2011b). Effect size estimates calculated with NAP can be interpreted as ineffective (i.e., below .50), questionable (i.e., between .51 and .70), effective (i.e., between .71 and .90), and very effective (i.e., above .91; Parker et al., 2011b). Tau-U is the percent of data that demonstrate improvement over time by comparing all data points in each phase ([(Pos–Neg)/Pairs; Parker et al., 2011a]. Tau-U can be interpreted using the guidelines set out by Rakap (2015) as ineffective (i.e., below .50), questionable (i.e., between .51 and .65), effective (i.e., between .66 and .92), and very effective (i.e., above .93). Tau-U and NAP are similar, but NAP is the percentage of non-overlap whereas Tau-U is the percentage of non-overlap minus overlap with the ability to control for trend (Parker et al., 2011a), making Tau-U the more conservative effect size estimate (Whalon et al., 2015). Effect size estimates were calculated using a web-based calculator (Vannest, Parker, & Gonen, 2011). The .pdf files of the studies, along with Biosoft’s UnGraph for Windows (version 5.0), were used to extract the data from the graphs of all of the reviewed studies in order to calculate the effect size estimates. Although the data from UnGraph is often reliable and valid, in some instances the symbols on the graphs overlap and UnGraph can miss or misrepresent data points (Whalon et al., 2015). Therefore, the data extracted from UnGraph was compared with visual analysis to ensure reliability and validity. Errors in the extracted data were changed to better represent visual analysis. UnGraph data representing the number of sessions, frequency counts, and percentages were rounded to the nearest whole number (Shadish et al., 2009).

Effect size estimates were calculated for all of the reviewed studies, not only the ones found to be methodologically sound through the CEC’s evidence-based standards, to facilitate the quantitative comparison of the effectiveness of the implemented interventions across studies. Specifically, given the small number of studies that met inclusion criteria for this review, an even smaller number of methodologically sound studies were expected. Therefore, calculating effect size estimates only for methodologically sound studies would have made it impractical to compare the effectiveness of the interventions across studies. For example, calculations of the effect size estimates for each type of intervention, based on participants’ specific characteristics, would have been unfeasible using just methodologically sound studies (e.g., effect size estimates of instructional interventions on the participants with an average/above average cognitive ability).

Reliability

Once an initial determination was made by the first author as to whether or not an article met the inclusion criteria, the second author independently applied the same inclusion/exclusion criteria to a randomly selected 20% (n = 57) of the articles. In the case of a disagreement, the study in question was reread and discussed by the authors until an agreement was reached. After the final list of studies to be included in the review was obtained, the first author extracted and coded all of the relevant data from each study into the four aforementioned categories. The second author then independently extracted and coded all of the target data from a random sample of 20% (n = 5) of the included studies. There were 40 items across the four coding categories, per study, on which there could be agreements or disagreements. Percentage agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements, and multiplying by 100. Interobserver agreement across all
categories was 89% (range = 78–100%). However, when a disagreement occurred between the authors, the study in question was discussed until a consensus was reached.

**Results**

**Characteristics of the Participants**

A total of 26 studies published between 2002 and 2013 investigating the impact of school-based positive behavioral interventions on the challenging behaviors exhibited by 44 children with ASD were reviewed. The age of the participants ranged between 3 and 8 years with a mean age of six years. Table 1 provides descriptive information about the participants included in this review. Thirty-five (80%) participants were school-aged (i.e., over 5 years old), and nine (20%) participants were preschool-aged (i.e., 3 to 5). Descriptions of cognitive ability were provided for 37 (84%) of the participants. Out of those 37 participants, twenty-eight (76%) were described as performing below average while nine (24%) were described as performing in the above average/average range. With regards to language/communication skills, most participants (n = 34, 77%) were reported as having below average receptive and expressive language skills. Ten (23%) participants were reported as having above average/average receptive and expressive language skills. Table 2 provides information of effect size estimates by characteristics of the participants and type of intervention.

**Characteristics of the Studies**

The majority of studies employed a multiple baseline or multiple probe design (n = 11, 42%) to assess the effects of the implemented intervention on the participants’ target behaviors, while nine (34%) studies applied a reversal design, and six (24%) studies applied an alternating treatments design. Destructive behaviors were targeted in 12 (46%) of the studies and disruptive behaviors and stereotypic behaviors were targeted each in seven (27%) of the studies. Twenty-two (85%) of the studies were conducted in natural settings, while the rest of the studies (n = 4, 15%) were conducted in contrived settings. Interventions were implemented by teachers in 12 (46%) of the studies, and implemented by researchers in 14 (54%) of the studies. Most of the studies conducted assessments in order to determine the function of the participants’ target behaviors and thus, guide the development and implementation of the interventions. More specifically, 13 (50%) of the studies determined the function of the participants’ target behaviors utilizing experimental methods, three studies (12%) used direct observation methods, five (19%) studies used indirect methods, and two (8%) studies used combined methods. Three (11%) studies did not conduct assessment methods to determine the function of the participants’ target behaviors. Maintenance and generalization were each measured and reported in six (23%) studies. Finally, eight studies (31%) measured and reported information related to the social validity of the intervention.

**Type of Intervention and Methodological Quality of the Studies**

Eleven (43%) studies implemented instructional interventions, six (23%) studies implemented function-based interventions, four (15%) studies implemented antecedent-based interventions, three (12%) studies implemented reinforcement interventions, and two (7%) studies implemented multicomponent interventions. Table 1 provides information on the type of intervention implemented in each study. Table 3 provides a summary of the methodological quality ratings of the studies.

**Instructional interventions.** Nineteen (42%) children, with an average age of six (range 3–8), participated in instructional interventions. Instructional interventions were developed to target disruptive behaviors (e.g., screaming, yelling, crying, or loud humming; Agosta, Graetz, Mastropieri, & Scruggs, 2004; Crozier & Tincani, 2005; Iskander & Rosales, 2013; Ozdemir, 2008; Scattone, Wilczynski, Edwards, & Rabian, 2002), stereotypic behaviors (e.g., vocal stereotypy; Ahearn, Clark, MacDonald, & Chung, 2007; Brownell, 2002; Miguel, Clark, Tereshko, & Ahearn, 2009), and destructive behaviors (e.g., pushing, biting or kicking; Frea, Arnold, & Vittimberga, 2001; Machalicek et al., 2009; Mancil, Haydon, & Whitby, 2009).
<table>
<thead>
<tr>
<th>Reference</th>
<th>N</th>
<th>Age</th>
<th>Cognitive Functioning</th>
<th>Language Skills</th>
<th>Design</th>
<th>Target Behavior</th>
<th>Intervention</th>
<th>NAP</th>
<th>Tau-U</th>
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<td>BA</td>
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<td>.90</td>
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<td>Instructional</td>
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<tr>
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<td>BA</td>
<td>NR</td>
<td>Reversal</td>
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<td>Instructional</td>
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<td>Function-based</td>
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<td>.49</td>
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<tr>
<td>Ozdemir (2008)</td>
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<td>AA</td>
<td>AA</td>
<td>MBL</td>
<td>Disruptive</td>
<td>Instructional</td>
<td>1.0</td>
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<tr>
<td>Reichle et al. (2010)</td>
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<td>Reinforcement</td>
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<td>.85</td>
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<td>5-6</td>
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<td>Antecedent-based</td>
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<td>Disruptive</td>
<td>Instructional</td>
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<td>.30</td>
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<tr>
<td>Schindler and Horner (2005)</td>
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<td>Function-based</td>
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<td>.77</td>
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<tr>
<td>Strain et al. (2011)</td>
<td>2</td>
<td>5-8</td>
<td>BA</td>
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<td>Multicomponent</td>
<td>.96</td>
<td>.93</td>
</tr>
<tr>
<td>Taylor et al. (2005)</td>
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<td>.59</td>
</tr>
<tr>
<td>Waters et al. (2009)</td>
<td>2</td>
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<td>BA</td>
<td>BA</td>
<td>MBL</td>
<td>Destructive</td>
<td>Multicomponent</td>
<td>.92</td>
<td>.83</td>
</tr>
</tbody>
</table>

*Note.* BA = Below average; AA = Above average; NR = Not reported; MBL = Multiple baseline.
Social stories were the instructional intervention most frequently implemented in the reviewed studies (i.e., implemented by 63% of the studies categorized as instructional interventions). Other instructional interventions consisted of teaching participants socially appropriate behaviors that were incompatible with their challenging behaviors (Ahearn et al., 2007; Miguel et al., 2009), or using visual aids to teach participants socially appropriate behaviors (Frea et al., 2001; Machalicek et al., 2009). The effect size estimates of instructional interventions were highly variable (NAP ranging from .76 to 1.0; Tau-U from .23 to 1.0). However, the mean NAP was .92 (range .77–1.0) and Tau-U was .76 (range .23–1.0), indicating that overall instructional interventions are effective in decreasing the challenging behaviors exhibited by young children with ASD.

Methodological quality. Out of the eleven studies that implemented instructional interventions, five (45%) did not collect treatment fidelity data (Agosta et al., 2004; Ahearn et al., 2007; Brownell, 2002; Frea et al., 2001; Miguel et al., 2009), and one (10%) did not report all of the necessary data to meet the quality indicators related to internal validity (Iskander & Rosales, 2013). Therefore, only five studies (45%) were considered to be methodologically sound and were used to determine whether instructional interventions can be considered EBP. Out of the five methodologically sound studies, three had positive effects (Crozier & Tincani, 2005; Mancil et al., 2009; Ozdemir, 2008). The other two studies had mixed/neutral effects (Machalicek et al., 2009; Scattone et al., 2002). These studies were classified as having mixed/neutral effects because they did not have a minimum of three participants (CEC, 2014). Therefore, instructional interventions are considered to potentially be an EBP in terms of their effectiveness in decreasing challenging behaviors exhibited by young children with ASD in school settings (i.e., more than four methodologically sound studies implemented instructional interventions, but the ratio of studies with positive effects to studies with neutral/mixed effects was less than 2:1).

Functional interventions. A total of eight (17%) children, with an average age of six (range 4–7), participated in the six studies that implemented a function-based intervention. All of the studies targeted destructive behaviors (e.g., hitting, kicking, or pushing; Blair, Umbreit, Dunlap, & Jung, 2007; Braithwaite & Richdale, 2000; Buckley & Newchok, 2005; Falcomata, Muething, Gainey, Hoffman, & Fragale, 2013; O’Neil & Sweetland-Baker,

### Table 2

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Function Based</th>
<th>Instructional</th>
<th>Antecedent Based</th>
<th>Reinforcement</th>
<th>Multicomponent</th>
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<tr>
<td></td>
<td>NAP</td>
<td>Tau-U</td>
<td>NAP</td>
<td>Tau-U</td>
<td>NAP</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3–5</td>
<td>.88</td>
<td>.77</td>
<td>.98</td>
<td>.95</td>
<td>.91</td>
</tr>
<tr>
<td>n = 3 (38%)</td>
<td></td>
<td></td>
<td>n = 3</td>
<td>16%</td>
<td>n = 4</td>
</tr>
<tr>
<td>Above 5</td>
<td>.97</td>
<td>.87</td>
<td>.88</td>
<td>.74</td>
<td>.93</td>
</tr>
<tr>
<td>n = 5 (62%)</td>
<td></td>
<td></td>
<td>n = 16</td>
<td>84%</td>
<td>n = 5</td>
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<td>Cognitive ability</td>
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<td></td>
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<td></td>
</tr>
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<td>N/A</td>
<td>.98</td>
<td>.96</td>
<td>.95</td>
</tr>
<tr>
<td>n = 0</td>
<td></td>
<td></td>
<td>n = 5</td>
<td>36%</td>
<td>n = 5</td>
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<tr>
<td>Below average</td>
<td>.95</td>
<td>.81</td>
<td>.85</td>
<td>.60</td>
<td>.93</td>
</tr>
<tr>
<td>n = 5 (75%)</td>
<td></td>
<td></td>
<td>n = 9</td>
<td>64%</td>
<td>n = 7</td>
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<td>Language skills</td>
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<td></td>
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<td></td>
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<td>N/A</td>
<td>.94</td>
<td>.87</td>
<td>.95</td>
</tr>
<tr>
<td>n = 0</td>
<td></td>
<td></td>
<td>n = 6</td>
<td>3%</td>
<td>n = 6</td>
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<tr>
<td>Below average</td>
<td>.95</td>
<td>.85</td>
<td>.88</td>
<td>.68</td>
<td>.93</td>
</tr>
<tr>
<td>n = 8 (100%)</td>
<td></td>
<td></td>
<td>n = 13</td>
<td>68%</td>
<td>n = 7</td>
</tr>
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</table>
implemented functional communication training interventions. These interventions consist of teaching individuals socially appropriate communicative behaviors that serve the same function as their challenging behaviors in order to replace their challenging behaviors. Overall, function-based interventions were effective in decreasing the challenging behaviors exhibited by the participants (i.e., mean NAP of .96 [range .88–1.0] and Tau-U of .85 [range .49–1.0]).

Methodological quality. Out of the studies that implemented function-based interventions, four (66%) did not collect implementation fidelity data (Braithwaite & Richdale, 2000; Buckley & Newchok, 2005; Falcomata et al., 2013; O’Neil & Sweetland-Baker, 2001). Only two studies (34%) met all of the CEC’s quality indicators and thus, were considered to be methodologically sound studies (Blair et al., 2007; Schindler & Horner, 2005). Both of these studies had positive effects. Given that there were less than five methodologically sound studies with positive effects that implemented function-based interventions (i.e., the minimum of studies needed for an intervention to be considered EBP), function-based interventions are considered to potentially be an EBP (CEC, 2014).

Antecedent-based interventions. Nine (20%) children, with an average age of five (range 4–8), participated in antecedent-based interventions. These interventions were implemented to target stereotypic behaviors (e.g., vocal stereotypy; Conroy, Asmus, Sellers, & Ladwig, 2005b; Haley, Heick, & Luiselli, 2010; Lang et al., 2011) and destructive behaviors (e.g., biting or attempts to bite; Rispoli et al., 2011). Antecedent-based interventions consisted of providing participants with unrestricted access to items that maintained their challenging behaviors prior to activities in which they exhibited high rates of challenging behaviors (Rispoli et al., 2011), embedding preferred materials into activities in which participants exhibited high rates of challenging behaviors (Lang et al., 2010), or providing participants with visual cues to indicate to them times in which it was acceptable and times in which it was not acceptable for them to engage in challenging behaviors (Conroy et al., 2005b; Haley et al., 2010). Overall, an-

| Tables |
ecedent-based interventions were effective in decreasing the challenging behaviors exhibited by the participants with a mean NAP of .94 (range .85–1.0) and Tau-U of .80 (range .68–1.0).

**Methodological quality.** Out of the four studies that implemented antecedent-based interventions, one (25%) did not collect implementation fidelity data (Conroy et al., 2005b). The other three studies (75%) met all of the quality indicators and had positive effects (Haley et al., 2010; Lang et al., 2010; Rispoli et al., 2011). Therefore, antecedent-based interventions are considered to potentially be an EBP (CEC, 2014).

**Reinforcement interventions.** A total of four (9%) children, with a mean age of five (range 4–7), participated in the studies that implemented reinforcement interventions. Destructive behaviors (e.g., hitting or biting others; Reichle, Johnson, Monn, & Harris, 2010), disruptive behaviors (e.g., screaming; Carnett et al., 2014), and stereotypic behaviors (e.g., vocal stereotypy; Taylor, Hoch, & Weissman, 2005) were each targeted by one study. Reinforcement interventions involved the delivery of preferred tangibles or edibles to the participants for engaging in socially appropriate behaviors as a means to reduce their challenging behaviors. Overall, these interventions were effective in decreasing the challenging behaviors exhibited by the participants with a mean NAP of .91 (range .79–1.0) and Tau-U of .82 (range .59–1.0).

**Methodological quality.** Out of the three studies categorized as implementing reinforcement interventions, two (66%) met all of the quality indicators and had positive effects (Carnett et al., 2014; Reichle et al., 2010). The other study (34%) did not collect implementation fidelity data (Taylor et al., 2005). Since there was only one methodologically sound study with positive effects, reinforcement interventions are considered to have insufficient evidence in terms of their effectiveness in decreasing challenging behaviors exhibited by young children with ASD in school settings.

**Discussion**

As the prevalence of young children with ASD exhibiting challenging behaviors in school settings continues to increase, there is a critical need to identify educational interventions that are supported by scientifically-rigorous evidence (i.e., EBPs). This review focused on synthesizing the literature on interventions implemented in school settings as a means to decrease challenging behaviors exhibited by young children with ASD. A total of 26 articles published within the past 15 years met the inclusion criteria set for this review. An encouraging finding was that overall all of the reviewed interventions were effective in decreasing the challenging behaviors exhibited by the participants. However, none of the interventions could be considered an EBP due to the small literature base in this area (i.e.,...
less than five methodologically sound studies with positive effects, with more than 20 total participants across studies, were conducted for each type of intervention; CEC, 2014). Therefore, more research in this area is needed. Further research assessing the effectiveness of school-based interventions aimed at decreasing challenging behaviors exhibited by young children with ASD would aid in the identification of interventions that are supported by scientifically rigorous evidence.

Research suggests that many young children with ASD who exhibit challenging behaviors lack appropriate communication skills or task-related behaviors needed to thrive academically and socially and thus, need to be systematically taught those skills and behaviors (Conroy et al., 2005a). Consequently, an optimistic finding was the emphasis in the literature on targeting socially appropriate behaviors in addition to the challenging behaviors exhibited by the participants. In addition, to be considered effective from a clinical standpoint, interventions should not only reduce engagement in challenging behaviors, but also increase engagement in socially appropriate behaviors that will ultimately facilitate individuals’ inclusion into broad societal contexts (Dunlap et al., 2010). To that end, researchers are encouraged to continue to develop and evaluate interventions in which challenging behaviors and socially appropriate behaviors are targeted.

It is known that challenging behaviors (e.g., stereotypic behaviors) manifest in the early childhood years in individuals with autism (Boyd et al., 2012) and that these behaviors interfere with their everyday activities, including opportunities to socially interact with peers, engage in academic instruction, and perform learned tasks accurately (Boyd et al., 2012). Therefore, researchers are encouraged to continue to conduct studies with young children with ASD to find interventions that are effective in improving their developmental outcomes (Boyd et al., 2012). It is important to note that the majority of the participants included in this review were described as performing below average cognitively and socially. Therefore, more research is needed to determine the impact of the implemented interventions on the challenging behaviors exhibited by young children with ASD who demonstrate a wide range of cognitive abilities and language/communication skills.

Most of the reviewed studies conducted functional behavioral assessments to determine the function of the participants’ challenging behaviors (i.e., 23 [89%] studies conducted functional behavioral assessments) and indicated a direct link between functional assessment outcomes and the implemented interventions. This finding is important because research suggests that the effects of interventions linked to the outcomes of functional behavioral assessments tend to be more durable (Conroy et al., 2005a). Moreover, most of the studies that conducted functional behavioral assessments (n = 13, 57%) conducted experimental methods. Researchers are encouraged to continue using experimental functional assessment methods to identify the function of the challenging behaviors exhibited by young children with ASD as other assessment methods have limitations (Patterson, Smith, & Jelen, 2010). For example, research has shown that descriptive assessment methods (e.g., direct observations) often produce a high proportion of false positives for the attention function (Patterson et al., 2010). Research has found that attention is often correlated with challenging behaviors (e.g., stereotypic behaviors) regardless of their function(s) because practitioners and parents usually provide attention (e.g., a verbal reprimand) when individuals engage in those behaviors. Similarly, the information gathered through indirect assessment methods (e.g., teacher/parents interviews) can be highly subjective, prone to bias, and produce inaccurate information and thus, these assessments may erroneously identify the function(s) of challenging behaviors (Miltenberger, 2008).

Even though all of the reviewed studies were conducted in school settings, the majority of the interventions were implemented by researchers rather than teachers (i.e., authentic change agents). This suggests that teachers were not an integral part of the interventions implemented in the studies, thus decreasing the external and social validity support for the use of these interventions within schools by teachers. Researchers are encouraged to conduct studies in which teachers are the intervention agents. This will further expand our knowledge regarding the practicality, feasibil-
ity, and efficacy of teachers as implementers of these interventions in order to decrease challenging behaviors in young children with ASD. Moreover, the increasing emphasis on implementing EBPs in school settings highlights the need for future research examining the efficacy of behavioral interventions as implemented by teachers within their classrooms.

Lack of measurement generalization, maintenance, and social validity was a limitation found in most of the studies, which decreases the generalizability of the research. Without measurement of generalization, it is unknown whether the implemented interventions would be effective in settings other than the ones in which the interventions were implemented, or if the interventions would be effective when implemented by different intervention agents. Therefore, future research should gather generalization data by measuring the effectiveness of the implemented interventions across settings and intervention agents. Similarly, future research should include data on the maintenance of the implemented interventions. The duration of the effects of an intervention could have important implications for practice, as a short duration of an effect could limit the validity and feasibility of interventions. Lastly, without social validity data it is difficult to validate the appropriateness of the behaviors targeted by the interventions and to determine whether or not the outcomes of the interventions were socially acceptable, relevant, and useful to the participants and/or their families. Therefore, researchers are encouraged to collect data regarding the social validity/acceptability of the interventions implemented in their studies.

Limitations of the Literature Review

One possible threat to the validity of this literature review is publication bias (Rothstein, Sutton, & Borenstein, 2005). Publication bias occurs when researchers do not submit for publication studies with negative findings or journals do not publish studies that fail to produce positive results (Rothstein et al., 2005). The findings of this review should be interpreted with caution as publication bias may have influenced the results (e.g., the impact of the reviewed interventions on the participants’ challenging behaviors). For example, this could be the reason why none of the reviewed studies had negative effects when the CEC (2014) evidence-based standards were applied to assess their methodological quality and effects of the interventions implemented in them. In addition, this review included a small number of studies and thus, there may be insufficient data to draw firm conclusions about the effectiveness of the reviewed interventions on the challenging behaviors exhibited by the participants. Lastly, it is possible that some published articles that could have met the inclusion criteria set for this review may not have been captured in the electronic databases search due to the search terms used (e.g., the term “PDD-NOS” was not used when conducting the electronic databases search). Bibliographic searches of the included articles or archival hand searches of professional journals to identify articles related to behavioral interventions, early childhood, and authors who typically publish on these topics were not conducted. Therefore, this literature review may not be exhaustive.

A limitation of using the CEC’s evidence-based standards to determine whether or not the reviewed interventions could be considered EBPs is that these standards require studies to address all of the indicators in order to be classified as methodologically sound. This strict requirement could limit the consideration of studies conducted before quality indicators for single-case design research were developed and emphasized in published studies (CEC, 2014). Reviewers must evaluate the methodological quality of studies based on the information reported in manuscripts, which often do not fully contain all aspects of studies (Cook et al., 2014). Therefore, the application of these evidence-based standards is limited by accurate and complete reporting of research methods in published articles.

Conclusion

Challenging behaviors (e.g., aggression or stereotypic behaviors) constitute substantial obstacles to the participation of children with ASD in inclusive settings, such as general education classrooms or community activities (Dunlap et al., 2010). Challenging behaviors interfere with the ability of children with ASD
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Culture in Inclusive Schools: Parental Perspectives on Trusting Family-Professional Partnerships

Grace L. Francis
George Mason University

Martha Blue-Banning and Ann P. Turnbull
University of Kansas

Cokethea Hill
United Way

Shana J. Haines
University of Vermont

Judith M.S. Gross
University of Kansas

Abstract: This qualitative study improves understanding of parent perspectives about the factors that facilitate family-professional partnerships in schools recognized for inclusive practices. Five themes emerged from 11 focus groups consisting of parents of students with and without disabilities and with varying levels of involvement with the school: (a) school culture of inclusion, (b) positive administrative leadership, (c) attributes of positive partnerships, (d) opportunities for family involvement, and (e) positive outcomes for all students. School culture was an overriding theme, with each of the other themes closely linked to school culture. Implications for strengthening trusting family-professional partnerships as well as directions for future research are discussed.

Trusting family-professional partnerships occur when families and school professionals (e.g., principals, teachers, support staff) regard each other as reliable allies and families have multiple opportunities for meaningful participation in their children's education and in the life of the school (Haines, McCart, & Turnbull, 2013). Research indicates that trusting family-professional partnerships contribute to positive outcomes for multiple stakeholder groups, including students, educators, families, and community members (Tschannen-Moran, 2014). Family-professional partnerships result in enhanced student learning, achievement, positive behavior, and attendance; and in decreased achievement gaps between groups of students, including those with disabilities (Bryan & Henry, 2012; Giovacco-Johnson, 2009; Goddard, Tschannen-Moran, & Hoy, 2001; Lawson, 2003; Tschannen-Moran, 2014). Family-professional partnerships also promote educator efficacy and improved instruction (Haines et al., 2013; Lawson, 2003). Positive family outcomes include enhanced satisfaction, understanding, social connections, development, and parenting skills (Blue-Banning, Summers, Frankland, Nelson, & Beegle, 2004; Haines et al., 2013; Hill & Taylor, 2004). Burke and Hodapp (2014) also reported a relationship between trusting family-professional partnerships and lower levels of stress among mothers who have children with disabilities. Finally, community members benefit as families make connections with each other through the

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school and form supportive relationships outside of school (Hill & Taylor, 2004).

Although the importance of family-professional partnerships is well documented, barriers exist to making these partnerships a reality in many schools, including cultural mistrust among families who experience marginalization (Auerbach, 2010) and a prevalence of school professionals harboring low expectations for families with low incomes and/or families of color (Cooper, Riehl, & Hasan, 2010). Further, many school professionals have limited knowledge or support to partner effectively with families, especially those they consider “difficult to reach” (Blue-Banning et al., 2004; Hill & Taylor, 2004). Another barrier is a lack of information about the factors (e.g., professional development, class size) that facilitate trusting family partnerships. All of these barriers can be magnified in inclusive settings when teachers are unprepared to teach students with disabilities or have negative attitudes about teaching all students in an inclusive setting (Gullen, Gregory, & Noto, 2010).

These barriers can leave families and school professionals unable to conceptualize and engage in trusting family-professional partnerships. Developing a greater understanding about the influencing factors that facilitate trusting partnerships can mitigate many of these barriers. Further, the perspectives of parents of children with and without disabilities have the potential of providing keen insight into the factors families find most meaningful, thus enabling school professionals and families to hone in on the most crucial aspects of developing trusting family-professional partnerships.

Trusting family-professional partnerships are a vital component of family engagement and one of 10 features that form the foundation of the Schoolwide Integrated Framework for Transformation (SWIFT) Center, a national K-8 technical assistance center that promotes learning and academic achievement among all students, including those with and without disabilities (Sailor, McCart, Bezdek & Satter, 2014; see www.swiftschools.org). The SWIFT Center framework consists of five domains related to inclusive practices: administrative leadership, multi-tiered system of support, integrated educational framework, family and community engagement, and inclusive policy structure and practice. The framework coherently braids evidence-based practices to transform policies, organizational structures, and relationships to support improved academic and behavior outcomes for all students. The SWIFT Center’s National Leadership Consortium, a group comprised of researchers, scholars, and technical assistance providers knowledgeable about inclusive school reform, used surveys and phone interviews to select five culturally, geographically, and economically diverse elementary schools and one middle school that exemplified one or more of the SWIFT domains. These schools, known as knowledge development sites (KDS), informed SWIFT Center’s technical assistance practices and procedures. The purpose of this article is to explore the perceptions of parents with children attending the KDS regarding factors that facilitate trusting family-professional partnerships. Specifically, we investigated the following research question, “What factors do parents perceive as facilitating trusting family-professional partnerships in schools recognized for inclusive practices?”

**Method**

This paper reports qualitative focus group data from the six KDS recognized by The SWIFT Center as exemplary in at least one inclusive practice, which may include family-professional partnerships. The KDS included five elementary schools and one middle school that represent all major U.S. geographic regions (Northeast, South, West, and Midwest). The schools represented diverse race/ethnic populations, (e.g., 27% to 64% of students categorized as White, 18% to 24% Black, 11% to 24% Hispanic, 0.4% to 10% Asian, less than 1% Native Hawaiian or Pacific Islander and American Indian or Alaska Native, and 6% to 11% reporting two or more races/ethnicities), as well a economic diversity (12% to 54% of student families were categorized as economically disadvantaged). The percentage of students identified as having a disability ranged from 11% to 27% of students, and those identified as English-language learners ranged from 2% to 15%.
Participants

We conducted 11 focus groups at the KDS; six groups consisting of parents of children with disabilities (e.g., students with autism, intellectual and developmental disabilities, learning disabilities, attention deficit disorder) and five of parents considered by school personnel to be "leaders" (e.g., parents with reported high levels of involvement at the classroom, school, and/or district-levels), some of whom had children with disabilities. The initial sampling plan was to conduct two focus groups at each site. However, due to scheduling and other logistical issues, one school was unable to gather a focus group of parent leaders. We requested schools recruit 5-10 participants for each focus group to be small enough for "everyone to have the opportunity to share insights and yet large enough to provide a diversity of perceptions" (Kreuger & Casey, 2009, p. 6). Despite our guidelines, the actual groups the schools organized ranged from four to 12 participants. In total, 58 parents (49 mothers and 9 fathers) participated.

We collaborated with the principal and staff at each KDS to identify participants for the focus groups, providing them with a set of participant criteria. For the focus groups comprised of parents of children with disabilities, we requested a representative sample of the population of families who have children with disabilities at the school (e.g., family income, race/ethnicity). In addition, we requested that the focus group participants' children vary across a range of characteristics, including (a) academic, behavioral, functional, and health needs, and (b) grade levels. For the parent leaders focus groups, we requested parents who were highly involved with school and community activities and/or their child’s education, served on school/community leadership teams, and/or had leadership roles in various groups (e.g., PTA, school board, Girl Scouts, Big Brothers Big Sisters). With these criteria, school staff (i.e., principals, secretaries) contacted potential participants, explained the purpose of the research, and extended an invitation to participate. In accordance with our Institutional Review Board (IRB) approved plan, we report only limited participant demographic data in order to protect the confidentiality of the focus group participants.

Procedure

Two researchers moderated each focus group. A primary facilitator used an interview protocol to guide groups, while a co-facilitator took notes and monitored the time. The primary facilitator began each group by welcoming the participants, describing the SWIFT Center and the purpose of the focus group. The primary facilitator also obtained written informed consent from each participant. Participants then introduced themselves and shared information about themselves, their children, and their involvement with the school.

The primary facilitator used the interview protocol to guide the discussion and gain information about families’ perspectives of trusting family partnerships at their respective schools and to help control for moderator bias. Focus groups sessions averaged 1.5 hours and were audio-recorded with participant consent. A professional transcriptionist later transcribed the recordings.

Data Analysis

The research team used Dedoose, a web-based qualitative software, to methodically analyze the transcribed focus group data. In the process of data reduction, team members first independently open coded two transcripts noting general themes (Creswell, 2009). The team met weekly to discuss the coding process, data, and emerging themes. These conversations led to the development of an initial codebook, which contained defined themes and subthemes that team members agreed were prevalent across all transcripts. Subsequently, the codebook went through numerous revisions as team members completed coding of all transcripts. During this time, team members continued to meet weekly to determine if new themes emerged, if themes collapsed, and/or if theme definitions remained accurate. This process led to a semi-final version of the codebook. To ensure trustworthiness and credibility, this codebook was circulated to the entire research team who individually evaluated to determine if it accurately represented the data. Any changes were systematically in-
corporated into the final codebook. In the final phase of data reduction, two team members (the first and second authors) divided the transcripts equally between them and independently coded a clean copy of each using the final codebook. After sorting and organizing the data, the research team reconstructed the data, interpreting patterns and themes.

Findings

The purpose of this study was to understand the perceptions of parents of children with and without disabilities at the six KDS about factors that facilitate trusting family-professional partnerships. During focus group discussions, participants recounted, often with great emotion, the nature of partnerships in their respective inclusive schools. Five themes emerged: (a) school culture of inclusion (b) positive administrative leadership, (c) attributes of positive partnerships, (d) opportunities for family involvement, and (e) positive outcomes for all students.

School Culture of Inclusion

School culture permeated focus group discussions. Participants’ most passionate comments often related to school culture and focused on guiding beliefs, values, attitudes, and expected and demonstrated behaviors of all school stakeholders. Participants in all groups frequently used the word “community” to describe the culture in their schools: “It’s [the school] a community itself. It’s very unique because . . . we all feel part of this school. It’s not like [only] our kids go to school here. We feel part of this school.” Parents offered various descriptors of the school’s community. One parent described it as follows:

This sense of community within the school is just absolutely crucial . . . that families feel welcomed and have an opportunity any day, any time to make a suggestion . . . that there is a place for children of all abilities and all disabilities and that being in the same place, to not only be able to be different but to be respected while you’re being different.

A significant factor in establishing this community was the perception that inclusion and equality pervaded the school:

I came from a traditional local school, [where] there’s a sense that you’re just a parent. . . . We all come to the table [at current school] as equal, as well as a parent, so you really demolish a sense of hierarchy here, and I think that makes a huge difference . . . [at] most traditional schools, there is a hierarchy, the gate closes.

Focus group participants described a ubiquitous and “seamless” culture of “acceptance” and “diversity,” which created a “welcoming and . . . supportive” atmosphere that felt like “family.” Participants emphasized the importance of all school staff maintaining the “mindset” and “the attitude . . . that everybody’s valued.” The positive school culture that developed from these globally accepted values related to dignity, openness, and acceptance, which resulted in families feeling a strong sense of belonging as valued members of their school communities. Thus, the school served as a unit of shared values and goals. These values and goals, in turn, positively influenced trust between all stakeholders (e.g., educators, students, families, school staff).

Families, students, and educators uniting to meet the needs of all stakeholders also contributed to the positive school culture. One participant commented: “We’ve just been operating as a community that’s completely supportive of each other . . . recognizing and identifying what our needs are and pursuing and getting those needs met.” Uniting to meet the needs of others and having individual needs met made participants feel as if they were valued members of their school community.

Inclusive practices also played a significant role in creating a sense of belonging for families and students. Providing an appropriate education to all students in general education classrooms prevented families of children with disabilities from feeling “like the odd man out,” “alone,” or “unappreciated,” as school staff met all student needs “as a community.” Further, numerous participants stated that their children (with and without disabilities) also felt like valued members of the school community because their needs were met alongside their peers in non-stigmatizing ways.
[The child] loves being at [school], and to me that’s a part of the inclusion of the support system that they have in place . . . but that’s what I would want as a parent in any school, is to have a student, who is [academically] behind, still want to go to school, I think that’s huge.

The commitment to meeting the needs of all students resulted in a shared emotional connection. A mother recalled a powerful demonstration of a teacher’s commitment to her son’s success:

Last year, my son could not read a word, and this year he’s reading chapter books, and when [teacher] comes up to you and is crying and is giving you a hug and saying, “Look how far he’s come,” you know they care about your child just as much as we care about our children. It’s just amazing how the teachers can care.

Finally, the majority of parents of children with disabilities told a transformative “before and after” story, with the “before” stories comparing the segregation and isolation experienced in schools their children previously attended to the “after” stories at their children’s current schools, which demonstrated radically opposite experiences at the schools. Illustrative phrases used in the “before stories” were “going to fight,” “super, super battle,” and “always a struggle” with multiple references to mediation and legal assistance. Alternatively, phrases used in the “after” stories were “they explained everything thoroughly,” “it was such a collaborative process,” and “IEPs are like a meeting just to say congratulations.” This is exemplified by one father who shared his “before story,” in which he described the incredible effort he took to prepare for his child’s IEP, marking the document with colored tags, and creating an Excel spreadsheet. He contrasted this experience with his “after story,” in which he was “actually taken off guard . . . literally” by the positive IEP experience:

In the past what I have done is I’ve taken the previous IEPs . . . I’m an engineer, so I’m . . . a little anal attentive . . . . These are all red tags, these all have to do with goals; blue tags have to do with services; this . . . has to do with [policy requirements] . . . I even have an Excel spreadsheet about all the things I would need and the reasons why and what page . . . I had my best and final offer all ready, in my mind I knew exactly what I was gonna go to mediation or not. But [when I got to the new inclusion school] it was always like okay, it was like, all the air went out of my sails. I was like, ‘What you said [about my child] . . . that sounds like you nailed it.’ So it’s been a very different experience for me . . . and . . . so very difficult for me to get out of the mode of adversarial . . . . We address . . . exactly what the kid needs as opposed to what the school can save money on.

These contrasts in school cultures clearly demonstrated the importance of a positive school culture that creates a sense of belonging and investment among all stakeholders in building trusting family-professional partnerships.

Positive Administrative Leadership

Positive administrative leadership, particularly by school principals, was a major theme among participants across all 11 focus groups. Parents attributed positive school culture and positive student and family outcomes to principals’ actions, attitudes, and other characteristics. Participants perceived that a strong school culture that supports trusting family-professional partnerships “starts with the administrator.” Participants discussed attributes of the principal that contributed to the success of the school, including (a) demonstrating strong, effective leadership; (b) being directly and actively involved; and (c) having great expectations.

Participants consistently noted the importance of the principal’s leadership. Many parents identified that an important component of strong, effective leadership was hiring and mentoring quality staff. One parent described a time when she and other parents worked with the principal to hire a new teacher:

We [the hiring team] had some candidates that were pretty good, we [parents on the team] said ‘oh, maybe let’s give her [one of the candidates] a chance to come in and do a demo lesson and [the principal] said ‘no. If they're not excellent, there’s no need to
go to the next step. We have plenty of candidates. I want teachers that excel. I don’t want ones that are [just] good enough. They need to be the best.

The significance of the principal creating a “more relaxed, welcoming environment” came up frequently in the discussion about effective leadership. Participants indicated that a welcoming environment was facilitated by the principal’s enthusiasm and caring, as exemplified by the principal greeting students by name and informally interacting with families. These interactions put parents at ease, making them feel “safe” and “good” about their child going to school. Further, several participants noted how a principal’s welcoming behavior positively influenced teacher behavior and morale. One participant described how the principal’s clear commitment to families, school staff, and student outcomes “attracts other people who are committed,” including staff and family leaders. A leadership style that is approachable, available, and responsive to all families exemplified this commitment.

Participants focused considerable discussion on principals’ direct and active involvement in day-to-day student issues. They perceived that this involvement facilitated trusting family-professional partnerships. Participants from several schools recounted circumstances when the principal swiftly and effectively addressed family concerns related to bullying, academics, behavior, and student-teacher relationships.

We had some issues with a bus and bullying, and [the principal] rode the bus . . . he went the route with them, and he talked to the kids. There were some kids that were older that went to the middle school. He went to the middle school and met with the principal and that student [who was bullying], and one morning he got on . . . and he addressed everyone, but [bullying] stopped. I mean it was just his involvement there.

Participants also communicated the importance of principals having great expectations for all students and sharing those expectations with family members. One mother described her first interaction with her son’s principal, as she entered the school with her son who uses a walker.

I’m a better parent because of [the principal]. . . . At other campuses, [I thought] ‘Oh isn’t that cute how the kids push him around [in his walker] . . .’ [the principal at current school] said . . . ‘[Your son’s] walker represents his legs. So the mission for [your son], is to walk in his walker, so we don’t push him around on campus.’ . . . I thought that is so respectful of my child.

Attributes of Positive Partnerships

Participants described the attributes of their partnerships with educators and other school staff, including (a) communication, (b) respect, (c) commitment, and (d) professional competence.

Communication. Across all focus groups, parents strongly emphasized the importance of communication to bridge the home-school gap and ensure student success. Their comments related to communication included: (a) modality, (b) reciprocity, (c) frequency, and (d) cultural sensitivity. Parent participants often stressed the importance of establishing the preferred mode of communication between themselves and their children’s teachers. They said that this exchange was often a first step in establishing on-going positive communication. Their preferred types of communication included oral communication (i.e., phone calls, in person talks before or after school, parent-teacher meetings) and written communication (i.e., home-school journals, emails, text messages, photographs, newsletters, and student plans). Participants also alluded to the importance of non-verbal communication, such as appearing to genuinely care for their children and enjoy their jobs: “People here seem to be happy to come to work . . . It’s not like ‘this day’s over, oh, thank God.’”

Participants readily identified the importance of reciprocity with educators in communicating student needs and successes and emphasized that communication is not a one-way activity:

I do have a say in what’s happening with my child and when he does something here, they let me know because we have to rein-
force it at home; or if he does something at home, we let the teachers know here, so it’s that communication . . . we work on things together.

Participants in all focus groups expressed the importance of frequent and informal communication. They often used words such as “seamless” and “streamlined” when talking about how frequent communication occurred at their child’s school. One participant remarked that communication was “not about [just] setting up a meeting.” Instead, families and school staff typically communicated continuously throughout the school week. The continuous and informal communication about where students have “struggled” or had “challenges” also benefited formal meetings such as IEP meetings because “there really are no surprises” when it came to discussing student data to evaluate and update the IEP.

A final topic related to communication was cultural sensitivity. Participants said that culturally sensitive communication was particularly important in situations in which families are from diverse racial/ethnic backgrounds, are new to the school, and/or speak a language other than English. A participant from the parent leader group described how her school community recognized cultural differences by creating a “warm welcome team” to initiate communication with families from diverse backgrounds:

We have a woman on the team who was Latino and she said sometimes in [her] culture they [Latino parents] don’t just jump in and help. They want to be asked to help, and so, with that feedback . . . we’ve created this warm welcome team where we started calling and had a group of people who would call families and say, “How’s it going? Is there anything that you need? How can we help?”

Respect. In nine of the 11 focus groups, participants discussed the importance of members of a partnership demonstrating respect through action and communication. Participants were especially emotional as they described how teachers and staff “value and appreciate” their children for who they are. One father’s statement exemplified this sentiment, “[My child] is appreciated and loved for who he is, not for what he isn’t . . . and he’s seen as a valued member of the community.” Participants indicated that professionals demonstrating empathy, sensitivity, compassion, and kindness toward students also helped build trusting partnerships with families. They especially appreciated that teachers were invested in all students and that they identified “strength[s] [in] all the kids . . . let[ting] them know what their strength is and encour-ag[ing] them in that strength.”

Teachers and staff also demonstrated respect by treating families as equal partners, especially by seeking out and respecting parental knowledge. A parent described how equality pervades at her child’s school: “We [parents] all come to the table as equal [with educators] . . . here I feel like, if you have something to bring to the table, it’s welcomed.”

The conversation was often lively and energized when parents talked about the fact that the teachers at their child’s school “don’t roll their eyes” when parents give suggestions. A parent commented on how it made her feel valued for “the teacher to listen to you and treat you like you have a brain and know what’s best for your child.” Participants frequently described teachers’ openness and willingness to ask for parental advice: “I feel like the teachers respect the parents whether or not they personally agree, I just feel like they put their personal stuff aside . . . .”

Participants stressed the importance of educators listening and acting upon what they heard parents saying. As one parent said, “Words are only as good as the actions you follow up with.” One mother of a student with disruptive behavior talked about sharing a strategy she found effective at home with a teacher, “I just happened to mention it to the teacher one day, and she said, ‘I’ll pay attention to that,’ and then she did that [the strategy] . . . and it made a difference.” As a result of being respected by educators, parents perceived themselves as valued partners in educational decision-making for their children, felt that their contributions and personal investments were valued, and that they made positive differences in the school community.

Commitment. Participants’ comments regarding commitment focused on members of the partnership sharing a sense of assurance
about partners’ loyalty to the child and family and school professionals sharing positive visions and goals for all children, including a common investment in student success.

I feel the teachers . . . extend themselves. They seem very committed and . . . when I go to my child’s classroom . . . they greet me, [and] they communicate how my son has been doing, so I feel very good. If something happens during the day, I get a call. . . . I really get a good sense of their commitment to all children.

Participants described how the educators in their children’s schools go “over and above” to meet the needs of students because “it’s not just a job to them.” For example, one mother described how her son’s teacher responded to her son setting off the fire alarm at school:

[His teacher] has gone above and beyond. . . . Just an example, one day . . . the fire alarm went off at the end of the day. Apparently, [my son] tripped the fire alarm. . . . I got a call like 30 minutes after I picked him up from school at the end of the day and they said, “Could you bring him up here [to the school]?” He wasn’t in trouble . . . [his teacher] had printed out a little story—because he’s good with Social Stories—to . . . help him to understand, and she typed up a little Social Story about fire alarms and what they do, and she walked him all around the school, and they played a game about we don’t touch the fire alarms. I mean this was after school, and I know she was tired . . . but she spent like 40 minutes with him, teaching him, and apparently he has not touched the fire alarms [since then].

Parents recounted, with great appreciation, circumstances when teachers demonstrated commitment by attending student sporting events outside of the school and providing behavioral and academic support at the students’ homes, including dropping off/picking up materials and equipment and going to community activities with families. A few participants also pointed to the fact that parental commitment impacted educators’ commitment. As one parent noted, “I think if the teachers recognize that you’re [the parent] committed and that you’re going to be there and your communication is open, I think they embrace that and they work with you a lot . . .”

Professional competence. School professionals’ expertise and proficiency in addressing students’ individual needs, willingness to learn new techniques, and acting proactively rather than reactively to students’ needs is the final attribute of trusting partnerships families identified. Participants discussed how teachers and other staff met student needs by crafting meaningful IEPs or other individualized strategies; met students at their current levels; and employed “outside of the box” strategies to address unique academic, behavioral, social, and emotional needs inside and outside of the school environment, sometimes adapting on the spot.

Participants also appreciated teachers addressing needs of children with disabilities as a part of the “normal flow of the class” so “the rest of the class is not gawking . . .” Participants reflected on the amount of dedication involved in learning how to address student needs: “I think that it’s taken a lot of training on these teachers’ part to make it look so simple, but they’re dedicated to it.” Participants also noted the importance of preparation and proactivity regarding services, supports, and transitions between grades and schools. One mother appreciated the time her daughter’s teachers invested in her transition to middle school: “Yesterday in preparation for middle school . . . we walked through the whole day just to see what possible . . . hurdles might come up . . . it was awesome, just absolutely awesome how proactive they are, and very personal.”

Opportunities for Family Involvement

Participants described two types of family involvement opportunities: families volunteering as school leaders and families volunteering to support the life of the school.

Families volunteering as school leaders. Participants highlighted leadership efforts related to policies, programs, systems, or other issues that they did independently, with other families, and/or alongside educators. The degree of family leadership efforts ranged from leadership at a district level to a school or classroom level. For example, some participants
discussed families contributing to grant proposals or legislation on behalf of the school, while others talked about leading Parent Teacher Organization (PTO) committees. A parent of a child with a disability described how her leadership in the school community guided her to becoming a community leader focused on increasing inclusive opportunities in her community:

. . . so parents who get the power [of leadership] here [at the school] go out with that power and say, “okay, let’s make this change too because we can’t just have one space [school] where our kids are included, they need to be included in everything [in the community].”

Family leaders also developed a number of strategies to encourage more parents to partner with the school so they become “more comfortable . . . showing up.” Some of these strategies included: (a) “recruit[ing] kindergarten parents” to get “new blood” in the volunteer circuit and prevent burnout; (b) providing multiple ways for parents to be involved in the school “because everybody has their own family, demands, and their own needs;” and (c) initiating one-on-one contact with parents [new to the school] and inviting them to participate in school activities or volunteer opportunities.

Families volunteering to support the life of the school. Participants also described volunteer efforts that supported the school to function successfully. These efforts often supported strategies to encourage family involvement. Family involvement in class and school volunteer activities included (a) assisting teachers in the classroom, (b) contacting parents and inviting them to help, and (c) answering new parents’ questions. Parents assisted teachers in multiple ways, including providing clerical assistance (e.g., helping the teacher make copies), leading small academic or social skills groups, attending field trips, volunteering at school events, and donating materials to the classroom. Participants encouraged family involvement by contacting other parents with a personal invitation to partner with the school.

A lot of parents won’t show up to volunteer unless they’re specifically asked. And I do that a lot, too. When you send an email out, I won’t respond. . . . But if you specifically ask me . . . “Can you do this?,” almost always I can say, “Yeah, sure, I can do that.”

Participants reached out to other families over the phone, through email, and in person at school and community events and by responding to the questions of new parents, especially questions related to inclusion.

Many group participants volunteered at the school in some capacity and nearly all described attending school events such as international nights, math nights, back-to-school events, and parent education nights (e.g., a guest speaker presenting reading strategies to parents). Participants universally enjoyed these activities, noting how these activities created feelings of community, pride, and excitement in their schools.

Positive Outcomes for All Students

The positive outcomes of inclusion for all students also emerged as a factor that influenced trusting family-professional partnerships. Several participants who did not have children with disabilities admitted feeling surprised and relieved that their children’s education was not impeded, but instead benefitted from students with disabilities being included in general education settings. All participants generally agreed that the additional staffing, which occurred in inclusive classrooms, globally benefited students because paraprofessionals and other specialized staff assisted all students. For example, several parents noted, “that children have opportunities for differentiated curriculum and instruction” in inclusive classrooms. Another parent noted how therapists providing services in the general education classroom benefited all students:

What’s wonderful I think, too, is that a lot of the . . . speech therapists and occupational therapists come into the classroom so all of our kids get the benefit of having them there. Like, if they see someone who . . . needs a little help with the way they’re holding their pencil or whatever the case may be, they’ll mention it to the teacher, so they’re [students without disabilities] also getting this benefit in the classroom as well.

Many parents also noticed that inclusive
practices at their schools increased acceptance of diversity and differences because it “teaches all the other students to accept people for who they are...” Participants also commented on the benefits of demystifying disability by educators talking candidly about all students’ strengths and needs.

Parents of children with disabilities commented on their satisfaction with notable improvements in their child’s academics, social skills, and behavior that they attributed to inclusive education. Several participants reported specific gains, including enhanced reading skills, improved self-monitoring skills, more friends, greater self-awareness, and increased self-confidence. Many participants also reported decreases in disruptive or aggressive behavior. Participants of children with disabilities commented about the benefit of their children participating in extra-curricular activities, such as baseball, alongside supportive peers who know their children from class. A number of social/emotional benefits for students with disabilities were noted, but for many parents the biggest benefit was the acceptance of their child by other students as contributing members of the school community.

This is the first time that my son really had friends. He gets invited to birthday parties... He has friends that he talks to. He’s good friends with [child], and it’s just like a whole new world for him. He loves [his school].

Discussion

The purpose of this study was to understand the perceptions of parents of children with and without disabilities regarding factors that facilitate trusting family-professional partnerships at six KDS identified by The SWIFT Center for at least one exemplary inclusion practice. Our findings indicate that multiple factors contribute to trusting partnerships: (a) school culture of inclusion, (b) positive administrative leadership, (c) attributes of positive partnerships, (d) opportunities for family involvement, and (e) positive outcomes for all students.

The themes in this manuscript are highly interrelated and influence one another. We learned that a strong school culture that supports a sense of belonging in a school community, where everyone is “on board,” enabled trusting partnerships to flourish. Thus, a school culture of belonging and inclusion emerged as an overarching theme. The remaining themes of (a) administrative leadership, (b) attributes of positive partnerships, (c) opportunities for family involvement, and (d) positive outcomes for all students, formed and sustained a positive school culture, that, in turn, became the sustaining life force of the school, directly and powerfully influencing trusting family partnerships—including a strong sense of shared responsibility for student outcomes and for the life of the school. Participants across all 11 focus groups discussed administrative leadership often and with a great degree of passion in terms of the element that most directly influenced school culture.

Strong administrative leadership profoundly contributed to school culture and the other themes in this study. Participants across all focus groups uniformly noted that school principals who were friendly, involved, and focused on positive student outcomes influenced school culture and established trust and involvement among families. While describing their relationships with school professionals (especially school principals), participants highlighted numerous examples of trust, including those related to benevolence, honesty, openness, reliability, and competence (Tschannen-Moran, 2014). Participants identified that they had the sense that administrators really cared for their children as unique individuals, exemplifying benevolence and a dedication to positive outcomes for all students, including those with disabilities. Participants also emphasized how principals honestly and openly shared information and power, including creating opportunities for parents to assume leadership roles at the school. Participants repeatedly expressed the importance of trusting the competence of school professionals, indicating that principals selectively hiring quality teachers contributed to their perceptions of competence. Participants also emphasized the importance of school principals taking specific steps to foster trust among all stakeholders, such as setting high expectations for all students and creating
a “welcoming” atmosphere by frequently engaging in positive interactions with students, families, and faculty.

Many of our findings reflect recent literature on family partnerships with school staff. For example, researchers cite the importance of (a) trust (Tschannen-Moran, 2014); (b) administrative leadership style on school culture and partnerships (Auerbach, 2010; Tschannen-Moran, 2001, 2014), (c) attributes of positive partnerships between teachers and families (Blue-Banning et al., 2004; Tschannen-Moran, 2001), (d) parental involvement at school (Epstein 2001; Haines et al., 2013), and (e) the beneficial outcomes of inclusion for students with and without disabilities (Dessemontet, Bless, & Morin, 2012; Kalambouka, Farrell, & Dyson, 2007). Our findings also align with literature on the importance of positive school culture on partnerships and teacher, family, and student outcomes (Hoy, 2012; Rose, Espelage, Monda-Amaya, Shogren, & Aragon, 2013; Thapa, Cohen, Guffey, & Higgins-D’Alessandro, 2013).

This study is notable, however, because it reports (a) data from six schools across the nation recognized for excellence in inclusive education practices and (b) the perspectives of parents of children with and without disabilities and with varied levels of school engagement. These diverse perspectives are especially relevant considering our themes cut across all focus groups, establishing their crucial importance to building trusting family-professional partnerships and generalizability across schools and families. Further, we illuminated several key findings.

First, in order for trusting family-professional partnerships to occur, the culture of a school had to promote a sense of belonging and membership for all stakeholders, including school professionals, students, and families. Our analysis also made it clear that school administrators, namely principals, were essential in creating a culture of trust and community. The energy level and emotions of participants notably increased when discussing school principals and the culture of the school. Focus group participants frequently would finish each other’s sentences, emphatically agreeing that the sense of belonging established by the principal and embodied by the staff, students, and families from the school was what made their schools special.

Second, parents served as a conduit and key facilitators for recruiting other families to volunteer as family leaders or contribute to the life of the school. Actively involved families recruiting others is likely successful because new families may find it easier or less intimidating talking to other parents. Further, a personal invitation by a fellow parent may increase the sense of belonging in the school community, which may promote investment in the school and a level of comfort if the parent is new to family involvement.

Third, inclusive practices had a positive influence on trusting family-professional partnerships. Focus group participants universally were pleased with the academic, social, emotional, and behavioral progression of their children and appeared to take great pride in the fact that their schools practiced inclusion. Parental satisfaction that all students, including their own children, were full “members” of the school increased trust and their own motivation to partner with educators and extend inclusion into the community.

Limitations

The primary limitation in this study relates to the participant selection process. Purposeful selection of focus group participants enables researchers to appropriately represent the perspectives of stakeholders (Maxwell, 2005). As discussed in the methods section, we provided the six schools with a set of desired criteria for selecting focus group participants. This process limited our ability to control the purposeful selection of participants. Further, we conducted focus groups in only one middle school, which limits our ability to compare and contrast the perspectives of parents of elementary and middle school students. Last, our commitment to protecting participant confidentiality prevented us from reporting specific demographic information. Despite these limitations, this study has numerous implications for future research and technical assistance for schools implementing school-wide inclusive transformation.
Implications

Future research should address the limitations we identified in this study. For example, future researchers should seek to purposely or randomly select participants to achieve a representative sample of families from schools. This process, in conjunction with reporting specific demographic information (e.g., race/ethnicity, socioeconomic status) would likely mitigate possible issues related to the generalizability of findings.

A second important direction for future research is to analyze and compare the perspectives of various participant groups from inclusive and non-inclusive schools. These groups should include parents from backgrounds characterized by racial/ethnic and socioeconomic diversity as well as perspectives of teachers, administrators, students, parents, and other caregivers who have experienced dissatisfaction with school services and distrust of educators. These diverse perspectives are especially important given the number of barriers that many families have experienced related to trusting family partnerships (Auerbach, 2010; Kalyanpur & Harry, 2012). Future research should also consider exploring the perspectives of family members, teachers, and students in grades 7 to 12 to compare them to the findings of this study, which focused primarily on elementary grades. A longitudinal study, following a number of family and student participants from elementary through high school to see how partnerships evolve and change over time, would be especially insightful. Finally, future researchers should further explore specific strategies that educators and families with high levels of trusting partnerships use to facilitate strong trusting partnerships and school culture.

Participants overwhelmingly cited school principals as a major source of trusting partnerships. Future research should examine specific strategies that principals and other school administrators (e.g., superintendents) use to build trust and a strong community culture, including steps to overcome barriers, increase staff buy-in, facilitate shared decision-making, and build relationships with “hard to reach” families. Similarly, future research should explore the perspectives of teachers, school staff, and students to determine the effective strategies for building trusting family-professional partnerships.

Finally, the findings of this study also have numerous implications for technical assistance (TA) related to building trusting family-professional partnerships. For example, information about the influential factors identified in this study could be used to inform the ways in which (a) TA providers examine school and district policies, programs, practices and operations to identify strengths and areas of opportunity (Sailor, McCart, McSheehan, Mitchiner, & Quirk, 2014), (b) provide individualized TA supports to schools and districts, and (c) evaluate the effectiveness of TA efforts. The findings from this study also provide critical indicators that can serve as the basis of developing tools and professional development modules, which address the most effective and efficient methods of enhancing trusting family-professional partnerships during the inclusive transformation process.

Conclusion

The purpose of this study was to improve our understanding of parent perspectives about the influencing factors that facilitate trusting family-professional partnerships in schools recognized for inclusive practices. We identified five major themes, all of which are highly interrelated and influence one another. However, the theme of positive school culture that promotes a sense of belonging among all stakeholders emerged as the overarching, influential factor in facilitating trusting family-professional partnerships between families and school staff. Participants indicated that school principals were the driving force behind that school culture, which principals achieved by (a) demonstrating strong, effective leadership; (b) being directly and actively involved; and (d) having great expectations.

References


Blue-Banning, M., Summers, J. A., Nelson, L. L., &


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Abstract: Despite encouraging changes in the expectations of programming for persons with moderate to severe intellectual disability (MSD), data suggest that programs for these individuals are still lacking in several critical areas. Building administrators play a key role in promoting high quality programs for students with MSD within local schools but may have little specialized knowledge in this area. The authors outline five essential features of quality educational programs for this population and provide a framework upon which building administrators can assess and support local programs.

A Call for Change

Since the passing of Public Law 94–142, the Education for All Handicapped Children Act (1975), researchers, practitioners, and parents have worked diligently with the intent to establish effective programs for educating students with moderate and severe intellectual disability (MSD). Early advocates challenged restrictive developmental models and segregationist practices by introducing landmark concepts such as the provision of access to age-appropriate functional curriculum (Brown et al. 1979; Brown, Nietupski, & Hamre-Nietupski, 1976), education alongside peers without disabilities (Brinker & Thorpe, 1984), and the criterion of the least dangerous assumption (i.e., the assumption that poor student performance is due to poor instruction, not student deficits; Donnellan, 1984). Accordingly, legislation was enacted that not only forged these ideas into the fabric of special education policy but through iterative reauthorizations, shaped these ideas into new paradigms for instructional practice.

The research and disability communities have embraced many of these changes with optimism, but a few have sparked debate concerning their impact on outcomes for individuals with disabilities. For example, recent discourse has revolved around legislation directing the assessment of grade level core content for all students and its potential impact on instructional curriculum for students with MSD (Ayres, Lowrey, Douglas, & Sievers, 2011; Courtade, Spooner, Browder, & Jimenez, 2012). This discourse and others are likely to be in part perpetuated by advocates’ competing views of education as policy shifts in the absence of relevant outcome data. These disagreements contribute greatly to the analysis and refinement of our field, but they also may reflect a broader lack of consensus as to the core features of educational programming for persons with MSD.

Recent data suggest that despite these major evolutionary shifts in programming, outcomes for persons with MSD are still less than desirable. For example, students with MSD have minimal contact with their same age peers without disabilities and are at high risk for social isolation in and out of the school.
environment (Siperstein, Parker, Bardon, & Widaman, 2007; Smith, 2007). This isolation may be exacerbated by motor, social, and communication deficits associated with MSD and their teachers’ lack of training in communication instruction and the use of assistive technology (Zascavage & Keefe, 2004). Even more disheartening are data that suggest that many educators continue to respond to challenging behavior, often the only means of communication for some students with MSD, by using restraints, seclusion, or aversive treatment procedures (Westling, Trader, Smith, & Marshall, 2010).

Several researchers have suggested that students with MSD do not fair better in postsecondary environments. This is not surprising as Grigal, Hart, and Migliore (2011) found that transition planning for students with MSD reflected lower expectations for competitive employment and opportunities for post-secondary education than students with other disabilities. Persons with intellectual disability (ID) are three to four times less likely to be employed than their peers without disabilities and are most often employed in segregated settings (Verdonschot, De Witte, Reichrath, Buntix, & Curfs, 2009). They have fewer opportunities to engage in community groups and report having an average social network of three people, including a professional service staff member. This isolation may put individuals with MSD at an increased risk for maltreatment (e.g., sexual abuse, theft, neglect) over persons without disabilities (Horner-Johnson & Drum, 2006).

The recent adoption of implementation science by advocates and researchers in special education (Fixsen & Blase, 2009; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Odom, 2009) offers promise in mobilizing stakeholders towards improving quality of life outcomes (QOL) for individuals with MSD and has challenged current practices in moving the needle towards broader systemic change in special education. Researchers have acknowledged the failures of what once was perceived as low hanging fruit (e.g., research literature reviews, one-shot training workshops) to improve programs for individuals with disabilities (Odom, 2009). Scaling up of high quality programming involves multiple steps including (a) ensuring a fit between practices and school needs, (b) promoting a practice as a priority among stakeholders, (c) ensuring fidelity of implementation, (d) integrating practices into daily school operations, and (e) using data for continuous decision-making (McIntosh, Filter, Ryan, & Sugai, 2010). This approach has been effective in scaling up practices targeted at students with other disabilities (e.g., Classwide Peer Tutoring [CWPT], Peer Assisted Learning Strategies [PALS], Schoolwide Positive Behavior Supports [SWPBS]; Klingner, Boardman, & McMaster, 2013) and potentially may be a game changer for improving the quality of educational services for students with MSD. Unfortunately, the protracted nature of the “scaling-up” process suggests that many students with MSD must wait for the quality programming they deserve.

We purport that building administrators (i.e., principals, counselors, program coordinators) are uniquely positioned to impact individual programs for students with MSD while broader implementation initiatives are set in motion. These skilled professionals are within arm’s reach of existing programs, and may serve as drivers within system change initiatives, especially in the promotion of practices. Unfortunately, many have limited knowledge or experience with students with MSD and may be poorly equipped to accurately evaluate the quality of daily programming for these students (Pazey & Cole, 2013; Sirotnik & Kimball; 1994). For example, Wakeman, Browder, Flowers, and Ahlgrim-Delzell (2006) found that secondary principals reported having fundamental knowledge in special education (i.e., legislation, inclusion), but had limited understanding of concepts germane to daily practice (i.e., functional behavior assessment, universal design). This lack of specific programming knowledge may prevent administrators from identifying programs in need of assistance and in interpreting teacher evaluation systems in the context of MSD programs.

The purpose of this paper is to present a set of basic tenets or “essential program features” for use by building administrators in the promotion of quality educational programs for students with MSD. These basic features, though clearly not exhaustive, are rooted in both advocacy and educational research and include (a) the provision of a safe and respect-
ful environment, (b) an instructional focus on communicative competence, (c) instruction across a broad and age-appropriate curriculum, (d) the intensive delivery of explicit and systematic instruction, and (e) the ongoing evaluation of practice. We selected these features because of their potentially pervasive and far reaching impact on the QOL of learners with MSD. We propose that wholesale adoption of these features as “essential” by those in supervisory positions may help communicate a common expectation for those charged with the education of individuals with MSD and help to ensure that students are at minimum benefiting from nearly half a century of educational progress.

Safe and Respectful Environment

At the most basic level, all individuals are equal in dignity and are entitled to human and civil rights (United Nations, n.d.). Unfortunately, the exercise and protection of the rights of people with MSD have been unfulfilled as history has provided multiple examples of mistreatment, isolation, segregation, subhuman living conditions, abuse, and discrimination (Griffiths et al., 2003; Horner-Johnson & Drum, 2006; Ward & Stewart, 2008). The American Association on Intellectual and Developmental Disabilities (AAIDD; 2009) has issued a position statement on human and civil rights that states, “The human and civil rights of all people with intellectual and/or developmental disabilities must be honored protected, communicated, enforced, and thus be central to all advocacy on their behalf” (para. 1). Therefore, an essential feature of education for students with MSD in our nation’s schools must be access to basic human rights afforded in a safe and respectful educational environment. Components of safe educational environments are those that promote dignity; allow for self-advocacy and self-determination; are free from physical pain, seclusion, and restraint; and offer programs that are inclusive—allowing access to the same settings and activities in which all students participate.

Personal Dignity

Schools must provide environments in which students are treated with dignity. In interactions with students, administrators should observe that professionals maintain calm demeanors, and use tones of voice and facial expressions that are free of sarcasm or ridicule. Professionals should refrain from speaking in front of students as if they are not present, or speaking about confidential or private topics concerning the student in the presence of others who may overhear. The privacy of students must be protected especially when students require assistance with personal care needs. For example, if a student requires a diaper change or assistance with toileting, these should be done in private and out of view of others who may be in the environment.

Self-determination and Self-advocacy

To provide safe and respectful environments, opportunities for students to self-determine and self-advocate are critical. Students who are self-advocates and are self-determined can act as the “primary causal agent” to maintain or improve their own QOL (Wehmeyer, 2005, p. 117). Professionals create a classroom climate of respect and dignity when students have control over what happens to them, and when professionals respect and honor those choices and decisions (Powers et al., 2007). Individuals with MSD, in particular, have difficulty exerting control over their environment because they may not have the verbal or language skills to make their choices known, and they specifically need to be taught how to express their choices and opinions. Administrators should observe professionals directly teaching students how to make choices, set goals, work toward those goals, express their preferences, refuse what they do not want, and ask for or refuse assistance (Browder, Wood, Test, Karvonen, & Algozzine, 2001; Jones, 2006; Mason, Field, & Sawilosky, 2004; Wehmeyer & Mithaug, 2006). By directly teaching these skills and respecting the personal choices of their students, professionals create environments where all individuals, regardless of their ability level, can have an effect on, and make meaningful decisions about their own lives.
A safe educational environment is one in which individuals are free from pain or fear. Unfortunately, recent data indicate that restraint, seclusion, and aversive procedures are often used in educational environments with students with disabilities. Westling et al. (2010) surveyed a nonrandom sample of over 1200 parents of children with disabilities. They found that 64.7% of the parents reported their child had been restrained, secluded, or subjected to aversive procedures by school personnel; and the majority (72.2%) had not authorized the procedure. When asked what occurred as a result of the procedures, 92.2% indicated their child experienced emotional trauma, and 42.2% reported their child had physical injury. Ryan and Peterson (2004) found in a review of the literature, that restraints were commonly used in public school settings and that professionals considered restraints acceptable for severe behaviors (e.g., self-injury, aggression), but also indicated that restraints were used for less serious behaviors (e.g., property damage, leaving the classroom). Individuals with MSD may engage in inappropriate, maladaptive, and self-injurious behaviors that increase the chance that they may encounter professionals who may use aversive procedures to manage these behaviors (Matson & Taras, 1989). Since these data have come to the forefront, the U.S. Congress has pending legislation to monitor and limit the use of inappropriate restraint and seclusion in schools (H.R. 4247, S. 2860; Alliance to Prevent Restraint, Aversive Interventions and Seclusion; APRAIS, 2011).

Administrators should ensure that district policies have been developed and verify that professionals who are teaching students with challenging behaviors follow those policies for when, and if appropriate seclusion or restraint procedures may be used. If such procedures are deemed appropriate for individual students, administrators must ensure that professionals have obtained appropriate training. All students with challenging behaviors must have behavior intervention plans in place in which the focus is on positive behavior supports. That is, students should have individualized plans that have been designed based on an analysis of the function of the behavior, that emphasize teaching appropriate replacement behaviors, that modify the environment to decrease the probability of the occurrence of the behaviors, and that focus on long-term maintenance of appropriate behaviors (APRAIS, 2011; Carr et al., 2002).

The Individuals with Disabilities Education Improvement Act (IDEA, 2004) requires that students be educated in the least restrictive environment and participate with peers without disabilities in academics, extracurricular activities, and other nonacademic activities. Such inclusionary activities have been shown to benefit students both educationally (Downing, Spencer, & Cavallaro, 2004) and socially (Fisher & Meyer, 2002). To deny students access to activities involving peers without disabilities denies them the right to participate in the full range of activities afforded to other individuals in the school and perpetuates the philosophy that students with disabilities should be sheltered, protected, and kept separate from the general population (Donnell & Hardman, 1989). Additionally, students are denied the opportunity to develop friendships if they are never provided the opportunity to be in proximity of other students without disabilities (Carter & Hughes, 2005). Today, administrators should observe that students with MSD are participating in academic instruction alongside students without disabilities in general education classrooms to the extent determined appropriate by the students’ individualized education program (IEP) teams. In addition, professionals should ensure their students have many social opportunities with their peers without disabilities by including them in inclusive extracurricular activities, having students ride the same school buses, having them eat alongside their peers in the same lunch periods, and explicitly teaching social interaction skills. This will require that administrators provide opportunities for general and special educators to work collaboratively to co-plan and have collaborative partnerships.
Instructional Focus on Communicative Competence

An individual’s level of communicative competence can be defined as their existing repertoire of skills used to affect the environment through interactions with others. This repertoire rests at the core of an individual’s QOL as it impacts one’s ability to indicate preferences, access reinforcers, avoid aversive stimuli, maintain social relationships, demonstrate knowledge, and access integrated community and employment settings. Though the research literature suggests that individuals with MSD often face considerable challenges in effective communication, there appears to be a consensus that most individuals with MSD can acquire a functional communicative repertoire (Snell, Chen, & Hoover, 2006). Several reviews of research literature demonstrate the potential benefits of communication intervention for students with MSD implemented by a range of professionals (e.g., Goldstein, 2002; Snell et al., 2006). Collectively, these reviews reflect several clear components of communication instruction for students with MSD that should be evidenced upon observation in educational settings.

Means and Opportunities to Communicate

First, all students must be provided opportunities to communicate and observe the effects of their communication on their environment. Administrators should observe that every student has a specified communication system (e.g., vocal, sign, pictures), access to that system at all times (Sigafoos, O'Reilly, Seely-York, & Edrisinha, 2004), and that it is used to respond during instructional activities. Additionally, for communicative interactions to be effective, they must occur within a responsive environment. That is, educators and peers with and without disabilities should be observed frequently responding to and honoring the conventional and potential communicative responses of the students in their classrooms (Kent-Walsh & McNaughton, 2005). For example, a student with MSD who does not have a conventional mode of communication may express their refusal to participate in a task by pushing away materials and turning their head. Given that this is the student’s current means of communication, administrators should see that teachers honor this communication attempt by stopping or changing the activity, while at the same time providing instruction on developing more conventional means of communication (e.g., saying “stop”, pointing to an “I don’t want to do this” picture, signing “Stop please”). It is important to note that a breach of either of these basic communication tenets is conceptually congruent with the application of restraint as it severely limits an individual’s access to instruction, reinforcement and ultimately freedom or control over their environment.

Explicit Communication Instruction

Second, administrators should observe the delivery of explicit communication instruction involving the use of systematic prompting procedures, programmed delivery of reinforcement, and ongoing data collection (Chiang & Carter, 2008). Students will not likely acquire a sufficient communicative repertoire through observational learning alone (i.e., watching others) and should be engaged in programmed instructional opportunities throughout the entire day. Teachers should avoid the trappings of scheduling daily communication sessions around a single activity (e.g., snack time, speech-language therapy) and should ensure that instruction occurs across multiple communicative partners and naturalistic contexts. This will require that administrators ensure that teachers and speech-language pathologists have the time to work together to plan and implement communication instruction that occurs within the context of ongoing activities that occur all throughout the student’s daily schedule.

Ongoing Communication Instruction

Finally, data suggest that students with MSD benefit from communication instruction across the lifespan (Millar, Light, & Schlosser, 2006). Educators should provide longitudinal programming to promote the refinement and generalization of critical communication skills. For example, a young child with autism spectrum disorder may be taught to request items within his immediate environment, but longitudinal programming will help the child to improve the quality and complexity of
those responses, identify appropriate environments in which to make requests, and to make requests for novel items. Programmatic continuity in communication instruction at minimum should be evidenced by the inclusion of communication goals on each student’s IEP despite the student’s age and evidence of planning for communicative competence in postsecondary environments. Administrators should expect that teachers address communication deficits in the IEPs of their students, and that communication is a priority for all students.

Instruction across a Broad and Age-Appropriate Curriculum

Federal legislation (IDEA, 2004; No Child Left Behind, 2001) over the past decades has led to the requirements that all students have access to and show progress in the general education curriculum. These requirements have caused debate in the field of special education over the appropriateness of teaching core content standards to students with MSD (e.g., Ayres et al., 2011; Courtade et al., 2012). We support the view that there must be a balance between the instruction of grade level core content and other skill domains (e.g., self-help, communication, social skills) to develop the repertoire necessary for independence and a high QOL in all potential future environments (Hunt, McDonnell, & Crockett, 2012). In order to find that balance, it is important for administrators to support thoughtful IEP development.

Fostering Balanced Instruction through IEPs

The intent of an IEP is to outline an appropriate education for students with disabilities through individualized special education services (Turnbull, Turnbull, Wehmeyer, & Shogren, 2012). In order to ensure that students with MSD receive instruction across a broad and age-appropriate curriculum, IEP teams will need to develop goals and objectives that develop both age-appropriate academic knowledge and life skills. Administrators serving as local education agency (LEA) representatives must understand the general process through which appropriate goals are developed and support teachers in the planning and delivery of instruction to meet those goals. Although this charge may be difficult, there are frameworks to guide teams to develop relevant, appropriate IEPs that address a broad curriculum.

Hunt et al. (2012) recommended the use of an ecological framework to develop IEPs that reflect a balance between QOL outcomes and standards-based academic progress for students with MSD. They incorporated Brown et al.’s (1979) ecological framework and recent advances towards standards based goals in designing a “process for developing and teaching standards-based goals that reflect meaningful knowledge and skills, individualization, and application to everyday life” (p. 142). The process can help guide educators and families to create high quality IEPs and include both QOL and academic goal areas. The process is arranged into six steps and can be evidenced by teachers’ (a) use of family and student centered assessment activities, (b) identification of priority grade level content standards, (c) identification of the critical function of each standard, (d) identification of meaningful outcomes that reflect QOL goal areas and a current mode of communication, (e) generation of quality IEP goals and objectives to address the performance outcomes, and (f) instruction of skills within meaningful activities that are personally relevant to the student.

Furthermore, this balance should be evidenced across instructional contexts. Although IDEA (1997, 2004) emphasizes that students with disabilities be educated with their general education peers, in 2007, only 16.4% of students with intellectual disability spent 80% or more of their day in general education classrooms, while 48.8% of student with intellectual disability spent less than 40% of their day in general education classrooms (please note this percentage includes students labeled with mild intellectual disability; U.S. Department of Education, 2012). With a large percentage of students with MSD educated outside of general education classrooms, educators must consider how the context of teaching affects the ability of students to acquire academic content and social skills and overall, meet the mandate of access to the general curriculum (Ryndak, Moore, Orlando, & Delano, 2008–2009). Additionally, teachers must determine how students will access life skills.
components of the curriculum in general education contexts.

Though considerably complex, we suggest that balanced programs can and do exist. Administrators can identify such programs by their rich collaborations between general and special education staff, the frequent use of accommodations and modifications to ensure that students with and without disabilities engage in corresponding instructional activities, and instruction on critical life skills that occur across all instructional settings and personnel. For example, if a middle school student with MSD is in an English Language Arts class in which students are reading a classic novel, the administrator should observe that the student has access to the same book as his peers. The administrator should observe that the book has been modified to serve the student’s needs (e.g., rewritten with reduced complexity and length, supported with pictures or graphics) and that the teacher provides the student with modified ways to demonstrate his/her understanding of the book. In addition, the administrator should observe teachers providing instruction in skills that are immediately useful and frequently demanded for the student (e.g., caring for basic self-care needs, increasing independence in adaptive behavior skills).

Explicit and Systematic Instruction

Decades of research suggest that the use of systematic instruction is highly effective in teaching a variety of skills to individuals with MSD. Systematic instruction is a defined, replicable process which reflects currently accepted “best” practices; uses progress monitoring data to make instructional decisions; and includes acquisition, proficiency, maintenance, and generalization learning (Snell & Zirpoli, 1987). When executed correctly, systematic instruction includes the identification of measureable learning objectives, the delivery of high rates of reinforcement, the use of instructive feedback, and continuous data collection. Several core instructional strategies have been established in the research literature as evidence-based and should be a part daily instruction. These strategies include (a) response prompting (e.g., time delay, system of least prompts, most to least prompting; Collins, 2012; Wolery, Ault, & Doyle, 1992), (b) stimulus shaping and fading (Wolf, Risley, & Mees, 1964), (c) multiple exemplar and general case programming (Sprague & Horner, 1984), (d) video modeling (Bellini & Akullian, 2007), and (e) the use of peer supports (Carter & Hughes, 2005). This set of research-based strategies is not exhaustive and will certainly evolve as new data emerge. Administrators can support educators by having them self-assess or having peer coaches assess their competency in the implementation of these core strategies and then providing access to district level or peer coaches or professional development to refine their skills. This investment in time and resource is essential to the development of high quality educational programming.

Intensity of Delivery

The use of research-based systematic instructional procedures is not sufficient to ensure high quality instruction for students with MSD. Educational professionals also must program for intensity. Data suggest that the number of opportunities to respond (OTR) is one of the strongest correlates with student progress (Brophy & Good, 1986). As aforementioned, administrators should expect that students are actively engaged in instruction for almost the entirety of their instructional day.
Teachers should carefully consider the potential adverse effects of using practices that may decrease instructional time (e.g., time out, unstructured down time or periods in sensory rooms). They also should identify targeted skills that can be taught during traditionally less structured activities (e.g., recess, lunch, transitions).

The provision of an intensive and systematic instructional program is likely not possible without the support of a collaborative educational team. Furthermore, we suggest that teams use a transdisciplinary approach (Downing & Bailey, 2010) to deliver instruction. In this approach, professionals share their expertise so that all members are “cross trained” to deliver necessary instruction. Educational teams should include a range of critical personnel (e.g., parents, related service professionals, paraprofessionals) but also include general education staff. Administrators can assist in developing a school culture in which the general education staff members are supported to move beyond token members of an IEP team, and contribute to daily programming as content experts. Their active participation will likely result in higher quality academic instruction and smoother transitions to general education contexts. Their input also may help special educators identify age-appropriate and naturalistic supports.

Ongoing Evaluation of Practice

Finally, we purport that students are entitled to programs that involve continuous evaluation at two levels. At the first level, educational professionals select those procedures for use with students that have been demonstrated to be effective through high quality research endeavors. At a second level, educators assess students regularly, evaluate the resulting data, and make changes to their instruction based on their analysis.

The recent emphasis on evidence-based practices in special education has cast a light on the selection of interventions for use with students with MSD. Unfortunately, it also has illuminated the limitations of the research literature in interventions for this unique population. For example, though researchers have worked tirelessly to establish several evidence-based procedures (e.g., response prompting, picture-based communication systems), the application of these practices to the new and increasingly complex skills required by changing academic, vocational, and social contexts remain generally untested. Administrators should observe that teachers select evidence-based practices for students when they are available. These practices should be supported by multiple high quality research studies conducted with participants with similar characteristics (Gersten et al., 2005, Horner et al., 2005). Several resources exist to assist administrators and teachers in the identification and selection of evidence-based practices to use with their students (e.g., The National Professional Development Center on Autism Spectrum Disorders [http://autismpdc.fpg.unc.edu/]; The National Secondary Transition Technical Assistance Center [http://nsttac.org/content/evidence-based-practices]; What Works Clearinghouse [http://ies.ed.gov/ncee/wwc/]). When evidence-based practices are not available for a particular instructional context, teachers must select practices with an increased probability that they will be effective. Teachers may consider selecting interventions based on the following research criteria: (a) Has the practice been effective in teaching similar skills to students without MSD? (b) Has the practice been effective in teaching other skills to students with MSD? or (c) Is the practice conceptually congruent with established instructional/behavioral principles or practices (e.g., reinforcement, stimulus control procedures)? Despite the evidence supporting the selection of a practice, students can be safeguarded from exposure to ineffective instruction, through the regular collection and evaluation of progress data.

The use of established teaching strategies alone will not result in positive student outcomes. Building level administrators should observe teachers and support staff regularly collecting, displaying, reporting, and evaluating data on student performance. Continuous data collection affords many advantages (e.g., accountability, identification of learning patterns, communication to stakeholders) that are key in ensuring high quality instruction for this unique population. In addition, the frequent monitoring of student progress may prevent the continued exposure of students to ineffective or inefficient practices. The poten-
tial curriculum for students with MSD is vast and teachers will require every moment to help their students acquire and generalize new skills. Finally, continuous access to progress data may serve to reinforce the use of effective practices by teachers. We posit that in the absence of student data, teachers may use teaching strategies based on less desirable variables (e.g., effort, suggestions from peers or parents not based on research, advertisements from vendors). Continuous access to student data should potentially ensure that only the most viable practices are maintained within classrooms and the ineffective and even fad interventions would gradually fade away.

How Can Administrators Use the Essential Features to Promote Quality Programming for Students with MSD?

The quality of educational programs for students with MSD is likely impacted by multiple mediating factors (e.g., preservice training, peer groups, resources, school culture). We purport that despite the presence of these complex barriers, building level administrators can impact programs for this unique and often underserved population of students. First, principals play a critical role in the design of school culture (Hallinger, 2010) and may lay essential groundwork for change through establishing and maintaining high expectations for their students with MSD and their teachers. Through an increased awareness of expected program features for students with MSD, they can identify areas of weaknesses, respond to infractions, and help engage staff in discourse concerning ways to promote all students’ dignity and self-determination. Though the current paper may help administrators understand the “what” and “why” of essential program features, further assistance may be required in “how” to assess programs. One way to evaluate programming against essential programs features is to compare existing programs against a quality indicator checklist. Researchers have developed several checklists that are consistent with our proposed tenets. For example, Cushing, Carter, Clark, Wallace, and Kennedy (2009) developed the Program Quality Measurement Tool (PQMT) to evaluate inclusive educational practices for students with severe disability. The tool is comprised of 44 indicators that are ranked using 5-point Likert scale. Similarly, Calculator and Black (2009) developed an inventory of best practices for students using AAC devices in general education classrooms. This extensive 91-item inventory includes a range of items related to climate, programming, and collaboration. Finally, Ruble, McGrew, Dalrymple, and Jung (2010) created a checklist to evaluate the quality of IEPs for students with ASD. They compared IEPs against 21 items that included items related to functional communication, alignment with state academic standards, and functional behavior assessment. Though some states and local districts may develop their own quality program indicators, administrators can use these research-validated instruments to enhance their understanding of programming and may offer these tools to their teaching staff for use in self-assessment and program guidance.

Second, administrators with knowledge of programming for students with MSD may be able to allocate resources that are more closely aligned with staff needs. In the example above, the administrator may identify specialized training in data collection or pair a struggling teacher with an experienced peer to coach or mentor him through the process. In the absence of data on specific teacher programs, principals may be left to make arbitrary decisions concerning the provision of professional development and the allocation of fiscal resources.

Finally, these essential features may be used to assess the quality of applicants for teaching positions in MSD. Recent data suggest that there are national teacher shortages in the area of MSD (U.S. Department of Education, 2013). As a result, principals may be faced with a limited number of qualified applicants. Administrators with an increased knowledge of MSD programming will have a reduced risk of hiring teachers without the skills to establish a strong MSD program. In Table 1, we offer a list of potential questions that might be asked of new applicants for an MSD position.

Final Thoughts

The field of special education for students with MSD is rich with advocacy, expectations, and evolving practices, but we have yet to see
the comprehensive change envisioned by our earliest pioneers. Our students still remain frequently segregated from their peers, often subjected to contraindicated behavior management practices, and leave schools with minimal opportunities to lead self-determined lives. In this paper, we have described a subset of practices and deemed them as essential to be used by principals to assess the quality of programs for students with MSD under their supervision. We acknowledge that this list reflects only a portion of what is needed to ensure the best outcomes for individuals with MSD, and that the practices therein are not grand innovations. We do suggest, however, that the adoption of these essential features as "non negotiables" by every single practitioner, building administrator, and school district, might potentially result in a sea of change in outcomes for persons with MSD. At the very least, these program features might ensure that students with MSD are educated in the safe, dignifying, and effective educational environments to which they are entitled.

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Psychosocial and Computer-Assisted Intervention for College Students with Autism Spectrum Disorder: Preliminary Support for Feasibility

Susan W. White, John A. Richey, Denis Gracanin, Marika Coffman, and Rebecca Elias
Virginia Polytechnic Institute and State University
Stephen LaConte
Virginia Tech Carilion Research Institute
Thomas H. Ollendick
Virginia Polytechnic Institute and State University

Abstract: The number of young adults with Autism Spectrum Disorders (ASD) enrolled in higher education institutions has steadily increased over the last decade. Despite this, there has been little research on how to most effectively support this growing population. The current study presents data from a pilot trial of two novel intervention programs developed for college students with ASD. In this small randomized controlled trial, college students with ASD ($n=8$) were assigned to one of two new programs – either an intervention based on a virtual reality–Brain-Computer Interface for ASD (BCI-ASD) or a psychosocial intervention, the College and Living Success (CLS) program. Preliminary evidence supports the feasibility and acceptability of both programs, although behavioral outcomes were inconsistent across participants and interventions. Results indicate that expanded research on psychosocial and computer-assisted intervention approaches for this population is warranted, given the preliminary support found in this pilot study.

The diagnosis and clinical manifestation of ASD persists into adulthood for most affected persons (Billstedt, Gillberg, & Gillberg, 2005; Farley et al., 2009). Better identification and increased rates of diagnosis contribute to a steadily growing population of cognitively unimpaired adolescents and adults with ASD (VanBerkgeijk, Klin, & Volkmar, 2008), many of whom are college-bound (White, Ollendick, & Bray, 2011). Despite the increasing number of young people with ASD who are either college-bound or enrolled in college, there have been few academic or clinical interventions (e.g., Hillier, Fish, Siegel, & Beverdersdorf, 2011; Wenzel & Rowley, 2010) designed to address their unique needs. The current report presents data from a small pilot trial of two novel intervention programs developed for college students with ASD.

Although there is not a well-developed research base on developmental trajectories from adolescence through adulthood for people with ASD, this transition is a period of heightened risk, characterized by decreased structure and insufficient support services (Taylor & Mallick, 2014). Improvement of core ASD symptoms and daily living skills tends to either plateau or regress after adolescence (Smith, Maenner, & Seltzer, 2012; Taylor & Seltzer, 2011). Regardless of cognitive capability to succeed in college, it is generally agreed that students with ASD face specific risks once enrolled, including higher than average rates of drop-out, academic difficulty,
social isolation, and secondary psychiatric problems and emotional distress (Smith et al., 2012; VanBergeijk et al., 2008; White et al., 2011). Although the behaviors and skill deficits that may contribute to these outcomes vary across students (Fountain, Winter, & Bearman, 2012), some of the most commonly reported challenges faced by college students with ASD include poor organizational skills, impaired planning (related to poor executive function), impaired time management skills, and poor emotion regulation (Duke, Conner, Kreiser, & White, 2013). Problems related to secondary psychiatric difficulties, such as anxiety and depression (e.g., amotivation), are also common and should be addressed in treatment (Kreiser & White, 2014; Mazefsky & White, 2014).

Emerging adulthood, a developmental period that spans ages 18 to 25 (e.g., Arnett, 2000) and encompasses the age range of most college students, may be a critical time for targeting many of these challenges (e.g., delayed daily living and emotion regulation skills required for independent living). During this phase of life, most students, including those with ASD, struggle to manage multiple, developmentally salient life tasks, such as academic demands, building intimate relationships, as well as experiencing independent living, apart from their parents for the first time. Recently, some commercial, packaged curricula have been developed to support students with ASD in post-secondary settings (e.g., Achieving in Higher Education: http://www.aheadd.org/; College Living Experience: http://experiencecel.com/). However, such programs generally have a considerable cost to the student [or his/her family], with an average per-semester cost of approximately $3,500. On a more restricted basis, the University of Connecticut offers a first year experience through their disabilities support office, for a modest fee, that is designed to help students with ASD primarily in the social domain (Wenzel & Rowley, 2010). As such, most available programs are accessible only to students and families who can afford them or who are enrolled at a particular school. In general, there is also little research on the clinical impact or consumer acceptability of these programs. Although not examining college students, Hiller and colleagues (2011) reported promising findings in a non-randomized study of a group-based social and vocational skills intervention program for adolescents and young adults with ASD, suggesting that this population desires and can benefit from such intervention.

Most services and supports for college students with special learning or mental health needs come from disability services offices (e.g., academic accommodations, student monitoring; Wolf, Brown, & Bork, 2009), as well as college counseling centers. Individually administered psychosocial interventions such as cognitive-behavioral therapy (CBT) can be resource-intensive (with respect to time and money) and, for students with ASD, difficult to access due to unavailability of clinicians trained to work specifically with clients who have ASD (White, 2012). Technology-based interventions, such as brain-computer interface (BCI)-based applications, may therefore hold considerable promise in terms of increased ease of access as well as clinical efficacy (e.g., Insel & Sahakian, 2012).

Relative to psychosocial interventions, neurotechnological approaches may be preferable to some students with ASD for several reasons. For instance, BCI-based applications provide immediate feedback to the user and minimize extraneous arousal and anxiety that may be related to interacting with other people. People with ASD, in particular, may benefit from computerized interventions because of the highly predictable and controlled delivery format, the ability to work at one’s own pace and focus on specific skills, and their cost-efficiency (e.g., one can repetitively use the program [a ‘dosage’ consideration] without additional cost; e.g., Wainer & Ingersoll, 2011). BCI can be used to monitor a participant’s cognitive state and this information can then be used to automatically adjust the information presented to the participant. Virtual reality (VR) can effectively model social situations that occur in real life or replicate laboratory-based tests (Lazem, Graćanin, & Harrison, 2012; Wallegård et al., 2011). Furthermore, VR-based intervention tools (Bellani et al., 2011; El-Shehaly et al., 2013) can facilitate social learning and adoption of new behaviors through modeling such scenarios using virtual agents (Nye & Silverman, 2013). A combination of VR-based intervention tools and BCI allows one to not
only measure a person’s cognitive state and relate it with the presented social scenario, but also to inform the use of BCI feedback for real-time, adaptive social response via virtual agents (avatars) in VR.

Although neurotechnologies are increasingly available and show promise (White et al., 2014), there have been no direct comparisons of computer-based interventions to psychosocial therapies. Additionally, although students with ASD may prefer computer-assisted intervention, it is plausible that such an approach does not allow the level of support and individualization these students may need. It is important to consider the social validity and feasibility of both modalities as the field more rigorously explores the clinical effectiveness of interventions for this population. Accordingly, we sought to implement two novel intervention programs within the university-setting, one psychosocial and one BCI, developed for postsecondary students with ASD. The purpose of this pilot randomized control trial (RCT) was to examine the feasibility of each intervention model, and, in an exploratory fashion, examine preliminary behavioral outcomes.

The psychosocial program used in this study (College and Living Success: CLS) was designed to target social competence and self-regulation (e.g., time management, emotion regulation). The computerized program (Brain-Computer Interface for ASD: BCI-ASD) targeted social competence, with emphasis on emotion recognition. Two active paradigms were included, rather than a no-treatment control (waiting list) or placebo condition, in order to evaluate the feasibility and social validity of both the psychosocial and technology-based programs within the same target sample, as there has been no controlled research evaluating separate implementation of both approaches. Although the study was neither intended nor powered to detect statistically significant between-group post-treatment differences, we anticipated that both programs would be associated with improvement across a range of variables (e.g., within-participant improvement). We expected that participants would find both programs acceptable based on consumer satisfaction ratings, and we predicted that the participants in CLS would be more satisfied than those in BCI-ASD given the greater level of support and individualization provided.

Method

This study was approved by the university’s ethics review board. A simple randomization approach was used to ensure even allocation across conditions. Students were recruited through the university’s office of disability services, via emails and posted fliers. After providing informed consent, participants completed a screening evaluation to determine eligibility. Inclusion criteria required participants to: 1) be at least 18 years of age, 2) be enrolled full-time in coursework and be in good academic standing (so that program involvement would not adversely affect academic performance), 3) meet diagnostic criteria for ASD, confirmed by the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012) and a brief clinical interview, and 4) be free of other psychopathology warranting more intensive or acute treatment (e.g., suicidality, thought disturbance), as assessed by a semi-structured clinical interview (Anxiety Disorders Interview Schedule for DSM-IV Client version; ADIS-C; Brown, DiNardo, & Barlow, 1994). Participants were paid a small honoraria for assessments completed as part of the study. Students were enrolled at the start of the fall semester and completed endpoint assessments approximately 3.5 months later, toward the end of the same semester.

Participants

The final sample was comprised of five males and three females (Table 1). The sample was primarily Caucasian with one participant self-identified as “Other”. There were no group differences in age, \( t(6) = 1.11, p = .17 \). Academic majors included computer science \( (n = 3) \), chemistry \( (n = 2) \), physics and natural sciences \( (n = 2) \), engineering \( (n = 1) \), math \( (n = 1) \), and philosophy \( (n = 1) \); two participants had dual majors. All participants had pre-existing diagnoses of ASD and all had at least one co-occurring diagnosis, based on clinical interview (ADIS-C; Brown et al., 1994). The most common co-diagnosis was Social Anxiety Disorder (Table 1). At time of enroll-
ment, participants were asked why they were interested in being involved in the project. Three people did not answer the question, four indicated need for help (e.g., to succeed in college, decrease disorganization and social stress, increase stability), and one cited a desire to advance research. Self-reported concerns of the participants at the start of the study included social problems (e.g., uncertainty about how to interpret others, feeling socially awkward), cognitive problems (e.g., poor memory), anxiety and distress (e.g., feeling overwhelmed), and poor time management (e.g., spending too much time on videogames). Figure 1 depicts the flow of participants from initial screening for eligibility through randomization.

**Interventions**

**CLS.** A newly developed psychosocial intervention and support program, CLS is theoretically grounded in CBT and mindfulness-acceptance based approaches, in that it combines principles of behavioral change (e.g., psychoeducation, problem-solving) with acknowledging and accepting one’s transient feelings as well as personal strengths and difficulties. The program is comprised of three components: individual therapy (to improve emotion regulation, decrease arousal/anxiety, learn time management and social discourse skills), social outings and activities on and off campus (to practice newly acquired skills and conduct exposures to stress-inducing situations), and supportive ‘coaching’ help (for managing daily problems and demands more

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*PD = Panic Disorder; SAD = Social Anxiety Disorder; GAD = Generalized Anxiety Disorder; OCD = Obsessive-Compulsive Disorder; SP = Specific Phobia; PTSD = Post-Traumatic Stress Disorder.

*IQ based on 4-subtest WASI (two participants had 2-subtest WASI).

b SP: includes multiple SPs.

Figure 1. CONSORT flow chart of participants.
effectively). Participants received weekly therapy visits (up to 14 total, to account for semester breaks), approximately bi-weekly scheduled social outings (e.g., dining in a commons area on campus, attending a group of interest, bowling), and supportive coaching (e.g., phone calls to check in on progress toward goals) on an as-needed basis. Whereas the individual therapy visits were focused on skills teaching and practice, the outings offered opportunities to apply the skills in naturalistic settings with peers. Each participant had a primary therapist who delivered selected CLS modules (see Figure 2 for list of modules) and helped coordinate social outings. CLS therapists were doctoral students in a clinical psychology science program under the supervision of the first author; they received individual and group supervision weekly. Total time commitment for the CLS program participant was about 2 hours per week.

**BCI-ASD.** VR-BCI is a cross-platform intervention, which can be deployed in an immersive virtual environment, or on a dedicated desktop computer or tablet. The BCI-ASD program is intended to help individuals improve their ability to accurately interpret emotional facial expressions and practice social interaction skills. A commodity wireless BCI Device (BrainBand) provided a single channel EEG reading and attention/meditation levels measurements. First, a baseline BCI measurement was conducted (Figure 3), during which participants were asked to maintain a high level of attention and then a high level

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**Figure 2. CLS therapy modules.**

**Figure 3. BCI baseline measurement.**
of meditation for several minutes. Participants received direct feedback (visual or textual) about the attention/meditation level. The next phase used several off-the-shelf game apps where participants interacted with animated characters to follow clues and perform simple tasks (searching for objects). The final phase was interaction with the virtual agents (avatars) in a virtual environment. A participant was represented as an avatar (controlled by the participant using a keyboard and mouse) in the virtual environment. The other avatars were virtual agents controlled by the application. The participant was presented with a scenario describing a typical social situation and related social activities. For example, in a classroom setting scenario the participant had to greet other students (virtual agents), initiate a conversation, ask a question and interact in the virtual environment. BCI feedback was used to automatically adjust the responses provided by virtual agents, primarily by using the attention level, such that higher attention levels triggered less conspicuous social hints and responses by virtual agents. Participants received 10 to 14 weekly sessions, each lasting between 15- to 30-minutes. The intervention was administered on a dedicated desktop computer and a tablet in a clinical office setting (same as CLS). The individual (initials; masked for review) assisting participants in the BCI setup at each session was not, however, a clinician. Total time commitment for BCI-ASD program participants was about 40 minutes per week.

**Measures**

**Barkley Deficits in Executive Functioning Scale (BDEFS; Barkley, 2011).** The 89-item ‘long form’ of the BDEFS scale yields five factor scores (self-management of time, self-organization (problem-solving), self-restraint, motivation, and regulation of emotion), each of which is theoretically related to executive function, or the ability to regulate behavior over time in the service of attaining one’s goals (Barkley, 2011). Higher scores reflect more impairment. Previous studies have indicated that the BDEFS has acceptable internal consistency (with alpha above .80 for each of the scales) and test-retest stability (Barkley, 2011). In the present study’s sample, alpha was above .80 for all scales except regulation of emotion (alpha = .79). The BDEFS was used in the present study as the CLS program’s target behaviors included time-management and emotion regulation.

**Clinical Global Impression-Improvement (CGI-I; Guy, 1976).** The CGI-I was completed by a clinician unfamiliar with the treatment protocol and uninformed of condition assignment (i.e., an independent evaluator). In this study, the CGI-I represents a very high criterion for improvement, as improvement ratings reflect overall functioning (e.g., daily living skills, academic performance), not just domains covered in the interventions (e.g., social functioning, emotion regulation). Ratings were made on the basis of all available data, including self-report measures, interviews, and observations. The assessor was trained to a pre-set reliability standard (i.e., within one point of pre-established ‘gold standard’ ratings) to assign improvement ratings.

**College Living Experience Satisfaction Scale (I-CLE Satisfaction Scale).** Participant satisfaction was evaluated after completion of the interventions. The I-CLE Satisfaction Scale is a 10-point (1 = “not at all helpful”, 5 = “pretty helpful”, 10 = “very helpful”) scale designed by the authors to measure overall helpfulness of the program.

**Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1999).** Designed to assess student adjustment across four domains (academic, social, personal-emotional, and goal commitment), the SACQ is comprised of 67 items, each of which is rated on 9-point scale. Higher scores reflect better adjustment to college. The scale’s alpha has been found to range from .77 to .95 (Baker & Siryk, 1999). In the present study’s sample, alpha was .96. The SACQ was used to evaluate change in participants’ self-reported sense of adjustment to college before and immediately following the intervention.

**Data Analysis**

**Feasibility and Social Validity**

We first examined ease of recruitment and reasons provided by the participants for being involved in the study. Attendance and participation were evaluated by averaging across
participants the number of sessions attended, the length of the sessions, and the number of social outings attended (for CLS). Retention was assessed by examining percentage of dropouts during treatment. To quantify participant satisfaction, treatment satisfaction ratings were averaged across all individuals.

**Efficacy: Behavioral data**

All data analyses were conducted in SPSS Version 21. The CGI-I was used to assess change in global functioning from baseline to endpoint. Participants with CGI-I ratings of 1, 2, and 3 (i.e. “very much” improved, “much” improved, or “minimally” improved) were considered treatment responders, and participants with CGI-I ratings of 4 (i.e. “no change”) or higher were considered non-responders. CGI-I data were analyzed using a chi-square test. Reliable change indices (RCI; Jacobson & Truax, 1991) were used to calculate significance of change at the individual participant level from baseline to midpoint and baseline to endpoint on the BDEFS and SACQ. The absolute value of RCI scores greater than 1.96 indicated statistically significant change. Mean-level change across the two groups was evaluated with paired samples *t*-tests.

**Results**

**Feasibility and Social Validity**

Interest level among students with ASD is an important component of overall social validity, as no program will be successful if the target population is not interested and does not participate in it. A minimum of six eligible students were sought. Reflective of the interest among the eligible students, eight students were enrolled into the study in a two-week period at the start of the academic semester. A ninth student wanted to enroll but did not meet all study inclusion criteria (ASD diagnosis could not be independently confirmed with ADOS). During the semester-long program, there were no dropouts from either program. Moreover, all enrolled students (one student graduated after fall semester) opted to participate in the other, non-assigned intervention. The BCI-ASD participants completed an average of 11.75 (*SD* = 1.71) sessions (range = 10–14), and sessions lasted an average of 38.94 minutes (*SD* = 10.62; range = 19–63). The CLS participants attended an average of 12.75 sessions (*SD* = 1.26; range = 11–14), which lasted, on average, 60.02 minutes (*SD* = 1.63; range = 50–77). Therapists administered a majority of the available treatment modules (*M* = 9.0, *SD* = 0.812; range = 8–10). Although therapists aimed to complete one module during each treatment session, the flexible nature of the intervention allowed modules to be repeated on an as-needed basis. All participants in CLS engaged in several social outings within the community (*M* = 6, *SD* = 1.63; range = 4–8) with their therapist.

All participants responded to a 10-point (1 = not helpful, 10 = very helpful) program satisfaction scale after completing their assigned treatment. As hypothesized, participants in the CLS intervention expressed somewhat greater satisfaction with the program (*M* = 6,50, *SD* = 0.58) than participants in the BCI-ASD intervention (*M* = 4.75, *SD* = 2.06), although the difference was not statistically significant, *t*(6) = 1.64, *p* = .15. Qualitative feedback indicated that the CLS participants found the following aspects of the program most helpful: the weekly social coaching to monitor progress; having someone to talk to one-on-one, which increased awareness of communication skills; and that the program addressed goals self-identified by the participant. In response to being asked what was less helpful, participants of CLS indicated that they would like more time spent on addressing stress and anxiety management, less time on assessment, and more personalization of the topics addressed in therapy. One BCI-ASD participant indicated that more time practicing with the games could be helpful in improving ability to identify important details in the virtual scenes. No other comments, on either program, were offered by participants.

**Behavioral Outcomes**

There were two responders to treatment in each condition, and thus no significant difference between condition with respect to response to treatment based on the CGI-I scale, \( \chi^2[1] = 0.00, p = 1.00 \). As a whole, there was
no significant improvement in executive functioning from pre- to post- for either intervention for any participants on the self-regulation of emotion subscale, the self-management to time subscale, self-restraint, motivation, or total executive function as measured by the BDEFS. One participant in the BCI-ASD condition showed significant improvement on the self-organization/problem-solving scale of the BDEFS, whereas two participants – one from each intervention, showed significant decline on this scale. There was no clinically meaningful improvement or worsening in any of the BDEFS scales for the participants in either intervention. Mean scores over time on the BDEFS for the two treatment conditions are presented in Table 2. Within group, participants in the BCI-ASD showed significantly more problems after the intervention, compared to pre-treatment, in the BDEFS domains of self-management to time ($t[3] = 3.67, p = .035$) and motivation ($t[3] = 5.56, p = .012$).

Unexpectedly, based on RCI scores, two CLS participants and two BCI-ASD participants showed significant decline in overall adaptation on the SACQ, and one BCI-ASD participant demonstrated significant improvement in overall adaptation to college during the intervention period. Two BCI-ASD participants showed significant decline in academic adjustment. One BCI-ASD participant and two CLS participants showed significant decline (worsening) in attachment, while one BCI-ASD participant improved in this domain. One CLS and one BCI-ASD participant showed significant decline on personal-emotional adjustment. One BCI-ASD participant showed significant improvement in social adjustment, whereas one CLS and two BCI-ASD participants showed significant decline. There was no clinically meaningful change on overall adaptation to college, academic adjustment, attachment, personal-emotional adjustment, and social adjustment for any participant.

Discussion

The number of college-enrolled and college-bound adolescents and young adults with ASD is on an upward trajectory, yet there has been very little research on how to support these students to improve likelihood of academic and social success. We developed two new interventions designed to help college students with ASD navigate social situations and manage stress. We evaluated the feasibility and preliminary efficacy via a pilot RCT. Interest in both programs was high, and we surpassed our enrollment goal within two weeks. Both programs were implemented as intended, without adverse events or protocol deviations. Throughout the semester-long intervention, there were no dropouts from either program. Consumer satisfaction was moderate to high for both programs, with slightly higher (though not statistically significant) satisfaction for the CLS participants.

Due to the small sample size, we are not able to draw firm conclusions about the preliminary efficacy of either program. No uniform pattern (improvement or worsening) across participants or conditions was apparent in the domains of college adjustment or executive functioning. Apart from the small sample size, there are other limitations to note. Caution must be used when comparing the two intervention programs. The content of the programs, with respect to deficits and skills addressed, is not identical. Moreover, the CLS program offered a ‘higher dosage’ intervention. Participants in CLS attended an average of 12.75, 60-minute sessions (not including the outings or the weekly coaching), whereas those in the BCI-ASD program received an average of 11.75, 38-minute sessions. There was no traditional control group, making it impossible to assess whether observed changes across the two active programs are due to the intervention rather than a factor unrelated to treatment. Third, the post-intervention assessments took place at the end of the semester, during final examinations, whereas the pre-intervention assessments took place either before the start of the semester or during the first week of classes. These time points are periods of relative high and low stress, respectively, and it is conceivable that this confound influenced the outcome data. Although there are no published data on within-term changes in SACQ scores, there is evidence of declining scores, indicating lower adjustment, at mid-semester relative to the summer prior to matriculation (Baker & Siryk, 1999). Inclusion of a no-intervention control.
TABLE 2
Pre- and post-intervention descriptive statistics and change scores

<table>
<thead>
<tr>
<th></th>
<th>BDEFSa</th>
<th>SACQb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BCI-ASD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>191.25</td>
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</tr>
<tr>
<td></td>
<td>(43.78)</td>
<td>(11.93)</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>203.75</td>
<td>58.75</td>
</tr>
<tr>
<td></td>
<td>(32.29)</td>
<td>(12.71)</td>
</tr>
<tr>
<td>Change</td>
<td>12.50</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CLS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>156.75</td>
<td>41.25</td>
</tr>
<tr>
<td></td>
<td>(34.2)</td>
<td>(11.44)</td>
</tr>
<tr>
<td>Post-intervention</td>
<td>157.5</td>
<td>41.25</td>
</tr>
<tr>
<td></td>
<td>(47.35)</td>
<td>(15.33)</td>
</tr>
<tr>
<td>Change</td>
<td>0.75</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* p < .05.
a On BDEFS, negative change score indicates worsening and positive change score indicates improvement.
group would have helped to determine the degree to which observed changes were reflective of heightened stress and demands over the course of the academic semester. Related to this, most of our outcomes are based on self-report data rather than objective indicators. It is possible that participation in either program served to increase participants’ awareness of difficulties (e.g., with time management), regardless of whether or not a true change in the specific behavior occurred, which may explain the observed worsening in some domains from pre- to post-intervention.

These limitations notwithstanding, this is the first published RCT, to the authors’ knowledge, of any support or intervention program developed explicitly for college students with ASD. Moreover, we compared two unique, active interventions in this study. Results indicate that both psychosocial and computerized interventions for college students with ASD are feasible to implement and are acceptable to consumers. Additionally, participant enrollment and randomization was successful. As noted by trial methodologists, assessment of these elements is the primary impetus for pilot studies in clinical research, and demonstration of such is necessary for subsequent efficacy-testing clinical trials (Leon, Davis, & Kraemer, 2011).

Although behavioral outcome data from this pilot are equivocal, the programs are feasible to implement and socially valid for this population. As such, larger scale development efforts and clinical evaluation of psychosocial and computer-based interventions for college students with ASD are deemed warranted. Indeed, we are now conducting a more rigorously controlled clinical trial to evaluate the efficacy of the psychosocial program. Although neurotechnologies such as BCI are not yet widely available as intervention tools, this study adds to a growing body of research suggesting further development and evaluation of such approaches. We do not, however, envision computer-based approaches replacing more traditional, student-focused or group-based services and interventions. This study’s findings suggest that college students with ASD enjoy, and often derive benefits from, individualized support. As such, programs that combine technology with psychosocial intervention may allow for optimum individualization in the context of transportability, dissemination, and ease of use. In addition, future research will need to explore how best to match approach (e.g., computer-based, in-person) to the student to optimize outcome.

References


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Defining Success for Students with Autism Spectrum Disorder: Social Academic Behavior in Secondary General Education Settings

Elizabeth L. W. McKenney, Catherine Stachniak, Jordan Albright, and Jeremy D. Jewell
Southern Illinois University Edwardsville

Julie M. Dorencz
Joliet Public School District

Abstract: An exploratory, observation-based study sought to strengthen understanding of the development of social communication skills that facilitate academic success, particularly within general education settings. Sixteen middle and high school students with Autism Spectrum Disorders (ASD), all of whom participated in at least one period per day of core academic instruction in a general education classroom, were observed over a period of one to three months each. Frequencies of five appropriate and three inappropriate social academic behaviors are described, in terms of their relative frequencies to one another, and their overall consistency over the course of observations. Students observed were more likely to engage in appropriate, facilitative behaviors within the classroom setting than they were to demonstrate communicative symptoms of ASD. Most social academic behaviors were demonstrated at consistent frequencies over time. Implications for educational decision-making, progress monitoring, and future research are discussed.

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder, involving deficits in social cognition and behavioral functioning. There are specific observable symptoms central to ASD, including deficits in expressive communication and social skills, repetitive stereotypic motor mannerisms, and restricted interests (APA, 2013). These deficits vary in frequency and intensity depending on the individual. For example, individuals with ASD who are considered to be high-functioning (i.e., IQ ≥ 70) tend to show fewer repetitive stereotypic behaviors, which are often replaced by strong, perseverative interests in highly specific topics. Regardless of the individual’s level of functioning, these deficits can lead to daily challenges for those diagnosed with ASD (Stichter et al., 2010), which are often of particular concern within classroom settings.

Prevalence in Public Education

The Center for Disease Control's Autism and Developmental Disabilities Monitoring Network currently estimates that the prevalence rate of Autism Spectrum Disorders is 1 in 68 children (Baio, 2014). This overall increase in the prevalence of autism is reflected in the heightened number of students identified as having autism and receiving special education services. According to the National Center for Education Statistics, the total number of children identified with autism who are receiving special education services has risen from 0.2 to 0.8% of total student enrollment in the past decade (NCES, 2013). That increase is partially due to the introduction of the special education eligibility category of “autism” being added to the Individuals with Disabilities Education Act (IDEA) in 1990. Since that time, there has been an increased emphasis on providing educational services to all students with disabilities, including those with ASD, within the least restrictive environment. The increased prevalence of ASD in the school-aged population has resulted in more students with ASD being served in inclusive

Correspondence concerning this article should be addressed to Elizabeth L. W McKenney, Department of Psychology, Southern Illinois University Edwardsville, Campus Box 1121, Edwardsville, IL 62026. E-mail: elmcken@siue.edu
classrooms (Conroy, Asmus, Boyd, Ladwig, & Sellers, 2007). According to the 36th Annual Report to Congress approximately 61.5% of children with disabilities spend at least 80% of their time in an inclusive classroom with typical peers.

_Inclusive Classrooms: Benefits and Considerations_

Research has shown that students’ progress in developmental areas of deficiency is positively correlated with the quality of educational services provided in general education classrooms (Soukakou, 2012). It should be noted that both professionals and parents of students with ASD increasingly prefer inclusion of these children in general education classrooms, so that children with ASD experience both greater acceptance and increased exposure to typical language and social role models (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). Not only do students with ASD benefit from being a part of an inclusive classroom, but traditional students benefit as well. Students with ASD bring a unique perspective and presence, which can help to identify instructional concerns in the classroom (Chandler-Olcott & Kluth, 2009). Antecedent classroom factors have been found to significantly influence students’ level of challenging behaviors and engagement, which is why it is important to develop successful service models for this population (Conroy et al., 2007; Ruble & Robson, 2007). For example, children with ASD may require clearer, briefer prompts from teachers to understand classroom tasks. Clear and direct instructions stand to benefit most students in a general education setting. Although these kinds of teaching procedures are well known and frequently used, it is also important to monitor the progress of successfully integrated students with ASD in inclusive classroom environments, as these characteristics can further facilitate the development of adequate assessment criteria, goal setting techniques, and interventions.

_Progress Monitoring to Determine Appropriate Interventions_

As the number of children and adolescents identified with ASD has increased, schools and educators have had to make changes in educational services offered to youth with ASD. When students are served via special education, decisions regarding the services provided should be based on reliable and valid practices, while individual modes of instruction and accommodation should be based on individual factors (IDEA, 2004). Specifically, goals set forth in the student’s Individualized Education Plan (IEP) should address academic or behavioral deficits related to the disability, in order to practically monitor the student’s progress in areas of deficit (Magiati, Moss, Yates, Charman, & Howlin, 2011). For students with ASD, this means targeting specific academic deficits, appropriate language use, and appropriate social and behavioral functioning (Muller, 2006). Unfortunately, while the formation of adequate IEP goals may be intended to indicate students’ progress, this is not always the reality for students with ASD. IEPs for students with ASDs tend to more closely reflect the restrictiveness of a student’s educational setting rather than individual needs (Etscheidt, 2006). Research has also found that many IEPs are faulted with leaving out important information about how to accurately measure success, motivate, and engage students with ASD in general education classrooms (Rosenblatt, Carbone, & Yu, 2013). This indicates that, while monitoring IEP goal achievement may indicate a perception of progress, the use of these goals alone does not always reliably measure skill acquisition in areas of deficit, or predict behaviors likely to be demonstrated by students with ASD who have made strong skills gains in response to educational services.

A better understanding of long-term goals for students with ASD is needed to address inconsistencies in assessment practices, goal setting, and educational services. Some tools currently exist, such as Functional Behavior Assessment (FBA), through which professionals can identify areas of deficit, antecedent conditions, and environmental factors that promote the acquisition of social, behavioral, and academic skills (Boyd, Conroy, Asmus, McKenney, & Richmond, 2008). This assessment tool is particularly helpful in developing individualized interventions in academic settings (Rosenblatt et al., 2013). FBA can help to determine whether an individual is responding positively to intervention services.
and progressing in areas of deficit. However, functional assessment is not always implemented consistently within schools, and can be time consuming to conduct for all but the most intensively needy students (McKenney, Waldron, & Conroy, 2013). Additionally, the primary purpose of FBA is to assess the function of a behavior and not necessarily the frequency of a problematic behavior, although frequency data may be collected over the course of an FBA.

Once students have been deemed successful in response to interventions, it is probably more useful to observe whether they demonstrate classroom behaviors that reflect an acquired level of skill in a previous area of deficit, which would indicate that the model of service delivery is effective. There is currently no systematic assessment tool that allows for the monitoring of progress across all students with ASD who are receiving educational services. Also missing is a tool that assesses the long term effects of evidence-based interventions for students with ASD. Tools that can provide such evidence are likely to be especially helpful for students who demonstrate relatively strong progress in response to their educational services. Progress monitoring tools have been found to be important components for successful interventions in other areas. For example, monitoring progress is crucial to assessing the response of students with Specific Learning Disorders (SLD) in specific academic areas, such as reading (Justice, 2006). Systematic checks of performance accurately assess an individual’s growth over time in comparison to benchmark measures, acting as both a problem identification system and a measure of progress in areas of deficit (Fuchs & Fuchs, 2006).

The current study addressed weaknesses in the applied intervention literature by observing students with ASD who were receiving general education instruction in at least one core academic area. Researchers observed whether participants’ classroom behavior reflected acquisition of skills in core areas of ASD symptomology, specifically, social communication and restrictive behaviors. Consistent demonstration of specific behaviors across individuals with ASD who are successfully responding to educational services could lead to the development of an effective method of evaluating educational services for ASD. On an individual student level, confirming evidence of enhanced appropriate social and engagement behaviors may provide a means of evaluating whether a student demonstrates generalization of acquired skills in the core areas of deficit.

Method

Participants

Sixteen participants diagnosed with Autism Spectrum Disorder (ASD) were observed, ranging in age from 12 to 18 years. Fourteen participants were European American, one participant was multiracial, and one participant was Asian. Participants were recruited via nomination from special education teachers and directors in two school districts in a Metropolitan area in the Midwest. Inclusion criteria required participants to (1) have been identified with Autism Spectrum Disorder, via either medical diagnosis or school-based eligibility for special education, (2) be currently participating in general education instruction at least one academic period per day, (3) and have been served by their school’s special education services at some point during their K-12 education. Once local administrators approved the project and potential participants were identified, parents were contacted by their special education directors and were mailed letters of informed consent. Teachers and special education case managers distributed informed consent packets, thus, it is not known exactly how many potential participants were contacted who did not consent to participate. Based on the number of packets given to teachers, participation rate among those contacted is estimated to be above 80%. Participants also provided written assent to participate.

A pilot study was conducted with four participants to determine relevant appropriate and inappropriate social academic behaviors to be observed. Social academic behaviors are defined as appropriate and inappropriate behaviors that have the potential to facilitate or hinder interpersonal communication within a classroom setting. A total of eight appropriate or inappropriate student behaviors were tar-
Participants’ ASD symptomology was evaluated using the most recent ASD-specific measure in each participant’s academic record (e.g., special education eligibility documents; Table 1). When necessary, additional information regarding diagnostic and educational history was provided via parent report. Twelve of the participants had been evaluated for ASD symptomology within the five years prior to observation; three participants within the prior 10 years. ASD-specific measures included the Autism Diagnostic Observation Scale (ADOS), the Gilliam Autism Rating Scale, Second Edition (GARS-2), the Asperger Syndrome Diagnostic Scale (ASDS), the Gilliam Asperger’s Disorder Scale (GADS), and the Adaptive Behavior Assessment System, Second Edition (ABAS-II). Four participants’ records did not contain results of any of the above assessments; however, the Behavior Assessment System for Children, Second Edition (BASC-II) Atypicality and Withdrawal scores and the Vineland Adaptive Behavior Scales, Second Edition (Vineland-II) Socialization scores were reported and are described here to substantiate ASD symptoms in the population observed. One participant’s file was not available with which to substantiate ASD symptomology.

Participants’ estimated intelligence quotients were also evaluated using the most recent measure of cognitive ability reported in each participant’s educational and/or medical file. The most common test of cognitive ability administered was the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), with nine participants having been administered this measure, followed by the Woodcock-Johnson III Tests of Cognitive Abilities (WJ III COG), with four participants administered this measure. The Wechsler Abbreviated Scale of Intelligence- Second Edition (WASI-II) and the Leiter International Performance Scale, Revised (Leiter-R) were each administered to one participant. Nine participants’ scores fell within the average range,


* Participant provided informed consent rather than assent.

<table>
<thead>
<tr>
<th>Participant #</th>
<th>Age &amp; grade at time of obs.</th>
<th>Diagnosis at time of obs.</th>
<th>Most recent IQ</th>
<th>ASD symptomology measure reported in file</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>14, 7th</td>
<td>Asperger</td>
<td>130</td>
<td>ASDS</td>
</tr>
<tr>
<td>2</td>
<td>18, 12th</td>
<td>Asperger</td>
<td>99</td>
<td>GARS-2</td>
</tr>
<tr>
<td>3</td>
<td>14, 8th</td>
<td>HFA/Asperger</td>
<td>82</td>
<td>ASDS</td>
</tr>
<tr>
<td>4</td>
<td>12, 6th</td>
<td>Asperger</td>
<td>89</td>
<td>ADOS</td>
</tr>
<tr>
<td>5</td>
<td>13, 7th</td>
<td>Autism</td>
<td>47</td>
<td>GARS-2</td>
</tr>
<tr>
<td>6</td>
<td>15, 10th</td>
<td>Asperger</td>
<td>110</td>
<td>BASC-2 (Atypicality &amp; Withdrawal)</td>
</tr>
<tr>
<td>7</td>
<td>17, 11th</td>
<td>Asperger</td>
<td>113</td>
<td>ASDS</td>
</tr>
<tr>
<td>8</td>
<td>11, 6th</td>
<td>Asperger</td>
<td>63</td>
<td>GARS-2</td>
</tr>
<tr>
<td>9</td>
<td>11, 6th</td>
<td>Asperger</td>
<td>72</td>
<td>GARS-2</td>
</tr>
<tr>
<td>10</td>
<td>18*, 12th</td>
<td>Asperger</td>
<td>91</td>
<td>GADS</td>
</tr>
<tr>
<td>11</td>
<td>14, 9th</td>
<td>Autism</td>
<td>115</td>
<td>ASDS</td>
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<tr>
<td>12</td>
<td>13, 7th</td>
<td>Autism</td>
<td>76</td>
<td>ABAS-II</td>
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<tr>
<td>13</td>
<td>17, 10th</td>
<td>HFA</td>
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<td>Vineland-II</td>
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<tr>
<td>14</td>
<td>17, 11th</td>
<td>Asperger</td>
<td>112</td>
<td>BASC-2 (Atypicality &amp;Withdrawal)</td>
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<tr>
<td>15</td>
<td>15, 10th</td>
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<td>Not available</td>
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<tr>
<td>16</td>
<td>15, 10th</td>
<td>Asperger</td>
<td>100</td>
<td>BASC-2 (Atypicality)</td>
</tr>
</tbody>
</table>
between 85 and 115. Four participants’ scores fell in the below average range (70–84). Two participants’ scores fell in the low range (≤69). One participant’s score fell in the above average range (116–130). Scores can be viewed in Table 1.

Measures

Five of the eight behaviors observed were categorized as being appropriate forms of social academic behavior. Such behaviors included Orientation to Speaker (OS), Appropriate Conversations with Others (AC), Appropriate Conversation with Teachers (TC), Prompted Statement to Teachers (PS), and Unprompted Statement to Teachers (US). Inappropriate social academic behavior observed included Mumbled or Jumbled Speech (MU), Interruptions (INT), and Perseverative Speech (PSP). See Table 2 for operational definitions.

Each of the social academic behaviors observed were operationally defined with examples and non-examples, and observers were trained to reliably record each target behavior via mock observation sessions. Training concluded when each observer demonstrated 80% or higher agreement on each target behavior for three or more mock data collection sessions. Inter-observer Agreement (IOA) was calculated using the formula (Agreements/Agreements + Disagreements) * 100 (Kazdin, 1982). IOA was obtained for 32% of sessions, and total average IOA across participants was 98% (94–100). IOA was also calculated per each behavior measured, averages and ranges are available in Table 3.

Procedure

Students were observed during ongoing classroom activities during 10-minute observations. Data were recorded via hand-held iPod touch devices equipped with iBAA software (www.futurehelpdesigns.com). Frequency of each behavior was measured via 10-second partial interval recording, meaning that an interval was turned “on” for a particular behavior if the behavior occurred at any time during that interval. On average, each student was observed a total of 21 sessions, which resulted in each student being observed a total of approximately 3.5 hours throughout the course of data collection. Often, students were observed more than once per class period.

Classes were selected for observation based on the following criteria: (1) general education, (2) the structure and content of the class allowed for opportunities for student-to-student and student-to-teacher interaction, and (3) the teacher gave permission to the researchers to observe. High school participants were observed in a variety of subject area classes, including algebra, trigonometry, geometry, honors algebra, earth sciences, biology, chemistry, physics, psychology, English, and government courses. Middle school students were observed in science, social studies, language arts, and mathematics courses. Across grade levels, science and social studies courses were the most frequently captured via observation (55% of courses observed), as they provided opportunities for social interaction as a part of instruction, and were attended by the broadest range of study participants (several study participants continued to receive math and language arts instruction in a special education setting, which was not observed).

Average frequencies of each observed behavior were evaluated to determine whether appropriate target behaviors were demonstrated more frequently than inappropriate target behaviors. Additionally, data were split in half, according to the first and second half of sessions collected, so that levels of social academic behaviors over time could be compared.

Results

In the overall sample, appropriate target behaviors (M = 2.11, SD = 2.98) were observed more frequently than inappropriate target behaviors (M = 0.21, SD = 0.50), t = 4.79, p < .01. The most frequently observed behavior was Oriented to Speaker (M = 6.85, SD = 3.55). On average, students were observed as being oriented to the speaker 6.85 intervals per session. Other frequently observed appropriate target behaviors include Appropriate Conversations with Others (M = 1.35, SD = 1.40), Appropriate Conversation with Teacher (M = 0.97, SD = 0.91), Prompted Statements to Teacher (M = 0.89, SD = 0.75), and Un-
Across all participants, inappropriate target behaviors were observed less frequently than appropriate behaviors. Less frequently observed, inappropriate target behaviors include prompted Statements to Teacher ($M = 0.49$, $SD = 0.56$).

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented to speaker (OS)</td>
<td>The student is positioned toward the speaker for at least 3 continuous seconds. This may also be coded if the student is oriented toward the materials to which the speaker is oriented for at least 3 continuous seconds, if the material is the subject of the discussion for the student and his/her social partner. This behavior can be coded with reference to a teacher or a peer. Shoulder and/or face are pointing toward the speaker, rotated no more than 45 degrees away from the speaker’s face.</td>
</tr>
<tr>
<td>Interruption (INT)</td>
<td>The student engages in speech that interferes with or halts the speaker’s message. Student’s speech may be related to the topic at hand, but inappropriately timed, or may be off-topic. If the interruption contains perseverative speech, interruption should be recorded first, and then perseverative speech should be coded.</td>
</tr>
<tr>
<td>Appropriate Conversation with Other (AC)</td>
<td>Target student engages in a three-step series of verbal interchanges with a social partner that leads to an interaction. Social partners in classroom settings include other students in the class, but not teachers. This can either begin with the target students (TS - P - TS) or the peer (P - TS - P). Even if a conversation carries over into the next interval, a series of three verbal interchanges on the same topic should be coded during each interval in which they occur.</td>
</tr>
<tr>
<td>Perseverative Speech (PSP)</td>
<td>The student introduces and persists in discussing a topic of his/her own interest. This behavior is considered perseverative when either a) the speech concerns a known restricted interest of the student or b) the student persists in discussing a particular topic after the social partner has indicated disinterest or attempted to change the subject.</td>
</tr>
<tr>
<td>Prompted Statement to Teacher (PS)</td>
<td>The student responds to a question presented by the teacher, either to the whole class or directly to the student. This should be coded if the student raises his/her hand to volunteer an answer or just says the answer out loud. The student’s answer must be appropriate to the context of the question and typical classroom behavioral expectations.</td>
</tr>
<tr>
<td>Unprompted Statement to Teacher (US)</td>
<td>The student makes a statement to the teacher, when the teacher did not pose a question. The statement must be appropriate to the topic of class discussion.</td>
</tr>
<tr>
<td>Appropriate Conversation with Teacher (TC)</td>
<td>Target student engages in a three-step series of verbal interchanges with a teacher that leads to an interaction. This can either begin with the target student (TS – T – TS) or the teacher (T – TS – T). Even if a conversation carries over into the next interval, a series of three verbal interchanges on the same topic should be coded during each interval in which they occur. A new conversation may be coded three seconds after the previous conversation has ended.</td>
</tr>
<tr>
<td>Mumbling or Jumbled Speech (MU)</td>
<td>The student’s speech is spoken at a low volume, with inadequate enunciation, or at a rate that interferes with intelligibility. This should not be scored if either the observer or the student’s social partner(s) understand the statement well enough to formulate a response.</td>
</tr>
</tbody>
</table>
Mumbled or Jumbled Speech ($M = 0.46, SD = 0.76$) and Interruptions ($M = 0.15, SD = 0.31$). On average, students were observed using mumbled speech and interrupting the speaker 0.46 and 0.15 times per session, respectively. Perseverative speech was observed so rarely, with an average of 0.03 times per session ($SD = 0.08$), that it was not included in further analyses examining differences in behavioral frequency over the course of observations.

Overall, frequencies of most observed behaviors remained consistent over time for all participants. Consistency estimates were evaluated by conducting paired-samples $t$-tests for each target behavior. There were no significant differences found between the means of the first half and second half of data for all behaviors, except Oriented to Speaker and Appropriate Conversation with Teachers. Oriented to Speaker increased from the first half of data collection ($M = 5.73$) to second half of data collection ($M = 7.86$), $t = -2.65$, $p = 0.01$, Cohen's $D = 0.34$. Appropriate Conversation with Teachers decreased slightly from the first half of data collection ($M = 1.84$) to the second half of data collection ($M = 1.19$), $t = 2.07$, $p = 0.04$, Cohen's $D = 0.27$. Consistency estimates for each observed behavior are described in Table 4.

### Discussion

Developing a comprehensive understanding of the behavioral markers of success for students with ASD is a lengthy and complex process. This study represents a first step in documenting the types of behavior that are often demonstrated by students who successfully participate in general education instructional settings. One of the clearest findings across participants in the current sample is that appropriate social academic behaviors occur more frequently than inappropriate behaviors, indicating that successful students with ASD are able to use age appropriate volume, enunciation, and conversational pacing, and do not frequently discuss their restricted interests during class. Not only were inappropriate behaviors consistently occurring less than once per observation, but they appeared to decline.

### Table 3

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>IOA Range</th>
<th>IOA Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented to Speaker</td>
<td>(84–100)</td>
<td>93.87</td>
</tr>
<tr>
<td>Interruption</td>
<td>(100–100)</td>
<td>100</td>
</tr>
<tr>
<td>Mumbled or Jumbled Speech</td>
<td>(96–100)</td>
<td>99.56</td>
</tr>
<tr>
<td>Unprompted Statement to Teacher</td>
<td>(82–100)</td>
<td>97.25</td>
</tr>
<tr>
<td>Prompted Statement to Teacher</td>
<td>(93–100)</td>
<td>98.06</td>
</tr>
<tr>
<td>Conversation with Teacher</td>
<td>(88–100)</td>
<td>96.69</td>
</tr>
<tr>
<td>Conversation with Other</td>
<td>(93–100)</td>
<td>98.81</td>
</tr>
<tr>
<td>Perseverative Speech</td>
<td>(98–100)</td>
<td>99.75</td>
</tr>
</tbody>
</table>

### Table 4

<table>
<thead>
<tr>
<th>Target Behaviors</th>
<th>$M_1$</th>
<th>$M_2$</th>
<th>$t$</th>
<th>Significance ($p$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriented to Speaker</td>
<td>5.73</td>
<td>7.86</td>
<td>-2.65</td>
<td>0.01***</td>
</tr>
<tr>
<td>Appropriate Conversation with Others</td>
<td>1.33</td>
<td>1.76</td>
<td>-1.13</td>
<td>0.26</td>
</tr>
<tr>
<td>Appropriate Conversation with Teacher</td>
<td>1.84</td>
<td>1.19</td>
<td>2.07</td>
<td>0.04**</td>
</tr>
<tr>
<td>Prompted Statement to Teacher</td>
<td>1.32</td>
<td>0.96</td>
<td>1.93</td>
<td>0.06</td>
</tr>
<tr>
<td>Unprompted Statement to Teacher</td>
<td>0.43</td>
<td>0.55</td>
<td>-1</td>
<td>0.32</td>
</tr>
<tr>
<td>Mumbled or Jumbled Speech</td>
<td>0.74</td>
<td>0.51</td>
<td>1.66</td>
<td>0.10</td>
</tr>
<tr>
<td>Interruptions</td>
<td>0.23</td>
<td>0.17</td>
<td>0.86</td>
<td>0.39</td>
</tr>
<tr>
<td>Perseverative Speech</td>
<td>0.06</td>
<td>0.01</td>
<td>1.41</td>
<td>0.16</td>
</tr>
</tbody>
</table>

*Note:* Mean differences with significance ($p$) values less than .05, was considered statistically significant; $M_1$ = mean of first half of observations; $M_2$ = mean of second half of observations.
from the first to the second half of observations. Thus, being in a general education environment may continue to have an ameliorative effect on social excesses and deficits commonly observed among adolescents with ASD.

The changes observed over the course of data collection in Oriented to Speaker and Appropriate Conversation with Teachers indicate a need for further investigation. Increases in orienting to speakers within the classroom setting may reflect increased comfort on the part of students with ASD, or increasing knowledge of classroom routines and norms. This is consistent with previous findings that children with ASD exhibit temperamental characteristics of shyness, one of which is being slow to acclimate to novel situations (Clifford, Hudry, Elsabaggh, Charman, & Hudson, 2013). Indeed, shyness as a personality characteristic may underlie the ASD symptoms of insistence on sameness and distress at small changes (APA, 2013; Schreib, Robins, & Solomon, 2014). Thus, students with ASD may increase their eye contact with and looking at other people as they become more comfortable in the classroom environment. This finding needs replication, however, and its impact upon academic and social success should be examined directly.

While not significant, the rate at which students spoke to peers also increased, and the degree of change is similar to the change in conversation with teachers, which was significant and declined over time. One possible explanation for this finding is that students spoke less to teachers as they increased the number of times that they interacted with peers. Also, as the definition of interaction in the present study required relatively complex interactions (three back and forth utterances), students with ASD may have acquired skills and comfort in interaction over time that allowed them to begin to demonstrate higher order conversation skills (rather than single initiations and responses, which were not coded). Conversely, peers may have become more knowledgeable about their classmates with ASD, in ways that allowed them to foster and support lengthier conversations in the classroom setting. Perhaps simultaneously, teachers may have come to discourage lengthy interactions from students with ASD over time, via verbal or nonverbal cues indicating their lack of availability for continued interaction. Each of the above hypotheses should be investigated, to determine the contextual factors that evoke and reinforce social academic behavior among adolescents with ASD. Such analyses would be strengthened by larger sample sizes, which would allow for stronger demonstration of significant changes, when they occur.

Students without ASD were not observed in this exploratory study. However, conclusions about the relative importance of each of the social academic behaviors explored here, as well as any other behaviors of concern in general education settings, will be strengthened by comparison to students without ASD. Future investigations of social academic indicators of success should include typically developing peers, including those with non-pervasive disabilities, such as Attention Deficit/Hyperactivity Disorder (ADHD) or learning disabilities (LD). Comparisons across these groups will provide much-needed knowledge of normative progression of social academic behaviors for students with a variety of disabilities, as well as provide guidance for educators regarding what kind of challenges they are likely to encounter in diverse general education secondary classrooms. If such analyses can be conducted longitudinally, including when students are first introduced to general education academic instruction, more information will be available about normative progression over time.

Understanding the progression of social academic behavior and its relation to ASD symptom presentation in adolescence has the potential to facilitate decision-making about when and to what degree students are ready for instruction in the large group, general education setting. This would represent an important advance, as there is evidence that, currently, educators making decisions about inclusion in general education settings for students with ASD consider many complex factors, but lack an integrated way of evaluating students’ readiness (Sansosti & Sansosti, 2012). While it is indisputable that a constellation of social, behavioral, academic, and communicative skills are prerequisite for inclusion in general education, what is lacking is a systematic way of documenting a minimal
level of progress in each area that may qualify a student as being ready for instruction alongside typically developing peers. Future investigations of social academic behavior, such as those measured here, can address this lack by beginning to draw conclusions across behaviors about when and under what conditions important developmental shifts occur. A developmental focus on the growth of social academic behaviors for adolescents with ASD is appropriate, given both the developmental nature of ASD and recent evidence suggesting that development is as dynamic in adolescence as it is during the childhood years (Blakemore, 2012).

Finally, while knowing the social academic behaviors demonstrated by students with ASD vis-à-vis the behavior of typically developing peers will assist in decision-making and progress monitoring efforts, it is also possible that students with ASD may demonstrate a unique progression of social academic skills. Further, individual development cannot be forgotten, such that different individuals with ASD are likely to demonstrate no small degree of variability in their rates of skill acquisition. Thus, as future research delves further into how and when adolescents with ASD exhibit developmental leaps in their social academic behaviors, individual factors that contribute to relative differences in rates of progress should also be explored.

References


Individuals with Disabilities Education Improvement Act of 2004, 20 U.S.C. 1400 et seq.


National Center for Education Statistics. (2013). Table 204.30. Children 3 to 21 years old served under Individuals with Disabilities Education Act


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The eighth volume of the CEC Division on Autism and Developmental Disabilities’ Prism series, *Friendship 101* focuses on building social competence, friendship making, and recreation and leisure skills among students with autism spectrum disorder and other developmental disabilities. Chapters in this evidence-based, user-friendly guide address the needs of students in different developmental periods (from pre-K through young adulthood), providing teachers, parents, faculty and teacher educators with tools and strategies for enhancing the social skill development of these children and youth. Presented through an ecological perspective, together these chapters emphasize building social competence within and across school, home, and community contexts.

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Education and Training in Autism and Developmental Disabilities

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