

1-1-2017

Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research and Practice

Pamela J. Mims

East Tennessee State University, mimspi@etsu.edu

Carol Stranger

Attainment Company, Inc.

Follow this and additional works at: <https://dc.etsu.edu/etsu-works>



Part of the [English Language and Literature Commons](#), and the [Women's Studies Commons](#)

Citation Information

Mims, Pamela J.; and Stranger, Carol. 2017. Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research and Practice. *DADD Online Journal*. Vol.4 6-19. http://daddceec.org/Portals/0/CEC/Autism_Disabilities/Research/Publications/DOJ_Volume4_2017.pdf

This Article is brought to you for free and open access by the Faculty Works at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in ETSU Faculty Works by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact digilib@etsu.edu.

Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research and Practice

Copyright Statement

© Division on Autism and Developmental Disabilities. This document was published with permission by the publisher. It was originally published by the *DADD Online Journal: Research to Practice*.

DADD Online Journal

Research to Practice

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

Volume 4 Number 1

DADD

December 2017

DADD ONLINE JOURNAL

*Journal of the Division on Autism and Developmental Disabilities
Council for Exceptional Children*

Editor: Stanley H. Zucker
Arizona State University

Associate Editors: Juliet E. Hart Barnett
Arizona State University

Emily C. Bouck
Michigan State University

Guest Editors: Kim W. Fisher
University of Illinois Urbana-Champaign

Meaghan McCollow
California State University, East Bay

Elizabeth West
Longview School District

Guest Reviewers: Amy Accardo, Kimberly Bean, Cean Colcord, Marissa Congdon, Liz Harkins, Aleksandra Hollingshead, Sarah Howorth, Lisa Liberty, Meghan McCollow, Annie McLaughlin, Bridget Miller, Cori More, Carly Roberts, Tal Slemrod, Renee Speight, Leah Wood, Colleen Wood-Fields

The *DADD Online Journal* integrates research and practice, reflecting the need for evidence-based and practice informed strategies and interventions within this diverse field. Topics include: Autism Spectrum Disorder, Assistive & Adaptive Technology, Early Childhood, Intellectual Disability, Mental Health, Multiple Disabilities, Paraprofessionals, Employment, Post-Secondary, and Transitions.

DADD Online Journal (ISSN 2377-3677), Volume 4, Number 1, December 2017, Copyright 2017 by the Division on Autism and Developmental Disabilities, The Council for Exceptional Children, 2900 Crystal Drive, Suite 100, Arlington, VA 22202-3556.

Division on Autism and Developmental Disabilities

Council for Exceptional Children

Board of Directors

Officers

PAST PRESIDENT David Cihak
PRESIDENT Elizabeth West
PRESIDENT-ELECT Jordan Shurr
VICE PRESIDENT Michael Wehmeyer
SECRETARY Meaghan McCollow
TREASURER Gardner Umbarger

Members

Autumn Eyre (Student Representative)
Beth Kavannah
Nikki Murdick
Leah Wood

Executive Director

Teresa Doughty

Publications Chair

Michael Wehmeyer

Communications Chair

Emily C. Bouck

Conference Coordinator

Cindy Perras

The purposes of this organization shall be to advance the education and welfare of persons with autism and developmental disabilities, research in the education of persons with autism and developmental disabilities, competency of educators in this field, public understanding of autism and developmental disabilities, and legislation needed to help accomplish these goals. The Division shall encourage and promote professional growth, research, and the dissemination and utilization of research findings.

DADD Online Journal

VOLUME 4

NUMBER 1

DECEMBER 2017

- Research Informed Practice in Autism, Intellectual Disability, and Developmental Disabilities** 1-5
STANLEY H. ZUCKER, KIM W. FISHER, MEAGHAN MCCOLLOU, and ELIZABETH WEST
- Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research and Practice** 6-19
PAMELA J. MIMS and CAROL STANGER
- The College Road Trip: Supporting College Success for Students with Autism** 20-35
GRACE L. FRANCIS, JODI M. DUKE, and CAYA CHIU
- College-Bound Young Adults with ASD: Self-Reported Factors Promoting and Inhibiting Success** 36-46
AMY L. ACCARDO
- Seeking the Perspectives of Transition-Age Students with Significant Disabilities in Research since 1990** 47-62
SAMANTHA WALTE, LISA S. CUSHING, LINDSAY S. ATHAMANAH, and KASANDRA POSEY
- Secondary Interventions for Young Children with Behavior Difficulties** 63-79
CEAN R. COLCORD, SARUP R. MATHUR, STANLEY H. ZUCKER, and REBECCA I. HARTZELL
- Increasing Food Variety and Intake Using High-Probability Sequencing** 80-91
HAYLEY E. JOHNSON and SETH KING
- College Students with Intellectual Disability Using YouTube to Access Video Instruction and Acquire Vocational Skills** 92-109
DAVID F. CIHAK, BYUNGKEON KIM, DON D. MCMAHON, RACHEL WRIGHT, JASON GORDON, and MELINDA M. GIBBONS
- What's BEFORE the iPad®? Teaching Basic Prerequisite Skills for iPad® Use** 110-122
KIMBERLY MAICH, STEVE SIDER, CARMEN HALL, and MEGAN HENNING
- The Brain and Autism: What Does Brain Research Tell Teachers?** 123-141
VICTORIA FRICKE, TANYATHORN HAUWADHANASUK, NIKKI MURDICK, and AMRITA CHATURVEDI
- Practical Application of Applied Behavior Analysis in the School Setting for an African American Female with Autism** 142-158
L. LYNN STANSBERRY BRUSNAHAN and ERIN FARRELL
- A University Based Model for Changing Outcomes for Individuals with Intellectual and Developmental Disabilities** 159-176
CHRISTINA R. CARNAHAN, CARLA SCHMIDT, KATHERYN DOYLE, DIANE CLOUSE, and CATHERINE DART

Gender Identity and Sexual Diversity: Supporting Individuals with an Intellectual or Developmental Disability 177-189
GLORIA Y. NILES and ELIZABETH A. HARKINS MONACO

Investigating the Symptoms of Traumatic Stress in Fathers of Children Diagnosed with Autism 190-202
CLINTON SMITH, LAURA BAYLOT CASEY, ROBERT L. WILLIAMSON, and SUSAN E. ELSWICK

Research Informed Practice in Autism, Intellectual Disability, and Developmental Disabilities

Stanley H. Zucker
Arizona State University

Kim W. Fisher
University of Illinois Urbana-Champaign

Meaghan McCollow
California State University, East Bay

Elizabeth West
Longview School District

On January 18 – 20, 2017, the Council for Exceptional Children Division on Autism and Developmental Disabilities (DADD) sponsored its Eighteenth International Conference: Research Informed Practice in Autism, Intellectual Disability and Developmental Disabilities. The conference was held at the Sheraton Sand Key Resort in Clearwater, Florida. The DADD Board of Directors decided to devote this issue of the *DADD Online Journal* to conference papers. The conference brought together educators from school and college classrooms from all over the world. The conference included pre-conference training institutes and strands on assistive and adaptive technology, autism spectrum disorder, intellectual disability, mental health, paraprofessionals, parental engagement, post-secondary transitions, and multiple disabilities. The conference provided many parents, teacher educators, researchers, teachers, and other practitioners an opportunity to gather to learn the most current information related to providing services for individuals with autism, intellectual disability, and developmental disabilities.

This issue of the *DADD Online Journal* can enable those who attended the conference to see expanded papers, prepared by presenters, and also give those who were unable to attend an opportunity to benefit from the thoughtful work done by conference participants.

Presenters were asked to submit papers based on their conference presentations. Papers submitted went under a blind review process by the Guest Reviewers and Guest Editors who selected the papers for publication. We think the selection of papers represents an interesting assortment of topics and formats ranging from discussion papers to data based research to descriptions of classroom techniques. The papers selected do not necessarily represent all the topics covered at the conference but they do give a good idea of the variety and quality of the presentations. We would like to thank those authors who submitted papers for their efforts in making this issue of the *DADD Online Journal* possible.

One of the many challenges that confront special educators who teach students with intellectual and developmental disabilities is how to bridge research to practice. In their article “*Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research to Practice*,” Pamela J. Mims and Carol Stanger describe effective strategies that educators can use to teach meaningful, grade aligned English Language Arts (ELA) content. These authors identify that this instruction can provide a full educational experience that can lead to increased quality of life for students with moderate and severe intellectual developmental disabilities. This article

provides educators with a clear framework for teaching grade aligned ELA and advocates for the use of technology to be considered as an option for supplementing instruction.

In the next article “*The College Road Trip: Supporting College Success for Students with Autism*,” Grace L. Francis, Jodi M. Duke, and Caya Chiu describe a framework of strategies and resources educators, students, and families can use to support the transition to college for students with autism. Using a vignette weaved throughout the manuscript and a “road trip” style framework, they provide resources and information to support educators, students, and families as they plan and experience “road bumps” in the post-secondary experience. Throughout the framework, the delineation between family responsibilities and supports and student responsibilities and supports are clear – mirroring the expectations of the post-secondary environment. The importance of planning, being aware of resources, and recognizing of the common experiences and expectations of post-secondary education are emphasized throughout the manuscript.

In her article “*College-bound Young Adults with ASD: Self-Reported Factors Promoting and Inhibiting Success*,” Amy L. Accardo describes a study that examined the perspectives of college-bound young adults with ASD as they transitioned from high school to college. These first-hand accounts provide a unique perspective on what success as a college student means, what influenced their decision to attend college, and what obstacles have been presented to these young adults with ASD. Twelve young adults with ASD, all male, participated in the interviews and represented a wide range of high school experiences (e.g., self-contained support settings, resource room support settings, public high school, 1:1 aide) and a variety of

college majors (e.g., computer science, English, psychology). Interviews were coded using grounded theory, allowing for themes to emerge from the interview transcripts. Two major themes emerged from the interviews – *Defining Success*, *Identifying Factors Influencing Success*. For themes under *defining success*, most participants described success as getting good grades, feelings of self-efficacy, participating in social opportunities, and graduating. Sub-themes under *identifying factors influencing success*, participants described support from parents and mental health issues. As we watch opportunities grow for young adults with ASD, gaining their perspectives on transition issues (i.e., transition from high school to post-secondary education) is an important step to identifying supports needed as well as the strengths each individual brings to the transition process.

In the next article “*Seeking the Perspectives of Transition-Age Students with Significant Disabilities in Research Since 1990*,” Samantha Walte, Lisa S. Cushing, Lindsay S. Athamanah, and Kasandra Posey’s literature review reveals an important and often missed view of transition, the perspective students with severe intellectual and developmental disabilities (SIDD), their parents, and stakeholders. In the 11 articles that met inclusion criteria, the authors found that researchers used specific methods to obtain information about transition from SIDD (e.g., forced-choice and open-ended questioning methods), strategies to support the validity of responses for individuals with SIDD (e.g., cross-checking student responses), and strategies to support student participation (e.g., augmentative and alternative communication). These methods may be critical in understanding SIDD’s transition needs.

Cean R. Colcord, Sarup R. Mathur, Stanley H. Zucker, and Rebecca I. Hartzell examined a multi-component intervention, delivered at the Tier 2 PBIS level, to improve classroom behaviors of three elementary students with developmental disabilities in their article “*Secondary Interventions for Young Children with Behavior Difficulties*.” Each student was identified by his or her teacher as needing intervention to decrease disruptive classroom behavior. The researchers designed an intervention to target improved on-task behaviors as defined by readiness/preparedness, in-seat behavior, and appropriate academic responding and engagement. Their multi-component intervention utilized social skills training, check-in/check-out procedures, and behavior specific praise. The special education teachers taught the intervention to the participants and asked them to take what they learned into the classroom and utilize it. All three participants increased their use of on-task behaviors and were able to maintain those behaviors post-intervention. This study provides evidence to a multi-component intervention used by both special education and general education teachers providing additional support to the fact that collaboration in intervention is key.

In the next article “*Increasing Food Variety and Intake using High-Probability Sequencing*,” Hayley E. Johnson and Seth King used a multiple-probe design to test whether intake of low probability foods for an 11-year old girl with Autism increased when paired with low-probability foods. Similar to a priming intervention, the researchers primed the participant with a series of three trials of high probability food followed by presenting a low-probability food. Across three low-probability foods, the participant’s take of low-probability food increased suggesting that pairing high-probability foods with a low-probability food

may decrease food sensitivity for children with autism.

While researchers have established video modeling as an evidenced-based practice to promote acquisition and generalization of a variety of skills, including vocational training of individuals with intellectual and developmental disabilities (IDD), most researchers use instructor or teacher created videos on designated technology. Little to no research has explored how readily available videos on YouTube can be used to teach these skills. In their article “*Evaluating Video Modeling Using Youtube to Acquire Vocational Skills for College Students with Intellectual Disability*,” David F. Cihak, Byungkeon Kim, Don D. McMahon, Rachel Wright, Jason Gordon, and Melinda M. Gibbons use YouTube to teach to acquisition important vocational skills using a copy machine, data entry, and formatting a document. Using a single-subject multiple probe design across participants, the participants were able to use YouTube to teach themselves the specified vocational tasks. This work is promising as it utilizes a readily available video app containing a nearly limitless supply of ready-made videos and an opportunity for individuals with IDD to create their own channel, organize their videos, and access their videos wherever they are located which may increase independence.

In “*What’s BEFORE the iPad®? Teaching Basic Prerequisite Skills for iPad® Use*,” Kimberly Maich, Steve Sider, Carmen Hall, and Megan Henning describe how, and what, iPad® skills can be taught as part of the considerations for utilizing an iPad® as assistive technology. The authors begin with Universal Design for Learning and making learning accessible to all learners as they describe setting the stage for teaching use of iPad® and tablet devices as assistive devices.

Continuing on, the authors then address the considerations that need to be made and the skills (e.g., swiping, dragging, tapping) that need to be taught as learners are introduced to the use of an iPad® or other tablet devices, as well as recommending types of apps to consider for teaching these skills (e.g., cause and effect). Considerations for Individualized Education Plans (IEPs) and integrating teaching iPad® and tablet skills into teaching plans is described, making it clear how educators can incorporate these skills into everyday practice clear. A case study describing one learner’s journey from being introduced to an iPad® to utilizing it for communication in an inclusive classroom ties the article together, putting theory into practice.

Victoria Frike, Tanyathorn Hauwadhanasuk, and Nikki Murdick highlight important areas of brain research for autism spectrum disorder and how educators can use that information in their article “*The Brain and Autism: What Does Brain Research Tell Teachers?*” Four essential areas of brain research are described – sensory integration, executive function, psychological awareness and memory, and social competence. The authors define and describe each area, providing an overview of the current research, then discuss implications for the classroom, and strategies for selecting and using interventions and instructional activities to support students with autism. By translating the current brain research in autism, the authors have provided an accessible means for educators to gain insight into the current research as well as the implications for the classroom from that research.

In the next article “*Practical Application of Applied Behavior Analysis in the School Setting for an African American Female with Autism*,” L. Lynn Stansberry Brusnahan and

Erin F. Farrell describe the implementation of applied behavior analysis (ABA) procedures and strategies by a school-based team. This case study describes the steps one school-based team took to address the challenging behaviors of a 6-year old kindergarten female with autism, from the functional behavior assessment to selecting a communication-based alternative behavior to utilizing ABA strategies such as schedules of reinforcement for teaching the selected alternative behavior. The steps are clearly described as well as defining important terminology and utilizing easy to remember acronyms for each step the team made. The importance of data collection, including describing a variety of data systems for tracking different dimensions of behavior (e.g., frequency, duration, intensity), and how to use the data collected is described along with providing an example of the data form used by the school team. Results indicate a behavior change for this student as a result of the functional communication training. This case study supports previous research on the use of ABA in school settings and provides clear insight into steps one school-based team took to implement a behavior change program for a young student with autism.

Federal legislation and advocacy efforts have increasingly focused on postsecondary and employment opportunities for individuals with intellectual and developmental disabilities. The university context provides a wealth of opportunity across the physical and academic environment for learners who have extensive support needs. In the article “*A University Based Model for Changing Outcomes for Individuals with Intellectual and Developmental Disabilities*,” Christina R. Carnahan, Carla Schmidt, Katheryn Doyle, Diane Clouse, and Catherine Dart describe a model for creating programs for individuals with intellectual and developmental disabilities with a continuum

of support needs from mild to complex. They provide a discussion of specific programs, and barriers and facilitators to success. The authors illustrate this model in action as they present three student examples and include a highlight of each individual day. Relationships can develop when a continuum of programs on university campuses is provided. The authors indicate that these relationships have the power to change how we include individuals now and in the future.

Gloria Y. Niles and Elizabeth A. Harkins Monaco provide important suggestions for supporting gender identity and sexual diversity for learners with intellectual or developmental disability (IDD). In their article, *“Gender Identify and Sexual Diversity: Supporting Individuals with an Intellectual or Developmental Disability* the authors posit that children with IDD are often not provided with opportunities for personal sexual growth and development. Suggestions are provided for parents, educators and school communities to support and encourage those with IDD to explore and express their gender identity and sexual orientation. These authors identify that individuals with IDD have the right to explore their gender identity and sexuality and that this exploration promotes self-determination.

In the next article, *“Investigating the Symptoms of Traumatic Stress in Fathers of Children Diagnosed with Autism,”* Clinton Smith, Laura Baylot Casey, Robert Williamson, and Susan Elswich focused solely on fathers to examine stress levels. A particular type of stress was explored, traumatic stress where recommendations were grounded in a trauma-based framework. The specific traumatic event that the fathers were asked to provide input on was the diagnosis of autism for their child. Results from the study indicated that fathers do experience stress and the stress levels of fathers participating in the study differed. The authors of this study provide suggestions for supporting fathers and specifically identify information on evidence-based treatments and multi-systematic programming to assist the family as they navigate service delivery and supports. The authors advocate for interventions that focus on a reduction of using avoidance strategies to cope with stress and a shift towards a more problem-based approach.

The conference provided educators and researchers with the opportunity to explore current research, topical issues, and best practices relating to autism, intellectual disability, and development disabilities. We hope readers of this research to practice issue of the *DADD Online Journal* find the information valuable and timely.

Correspondence concerning this article should be addressed to Stanley H. Zucker, Special Education Program, Mary Lou Fulton Teachers College, Box 871811, Arizona State University, Tempe, AZ 85287-1811. Email: dadd@asu.edu

Bringing Meaningful Grade Aligned English Language Arts to the Classroom: Bridging Research and Practice

Pamela J. Mims
East Tennessee State University

Carol Stanger
Attainment Company, Inc.

Instruction in meaningful grade aligned English Language Arts (ELA) content for students with moderate to severe intellectual and developmental disabilities provides a full educational experience that can lead to increased quality of life. Many teachers, however, face barriers in how to teach meaningful, grade aligned ELA. This article bridges research to practice by describing effective strategies for teaching a wide range of strands that fall under ELA, such as comprehension, writing, and student-led research. In addition, a framework is offered as a model of how to put it all together when teaching grade aligned ELA.

Given the era of standards-based instruction for students with moderate to severe disabilities (SwMSD) including those with intellectual and developmental disability, teachers must bridge barriers to provide meaningful grade aligned instruction. This drive includes instruction in English Language Arts (ELA) standards, yet barriers to meaningful ELA instruction exist. For example, many SwMSD lack emerging reading skills, have difficulty with the mechanics of writing and organizing information, and have limited expressive communication skills. In addition, many teachers of SwMSD lack training in content areas or have limited resources with which to teach grade aligned ELA. Given these barriers, teachers need strong strategies and resources to teach the standards they are charged with teaching.

Recent research has provided viable options for teachers of students with SwMSD. For example, use of technology (Knight, Mckissick, & Saunders, 2013), grade aligned adapted text (Browder, Trela, & Jimenez, 2017), systematic instruction (Spooner, Knight, Browder, & Smith, 2012), and

graphic organizers (Knight, Browder, Agnello, & Lee, 2010) are several of the mechanisms available to teachers to successfully navigate access to strong and effective instruction in ELA. Through the use of these strategies, as well as providing access to meaningful grade aligned content, teachers both meet mandates for academically aligned instruction (NCLB, 2002; IDEA, 2004; IDEIA, 2007) and nurture their students' life-long skills in making choices, thinking critically, and living with greater independence (Kearns et al., 2010; Root, Knight, & Mims, 2016).

Knowledge of effective strategies, however, as well as content instruction varies widely across educators for a range of reasons such as personal philosophy, balance between functional and academic instruction, lack of supports, prior teaching experiences, teacher preparation training, and lack of professional development (Spooner, Browder, & Mims, 2012). In addition, research has shown that teachers feel unprepared to meet the above mandates and provide meaningful access. The reasons vary, but a study conducted by Durando (2008), which investigated attitudes

and instructional practices of those who taught students with multiple disabilities, found that over 70% of the teachers reported feeling unprepared. In addition, only half of the respondents felt reading instruction was appropriate for every student and that cognitive ability was viewed as the most important factor in deciding if literacy was important to teach. Finally, almost all of the teachers (92%) expressed interest in professional development focused on teaching literacy skills to this population.

A qualitative study by Peterson (2016) was conducted to understand the perspectives of teachers of SwMSD. Results indicated that the teachers were confused over general education curriculum access as they viewed it as the alternate assessment process. In addition, teachers expressed a lack of knowledge of state standards (e.g., CCSS) which led the author to suggest a need for professional development focused on the alignment between curriculum, instruction, and assessment. Many teachers reported having concerns about providing access to students across multiple grade levels, pace and prioritization of instruction, and time management for instruction in functional and life skills while teaching academics.

Despite the concerns over teacher preparedness and attitudes, studies have shown that when using effective instruction, SwMSD can benefit from access to literacy instruction (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006) or targeted academic skills. Grade aligned ELA goes beyond teaching literacy, therefore, guidance is needed on effective strategies to teach more comprehensive ELA skills, including literacy. The purpose of this article is to outline ways teachers of SwMSD can address meaningful instruction in grade aligned ELA

based on the results from several studies which demonstrated measurable gains in vocabulary, comprehension, writing, and student led investigation. In addition, guidance will be provided for teaching a wide range of ELA skills, using research to guide the recommendations. Finally, a framework will be provided for incorporating a range of grade aligned ELA skills into a Unit.

Grade-aligned ELA Skills

Using Adapted Grade Aligned Text.

Current legal mandates have pushed educators of SwMSD to provide access to grade appropriate content (NCLB, 2002; IDEA, 2004; IDEIA, 2007). In ELA, this includes access to the same text as students without disabilities of the same age and grade. Although this can present a challenge for this population as many texts are not accessible and need to be adapted (Hudson & Test, 2011). Common text adaptations have included rewriting the text at lower lexile levels and providing text summaries with controlled vocabulary, adding repeated story lines that support the main idea of the chapter or text, and adding picture supports (Hudson & Test, 2011). In addition to adapted text, research has indicated that a shared story approach (also known as repeated reading, read aloud, and story-based lesson) is effective for increasing communication, engagement, and comprehension (Mims, Browder, Baker, Lee, & Spooner, 2009). A shared story is a process that includes repeated readings, using a task analytic approach to encourage active student interaction with the text and promote emergent literacy skills (e.g., text pointing, turning pages) and comprehension (Browder et al., 2007). In fact, in an evaluation of the evidence base, Hudson and Test (2011) have identified shared story reading as a promising practice for promoting literacy for SwMSD.

Since this evaluation, additional studies have been published reinforcing the efficacy of a shared story approach to access adapted grade aligned text. For instance, Roberts and Leko (2013) conducted a study to investigate the effects of integrating academic and functional goals in a story based lesson of adapted grade level text on the percent of correct responses by students with significant cognitive disabilities. Results indicated that students improved their functional and academic goals.

Grade aligned adapted shared stories have been used to promote additional ELA skills beyond literacy. In a study by Mims, Lee, Browder, Zakas, and Flynn (2012), they taught a variety of ELA skills. The authors included a variety of adapted middle grade texts (fiction, nonfiction, poetry, plays) as the basis for ELA units focused on teaching a range of skills (e.g., vocabulary, comprehension, opinion writing, student led research, simile, onomatopoeia). This study used a one-group, nonrandomized, pre-posttest design to investigate the effects of an ELA curriculum (*Teaching to the Standards: English Language Arts*) on a pre and post Unit test. Results indicated significant gains were found in vocabulary and comprehension.

In the above examples, teachers delivered the shared story interventions. Technology has also become a plausible option for the delivery of shared stories. For example, a shared story via an iPad application (*Access Language Arts, 2017*) was used in a study focused on teaching opinion writing to middle grade students with moderate and severe disabilities (Mims et al., in press) in a multiple probe across participants design. Specifically, after listening to an adapted version of *The Outsiders*, read via the iPad app, students were taught to create a five-sentence opinion paragraph based on the

targeted adapted chapters using systematic instruction (i.e., system of least prompts). The findings indicated the intervention resulted in increased opinion writing skills for all three participants.

In addition, Spooner, Ahlgrim-Delzell, Kemp-Inman, & Wood (2014) used an iPad to serve as the platform for a shared story and focused on a task analysis to promote emergent literacy skills for three elementary SwMSD. Results indicated the iPad delivered shared story was effective in increasing the targeted emergent literacy skills.

Teaching Grade Aligned Vocabulary. Lifelong learners of all ages continue to expand their vocabulary. SwMSD also benefit from receiving vocabulary instruction. Historically, vocabulary instruction has included instruction in words that have a functional value (e.g., safety words, grocery words), but more recently, researchers have shown teaching more grade aligned content words to be of high value for SwMSD. In fact, studies have demonstrated SwMSD have been able to actively participate in grade aligned ELA, math, and science lessons because they were taught the academic vocabulary necessary to make progress in the lessons (e.g., Browder, Trela, Courtade, Jimenez, Knight, & Flowers, 2012).

Constant time delay (CTD). One strategy shown to be highly effective in teaching targeted vocabulary is the response prompting strategy of CTD. CTD is an evidence based practice to teach sight words and vocabulary (Browder, Ahlgrim-Delzell, Spooner, Mims, & Baker, 2009). It consists of two rounds, a zero-time delay round and a time delay round. For example, when teaching targeted vocabulary, in the zero-time delay round, an array of words will be placed in front of the student (e.g., 2x2) and

the teacher will point to a targeted word and ask the student to point to the same word (e.g., point to the word ‘habitat’ while the teacher is pointing to the word). The teacher would then mix up the array of words and continue on until all words have been presented in the zero-delay round. During the delay round, the teacher needs to preset the wait time (e.g., 5 seconds). The words will be presented in the same random array and the teacher will ask the student to identify a targeted word and wait the set amount of time for the student to respond. If the student provides a correct response within the set amount of time, the teacher would praise the correct response (e.g., give a high five and “Nice job! That is the word, ‘habitat’”). If the student does not respond within the set amount of time, the teacher would prompt by showing the student the targeted word and moving on to the next word. If the student provides an incorrect response, the teacher will either block and redirect to the correct answer or just redirect to the correct answer.

An efficient strategy to implement CTD is through small group instruction. Small group instruction has been shown to be a highly efficient format for teaching SwMSD (Doyle, Gast, Wolery, Ault, & Farmer, 1990). In fact, research has shown that by incorporating observational and incidental learning into group instruction, it can lead to acquisition of targeted skills (Doyle et al., 1990). For example, when teaching vocabulary to a small group of students, the teacher can use CTD instruction with student A on a particular word, while telling students B, C, and D to watch student A. This can be repeated by targeting instruction with a new student each round of time delay. In addition, the definition of the targeted word can be embedded in the praise statement or paired with the reinforcement provided (e.g., Excellent! Precipitation means liquid that falls from the sky.).

Mims, Lee, et al. (2012) used CTD to teach targeted vocabulary words in the theme based ELA lessons pulled from grade aligned adapted text. All teachers in this study implemented the lessons in a small group format and incorporated observational and incidental teaching strategies. Results of the vocabulary acquisition showed strong gains in the treatment group from pre to posttest. This strategy has also been effective in teaching science content. One component of the Browder et al. (2012) study used CTD to teach science concepts to students with autism and ID during science inquiry lessons. Results showed that students in the treatment group had significant gains on science vocabulary from pretest to posttest.

Technology has also supported the use of CTD to teach targeted vocabulary. *Access: Language Arts* has replicated the CTD procedure in that it provides a zero delay round when introducing an array of four vocabulary words. The zero second delay round is followed by a 5-s. delay round. After each trial, the words are randomly shuffled to avoid the students memorizing the position of the word. Praise and specific feedback are incorporated as part of the instructional protocol, modeling evidence based best practice. In addition, small group instruction with observational and incidental learning can occur if you pair your iPad with an Apple TV and connect to a smart board. The smart board will mirror everything that occurs on the iPad so all classmates can see the screen of the iPad on the smartboard.

Teaching Grade Aligned Comprehension. While strategies for teaching comprehension are well established, SwMSD are seldom recipients of instructional protocols for comprehension (Knight & Sartini, 2015). The majority of research on literacy instruction for SwMSD has focused predominantly on reading sight words (Browder et al., 2006).

While knowing sight words is an excellent functional goal for SwMSD, reading sight words in isolation does not impact or improve comprehension (Browder et al., 2009). In a literature review by Al Otaiba and Hosp (2004), the authors primarily found studies for sight word retention, phonemic decoding, and phonological awareness. While one study identified in the 2004 literature review supported the integration of phonics and basal reading instruction, no studies were found that investigated fluency, vocabulary, or reading comprehension. The lack of research on SwMSD learning higher level skills including comprehension is in stark contrast to the promise of grade-aligned academic intervention for this population (e.g., Hudson, Browder, & Wood, 2013; Spooner et al., 2012) and the measurable progress that SwMSD make when exposed to grade-aligned academic instruction (Hudson, Browder, & Wood; Spooner et al.).

Newer research on teaching comprehension to SwMSD serves as a guide to effective strategies for promoting comprehension. For instance, Knight and Sartini (2016) conducted a review of the literature to identify effective comprehension strategies for students with ASD. Results indicated response prompting strategies (e.g., model-lead-test, CTD, system of least prompts) and visual supports have been shown to be effective in increasing comprehension skills across ELA, math, and science.

System of least prompts (SLP). Several researchers have found the SLP to be effective in teaching listening comprehension. For example, Mims et al. (2009) conducted a study that implemented the SLP to promote listening comprehension during a shared story for two students with visual impairments and severe intellectual disability. The study used relevant salient objects during the reading of the story and

then used the same objects for response options when asking questions. Results indicated both students increased the number of correct responses to comprehension questions across all three targeted books and maintained the results over time.

Modified SLP. Other researchers (e.g., Mims, Hudson, & Browder, 2012) have used SLP as well, but modified its implementation by changing the typical hierarchy of prompts (e.g., Verbal, Model, Physical) to the following: (a) reread text containing or alluding to the answer and reask the question, (b) reread more targeted text containing or alluding to the answer and model the correct answer, reask the question, and (c) show the answer in the text, and physically prompt the student to show the answer. The modified SLP has also been implemented with fidelity by peers without disabilities. In a study by Hudson, Browder, and Jimenez (2014), peers delivered the modified SLP to promote listening comprehension of students with moderate ID during the read aloud of science content.

Graphic organizers. The modified SLP has also been paired with a graphic organizer to promote the rules for answering WH-questions (e.g., When you hear “Where” listen for a place.) across a range of texts. For example, Wood, Browder, and Flynn (2015) used a modified SLP paired with a graphic organizer to help students with intellectual disability answer literal and inferential questions from a social studies text in an inclusive classroom.

Graphic organizers have also been used to help answer sequencing questions and story grammar. Mims, Lee, et al. (2012a) used a three-sequence graphic organizer to help students sequence events of a story. Additionally, in this study, story grammar was taught using model-lead-test (MLT; e.g.,

My turn- a setting is where the story takes place. Together- a setting is where the story takes place. Your turn- a setting is where the story takes place), followed by examples and nonexamples with the use of a T-Chart graphic organizer.

Response options. In several of the highlighted studies noted above, response options had to be provided as many of the students were unable to generate their own answers. Response options can range from three (e.g., correct answer, close distractor, highly disparate distractor) to a whole response board (e.g., response board of characters from a story) and can range from salient objects to text only (Hudson, Browder, & Wakeman, 2013). It is essential that students have a way to show what they know when teaching comprehension.

Technology based interventions. Recent technology has provided an engaging format for teaching comprehension after reading an adapted shared text. Specifically, iPads have become an easy and accessible platform to promote grade aligned academic skills. For example, Spooner, Ahlgrim-Delzell, Kemp-Inman, and Wood (2014) conducted a study using an iPad (GoTalk Now app) to deliver a shared story and teach skills like comprehension through modified SLP to four students with autism and little to no verbal ability. Results showed all four students increased the number of independent correct responses to literal recall and inferential comprehension questions and maintained results over time.

In a similar study, (Spooner, Kemp-Inman, Ahlgrim-Delzell, Wood, & Davis, 2015) researchers investigated the effects of grade aligned adapted text presented via an iPad and systematic instruction (e.g., CTD to teach vocabulary, SLP to teach comprehension) to teach acquisition and generalization of

listening comprehension. Using a multiple probe across participants design, five students with severe disabilities were not only taught new literacy skills but also to generalize these skills to new chapters through multiple exemplar training.

Teaching Grade Aligned Writing. In writing, when students are asked to write in the context of academic instruction, they are provided with opportunities to make decisions about and therefore, reexamine the content (Graham & Harris, 2016). In this way, written expression plays a critical role in reading comprehension when taught together. Most writing instruction for SwMSDs, however, has been taught without consideration for reading instruction (Pennington & Delano, 2014). In particular, the majority of research investigations on writing for this population have been focused on spelling and word construction tasks, with few research studies incorporating the production of written narratives (Joseph & Konrad, 2009; Pennington & Delano, 2012). In contrast, SwMSD have demonstrated success in composing an opinion (Trela, 2008) or opinion paragraphs after reading an adapted age appropriate fictional novel and non-fiction stories (Mims, Lee, et al., 2012). For example, a component of a study by Mims, Lee et al. focused on teaching SwMSD to write an opinion, identify facts from the story to back up the opinion, critique the initial opinion, and argue the final opinion after reading a grade aligned adapted text.

Pre-teach paragraph components. While the research studies documenting SwMSD composing a unique written narrative are nominal (Joseph & Konrad, 2009; Pennington & Delano, 2012), students have demonstrated measurable success when provided with the opportunity (Mims et al., in press). A first step in teaching SwMSD to produce a written narrative is to teach the

parts of a paragraph by teaching rules for the types of sentences. For instance, an opinion statement can consistently start with, “I think...” or a conclusion statement can consistently be worded, “In conclusion, ...”. These rules will help students start to identify words to look for or use when composing their own sentences.

In addition to teaching the types of sentences (e.g., introduction, opinion, reason, conclusion), students need to be taught sentence order. Sentence order can be taught along with the rules (e.g., A conclusion sentence is where you summarize your paragraph. It starts with “in conclusion” and is the last sentence of our paragraph.) or can be taught by pairing the above instruction with a graphic organizer that indicates the order of sentence types.

Provide examples and nonexample instruction. After receiving instruction on the sentence types, students can apply the rules through example and non-example instruction. In the example of applying the rule to the opinion sentences, students would be provided with sample sentences that depict opinion sentences (those that model the rule of “I think...”) and non-opinion sentences (these can be a variety of distractor sentences, including different sentence types) and asked if each is an opinion sentence or is not an opinion sentence. This activity can be done with a T-Chart graphic organizer (students would place each sentence into the column indicating opinion sentence or the column indicating not an opinion sentence) or symbols that indicate yes, opinion or no, not opinion. In addition, this activity can be done with sentence strips, sentences written on strips of high density paper. Color coding can be added to help with differentiation. Picture symbols can be placed above key words like “think” (e.g., a lightbulb) or “conclusion” (e.g., a right facing arrow

against a line or wall to depict moving to the end).

Apply targeted text. After teaching sentence types and paragraph structure, students can be led through a similar series of steps to produce a paragraph after reading a chapter or text. In the case of opinion paragraphs, students should first be given an opportunity to select between two topics they want to write about (i.e., the character Ponyboy or the character Cherry). Next, students would be presented with options of opinions about the selected topic (“I think Cherry was nice.” or “I think Cherry was trouble.”). An opinion would be followed up with writing one or two reasons from the adapted story that support the chosen opinion (e.g., “Cherry was trouble because she was a Soc.”). Finally, the students would write their conclusion sentence.

Technology based options. Given many SwMSD may have discrepancies in communication, comprehension, fine motor skills, and ability to establish a clear opinion, supports are often needed to provide access to gaining skills in writing (Mims et al., in press). Technology-aided instruction has started to emerge as a plausible option for teaching skill acquisition in a variety of areas writing (e.g., spelling) (Pennington, 2010; Pennington, 2016; Pennington, Flick, & Smith-Wehr, in press). In a recent study (Mims et al., in press) combined the above strategies to teach a five-sentence opinion paragraph via an iPad application (*Access Language Arts: Write!*). The study was conducted with three middle grade students with intellectual disability after reading adapted chapters of *The Outsiders*. All three students showed gains from baseline to intervention in opinion writing.

Teaching Student Led Research. One of the most important skills that educators can

impart to their students is learning how to learn. Self-determination is well known to be directly correlated to success after graduation for students with disabilities (Wehmeyer, 2005). SwMSD have even fewer opportunities, however, to pursue knowledge in a self-determined topic of interest with independence, then opportunities to read with comprehension or produce written narratives (Shogren, Palmer, Wehmeyer, Williams-Diehm, & Little, 2012).

KWHL graphic organizer. A fundamental challenge with learning new information across diverse topic areas is knowing how to organize new information. Graphic organizers have a long history of assisting students in the general education or students with mild disabilities (Ciullo & Reutebuch, 2013), but research studies for SwMSD using graphic organizers are less plentiful (Knight et al., 2010; Knight, Spooner, Browder, Smith, & Wood, 2013). Applications of the KWHL chart (What do I **K**now, What do I **W**ant to Know, **H**ow do I find out, What did I **L**earn) have been shown to be effective across all content areas for SwMSD (Knight et al., 2010). Most of the KWHL studies have applied to science lessons to help guide students through the process of understanding scientific inquiry (e.g., Smith, Spooner, Jimenez, & Browder, 2013). Few studies have focused on student led research and the KWHL process as a follow up to a reading activity. In one example, Mims et al. (2009) included the KWHL process to guide researching a topic the students wanted to learn more about after reading a fictional novel. For instance, after reading *Number the Stars*, students wanted to learn more about the Nazi regime. The teachers guided the students through the KWHL process to help the students learn more about the topic.

Teaching sources of information. When teaching the HOW in the KWHL process,

teachers must consider providing students with a lesson on sources of information. Teachers can explain to their students that it is possible to find more information in a book on the topic, from an expert on the topic, or by searching the internet. Each of these methods provides a unique way for students to glean additional information. Teachers should help students summarize the important points gathered during this process. This can happen in a variety of ways. One way is to use a graphic organizer to identify the main idea and important details. This process leads to a helpful way for students to organize the new information they learned through their source.

System of Least Prompts. Throughout the above process, it is important for teachers to have a strong systematic instructional strategy to teach the steps to move through the KWHL process. The SLP has been successful in teaching students to identify the facts they know as well as the facts they learned. This process pairs well with a shared story of targeted text. After reading the first few adapted chapters of the fictional novel, *Number the Stars*, and proceeding to the first step of the KWHL process, the teacher can ask the students what they Know from the chapters they read. If the students do not respond, the teacher can start the modified SLP process as described above in the section on comprehension. This same strategy can be replicated for the -what did you Learn- step of the KWHL process. This process was used in the Mims, Lee, et al. (2012) study where students were provided an opportunity to conduct research on a topic related to the theme (e.g., During the theme of Social Justice, students conducted research on Ghandi using the KWHL process).

Research Report. Another option is to format the KWHL graphic organizer so the KWHL are in the far-left column and run top

to bottom (as opposed to left to right as typically seen). See Figure 1 for an example. This sets the students up for a written research report and each step of the graphic organizer serves as a writing prompt. Once filled in, the student has a written research report that can be presented aloud (using a voice output device if needed).

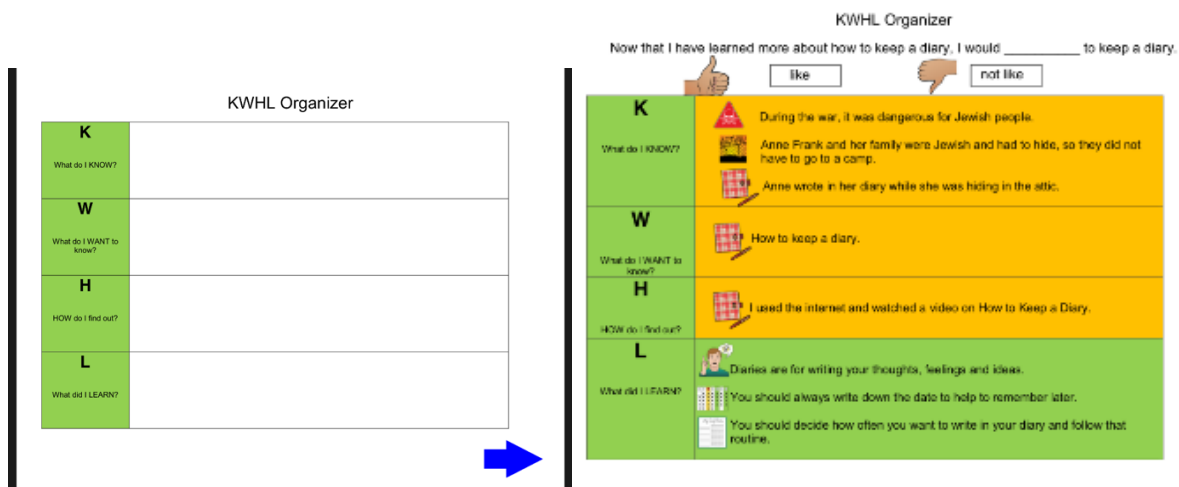
Technology based options. The KWHL graphic organizer can easily be built in an iPad app to provide a more interactive option for SwMSD to engage in the student led research process. For example, Authors (2016) conducted a study where the KWHL graphic organizer was built in GoBook app. Three students with significant disability were taught to research more about a topic using the KWHL graphic organizer and systematic instruction (e.g., task analytic instruction and SLP). Results showed that all three students improved the number of independent correct steps of the student led research task analysis after researching more about a topic introduced in targeted adapted text. In addition, all three students generalized to untrained content. The process used in the above study could easily be

replicated across other types of technology options (e.g., powerpoint) to promote overall engagement and add an additional format for conducting research.

Framework for Teaching Grade Aligned ELA

Given the success of the research on the skills highlighted above, a framework can help teachers for providing meaningful grade aligned ELA instruction to SwMSD. The framework features a comprehensive approach that includes theme based units using a variety of texts to support the identified theme (e.g., fiction, nonfiction). Using the adapted text as the basis for the lessons that target vocab, comprehension, writing, and student led research; interactive lessons that embed systematic instructional strategies, as highlighted above (e.g., CTD to teach vocabulary, SLP to teach comprehension); tools such as graphic organizers; and strategically paired with technology, skill acquisition in grade aligned ELA can be promoted. Social validity measures from many of the studies cited throughout, indicate that providing the opportunity to engage in grade appropriate

Figure 1. Example of blank and filled in KWHL Graphic Organizer



materials and acquire grade aligned skills in ELA, SwMSD result in a sense of belonging, improved knowledge about the world around them, and an overall increase in quality of life. See Figure 2.

Incorporating Technology. Technology has a decades long history of providing access to classroom content, yet it is just starting to emerge as a credible option to teach grade aligned academics for students with significant disabilities. For instance, although several studies have focused on effective strategies to promote listening comprehension of grade aligned text for SwMSD (Spooner et al., 2014), to date, few studies have been conducted to examine the effects of mobile technology, such as iPads, on listening comprehension. Yet it is widely known that students are engaged and motivated by technology (Knight et al., 2013).

In regard to teaching grade aligned ELA, technology should be considered as a viable option to the above framework for supplementing instruction. As highlighted in some of the studies reviewed above, technology has served as a strong format for instruction of grade aligned ELA content for SwMSD, but should not be used in isolation. Rather, strategically pairing technology with teacher-led instruction can reinforce targeted skills and provide an option for generalization. For example, a classroom teacher may decide to use *Teaching Standards: Language Arts* for the lesson on the nonfiction story, *Neighbors*. This lesson starts off by using CTD to teach targeted vocabulary from the story. After vocabulary instruction, the teacher would proceed through the shared story reading of the

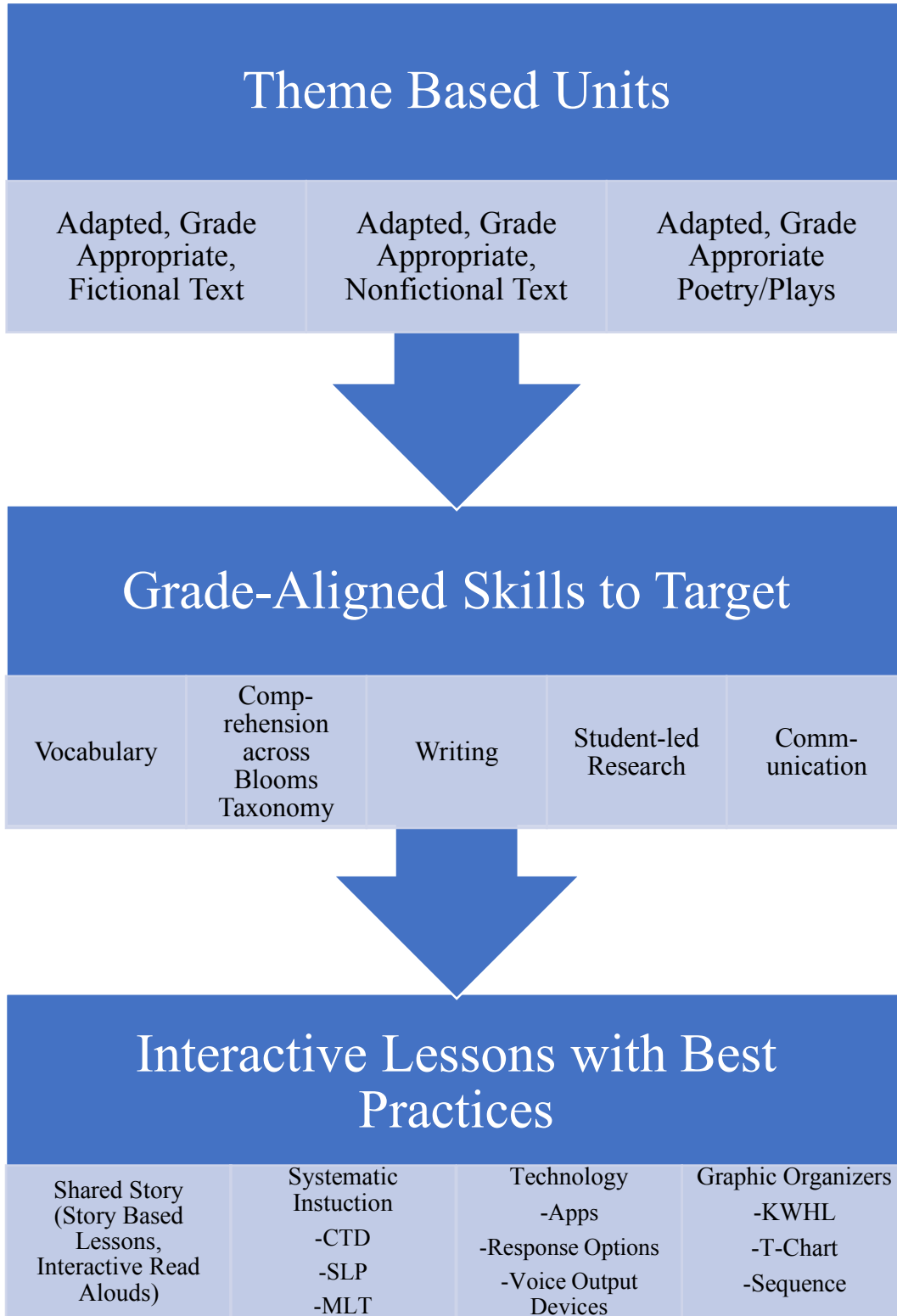
adapted text while using the modified SLP and graphic organizers to teach listening comprehension across Blooms Taxonomy.

This same lesson could be repeated the next day via the iPad app, *Access: Language Arts* (2013-2016). The app also starts off with CTD to teach targeted vocabulary, then moves into the shared story reading of the adapted text, and finally uses the modified SLP to teach comprehension. During the app-based lesson, the teacher provides feedback on overall engagement and can provide additional reinforcement, as needed.

Conclusion

Recent research has served as a framework for providing meaningful, comprehensive instruction in grade aligned ELA for SwMSD. Gains can be made in vocabulary, comprehension, writing, and student led research through integrated theme based units featuring adapted grade appropriate text, systematic instructional strategies, including CTD to teach vocabulary and SLP to teach comprehension, and response options. In addition, tools like graphic organizers can provide a format for helping students organize information and navigate lessons targeting multiple skills (e.g., KWHL). Finally, technology can serve as a supplemental option to typical teacher-led instruction and promote overall engagement. Blended together, these strategies have shown to be effective in delivering content that hits broadly and deeply on ELA standards. It is access to these standards, strong systematic instruction, high expectations, and meaningful, grade aligned materials that ultimately promote skill acquisition, leading to an increase quality of life.

Figure 2. Framework for Teaching Grade Aligned ELA



References

- Access Language Arts* [2013-2016] App and Software. Attainment Company, Inc.
- Access Language Arts: WRITE* (2017). App and Software. Attainment Company, Inc.
- Authors (2016). *The use of a KWHL to teach research skills to individuals with significant disabilities via an iPad app*. In submission.
- Al Otaiba, S., & Hosp, M. K. (2004). Providing effective literacy instruction to students with Down syndrome. *TEACHING Exceptional Children*, 36, 28-35.
- Browder, D. M., Ahlgrim-Delzell, L., Courtade, G., Gibbs, S. L., & Flowers, C. (2008). Evaluation of the effectiveness of an early literacy program for students with significant developmental disabilities. *Exceptional Children*, 75, 33-52.
- Browder, D., Ahlgrim-Delzell, L., Spooner, F., Mims, P., & Baker, J. (2009). Using time delay to teach picture and word recognition to identify evidence-based practice for students with severe developmental disabilities. *Exceptional Children*, 75, 343-364.
- Browder, D. M., Trela, K., Courtade, G. R., Jimenez, B. A., Knight, V., & Flowers, C. (2012). Teaching mathematics and science standards to students with moderate and severe developmental disabilities. *Journal of Special Education*, 46(1), 26-35
- Browder, D. M., Trela, K., & Jimenez, B. (2007). Training teachers to follow a task analysis to engage middle school students with moderate and severe developmental disabilities in grade-appropriate literature. *Focus on Autism and Other Developmental Disabilities*, 22, 206-219.
- Browder, D. M., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozzine, B. (2006). Research on reading instruction for individuals with significant cognitive disabilities. *Exceptional Children*, 72, 392-408.
- Ciullo, S., & Reutebuch, C. (2013). Computer-based graphic organizer for students with LD: A systematic review of literature. *Learning Disabilities Research & Practice*, 28, 196-210.
- Doyle, P. M., Gast, D. L., Wolery, M., Ault, M. J., & Farmer, J. A. (1990). Use of constant time delay in small group instruction: A study of observational and incidental learning. *Journal of Special Education*, 23, 369-385.
- Durando, J. (2008). A survey on literacy instruction for students with multiple disabilities. *Journal of Visual Impairment & Blindness*, 102, 40-46.
- Graham, S., & Harris, K. R. (2016). A path to better writing. *The Reading Teacher*, 69, 359-365.
- Hudson, M. E., Browder, D. M., & Jimenez, B. A. (2014). Effects of a peer-delivered system of least prompts intervention and adapted science read-alouds on listening comprehension for participants with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 49, 60-77.
- Hudson, M. E., Browder, D. & Wakeman, S. (2013). Helping students with moderate and severe intellectual disability access grade-level text. *TEACHING Exceptional Children*, 45, 14-23.
- Hudson, M. E., Browder, D. M., & Wood, L. A. (2013a). Review of experimental research on academic learning by students with moderate and severe intellectual disability in general education. *Research and Practice for Persons with Severe Disabilities*, 38, 17-29.
- Hudson, M. E., & Test, D. W. (2011). Evaluating the evidence base of shared story reading to promote literacy for students with extensive support needs. *Research & Practice for Persons with Severe Disabilities*, 36, 34-45.
- Individuals With Disabilities Education Improvement Act (IDEIA), 20 U.S.C. § 1400 (2004) (amended 2007).

- Joseph, L. M., & Konrad, M. (2009). Teaching students with intellectual or developmental disabilities to write: a review of the literature. *Research in Developmental Disabilities, 30*, 1-19.
- Kearns, J., Kleinert, H., Harrison, B., Sheppard-Jones, K., Hall, M., & Jones, M. (2010). *What does "college and career ready" mean for students with significant cognitive disabilities?* Lexington: University of Kentucky. Retrieved from <http://www.naacpartners.org/publications/CareerCollegeReadiness.pdf>
- Knight, V., Browder, D., Agnello, B., & Lee, A. (2010). Academic instruction for students with severe disabilities. *Focus on Exceptional Children, 42*, 1-14.
- Knight, V., Mckissick, B. R., & Saunders, A. (2013). A review of technology-based interventions to teach academic skills to students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*, 2628-2648.
- Knight, V. F., & Sartini, E. (2015). A comprehensive literature review of comprehension strategies in core content areas for students with autism spectrum disorder. *Journal of Autism and Developmental Disabilities, 45*, 1213-1229.
- Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R., & Wood, C. L. (2013). Using graphic organizers and systematic instruction to teach science concepts to students with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 42*, 378-389.
- Mims, P. J., Browder, D., Baker, J., Lee, A., & Spooner, F. (2009). Increasing participation and comprehension of students with significant cognitive disabilities and visual impairments during shared stories. *Education and Training in Developmental Disabilities, 44*, 409-420.
- Mims, P. J., Hudson, M., & Browder, D. M. (2012). Using read-alouds of grade-level biographies and systematic prompting to promote comprehension for students with moderate and severe developmental disabilities. *Focus On Autism and Other Developmental Disabilities, 27*, 67-80.
- Mims, P. J., Lee, A., Browder, D. M., Zakas, T., & Flynn, S. (2012). The effects of a treatment package to facilitate English/language arts learning for middle school students with moderate to severe disabilities. *Education and Training in Autism and Developmental Disabilities, 47*, 414-425.
- Mims, P. J., Stanger, C., Pennington, R., White, W., Sears, J., & Strickler, N. (in press). Opinion paragraph writing intervention for students with significant disability. *Assistive Technology Outcomes and Benefits, 11*.
- No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115 Stat. 1425 (2002).
- Pennington, R. C. (2010). Computer-assisted instruction for teaching academic skills to students with autism spectrum disorders: a review of literature. *Focus on Autism and Other Developmental Disabilities, 25*, 239-248.
- Pennington, R. C. (2016). Write on! Using assistive technology and systematic instruction to teach sentence writing to students with moderate to severe disability. *Journal of Special Education Technology, 31*, 39-49.
- Pennington, R. C., Flick, A., & Smith-Wehr, K. (in press). The use of response prompting and frames for teaching sentence writing to students with moderate intellectual disability. *Focus on Autism and Other Developmental Disabilities*.
- Pennington, R., & Delano, M. (2012). Writing instruction for students with autism spectrum disorders: A review of literature. *Focus On Autism and Other Developmental Disabilities, 27*, 158-167.

- Pennington, R., & Delano, M. (2014). Teaching written expression to students with intellectual disability. In D.M. Browder & F. Spooner (Eds.), *More language arts, math, and science for students with severe disabilities*. Baltimore, MD: Brookes.
- Petersen, A. (2016). Perspectives of special education teachers on general education curriculum access: Preliminary results. *Research and Practice for Persons with Severe Disabilities*, 41, 19-35.
- Roberts, C. A., & Leko, M. M. (2013). Integrating functional and academic goals into literacy instruction for adolescents with significant cognitive disabilities through shared story reading. *Research & Practice for Persons with Severe Disabilities*, 38, 157-172.
- Root, J., Knight, V. F., & Mims, P. J. (2016). A guide to addressing multiple priorities in core content instruction for students with severe disabilities. *Career Development and Transition for Exceptional Individuals*, DOI: 10.1177/2165143416680997.
- Shogren, K. A., Palmer, S. B., Wehmeyer, M. L., Williams-Diehm, K., & Little, T. D. (2012). Effect of intervention with the self-determined learning model of instruction on access and goal attainment. *Remedial and Special Education*, 33, 320-330.
- Smith, B., Spooner, F., Jimenez, B., & Browder, D. (2013). Using an early science curriculum to teach science vocabulary and concepts to students with severe developmental disabilities. *Education & Treatment of Children*, 36, 1-31.
- Spooner, F., Ahlgrim-Delzell, L., Kemp-Inman, A., & Wood, L. A. (2014). Using an iPad2 with systematic instruction to teach shared stories for elementary-aged students with autism. *Research and Practice for Persons with Severe Disabilities*, 39, 30-46.
- Spooner, F., Browder, D., & Mims, P. (2011). Chapter four: Using evidence-based instructional strategies. In D. Browder, & F. Spooner (Eds.). *Curriculum and instruction for students with Moderate and Severe Disabilities: Finding the balance*. New York: Guilford Press.
- Spooner, F., Kemp-Inman, A., Ahlgrim-Delzell, L., Wood, L., & Davis, L. L. (2015). Generalization of literacy skills through portable technology for students with severe disabilities. *Research and Practice for Persons with Severe Disabilities*, 40, 52-70.
- Spooner, F., Knight, V. F., Browder, D. M., & Smith, B. R. (2012). Evidence-based practice for teaching academics to students with severe developmental disabilities. *Remedial and Special Education*, 33, 374-387.
- Trela, K. (2008). *The Effects of I Write Now Strategy on High School Students with Significant Cognitive Disabilities' Participation in Composing and Opinion Paragraph*. Doctoral dissertation. The University of North Carolina at Charlotte.
- Wehmeyer, M. L. (2005). Self-determination and individuals with severe disabilities: Re-examining meanings and misinterpretations. *Research and Practice for Persons with Severe Disabilities*, 30, 113-120
- Wood, L., Browder, D. M., & Flynn, L. (2015). Teaching students with intellectual disability to use a self-questioning strategy to comprehend social studies text for an inclusive setting. *Research and Practice for Persons with Severe Disabilities*, 40, 275-293.

Correspondence concerning this article should be addressed to Pamela J. Mims, East Tennessee State University, Department of Educational Foundations and Special Education, Office 319/ Box 70548, 807 University Pkwy., Johnson City, TN 37614. E-mail: mimsbj@etsu.edu

The College Road Trip: Supporting College Success for Students with Autism

Grace L. Francis
George Mason University

Jodi M. Duke
George Mason University

Caya Chiu
National Taiwan Normal University

Approximately 44% of students with autism enroll in college after graduation from high school. The differences between high school and college, including academic and social expectations, the nature of support services, and the degree of family involvement in the educational process can hinder student progress and even result in students dropping out of school. However, meaningful transition planning, effective support strategies in college, and thoughtful approaches to family involvement can prevent or mitigate barriers that students with autism experience in college. In this manuscript, we use a “college road trip” framework to organize strategies and resources educators, students, and family members can use to support student success. We also discuss strategies and resources for families as they embark on their own trip as parents of college students.

Iris recently turned 17 years old and is starting to consider college options after graduation. Iris watched her older brothers go to college and assumed she would attend college after high school, too. Iris’ parents, however, are not so sure. They always maintained high expectations for Iris, but have doubts about how she will fair in college. While they are grateful for Iris’ dedicated high school teachers, they also feel concerned that the support she receives in high school is creating an unrealistic concept of academic rigor. Also, just last week, Iris’ high school called them to school to discuss her “behavior outbursts” which seem to occur when she feels overstimulated by noise or light. College is an ideal post-high school outcome for both Iris and her family, but they are all unsure how to get Iris there and ensure her success.

postsecondary school (e.g., two-year college, four-year college) after graduation from high school (Newman et al., 2011). However, this number likely underrepresents the actual representation of college students with autism as a result of individuals electing not to disclose their disability after high school (Burgstahler & Russon-Gleicher, 2015; Cullen, 2015). The differences students experience as they transition from high school to college are many, including heightened academic and social demands and the need for students to initiate and direct their own experiences across many domains and environments (Dente & Coles, 2012). For some students with autism, the differences between high school and college are so troublesome that harbor deep concerns about if and how their needs will be met in college (Camarena & Sarigiani, 2009).

Iris is an example of the approximately 44% of students with autism who enroll in

College Services and Supports

Services and supports in college are key to the success of many students with autism. The differences between services provided through the Individuals with Disabilities Education Act (IDEA, 2004) in high school to services provided through Section 504 of the Rehabilitation Act (1973) in college can be startling for students. Unlike specific services and requirements provided in high school by IDEA (an educational law) through a detailed Individualized Education Plan, the procedures, compliance regulations, and services provided by Section 504 (a civil rights law) are far less individualized and comprehensive. The Office for Civil Rights enforces Section 504 of the Rehabilitation Act (1973) among colleges who receive federal funding. Provisions outlined in Section 504 applicable to college include, (a) protection from discrimination based on disability during admission, in academic programs, or in specific courses; (b) accessible housing if housing is available on campus; (c) equal opportunity to financial and employment assistance; (d) equal opportunity to participate in college-sponsored clubs, organizations, and activities; (e) non-discriminatory counseling and placement services; and (d) modifications to academic requirements that would otherwise result in discrimination (34 C.F.R. Part 104). Academic modifications may include extra time to complete a degree, course substitutions, and adaptations to instruction. The statute references the use of tape recorders, audio texts, interpreters, adapted classroom equipment, and also indicates that colleges are not required to provide personal attendants or other devices or services for personal use. Further, unlike in high school, students must disclose that they have a disability in order to receive services and accommodations from Section 504 in college (Van Hees, Moyson, & Roeyers, 2014).

Family Involvement in College

Family involvement can support numerous positive student outcomes, including enhanced self-determination (Katz, Madjar, & Harari, 2015). However, family involvement in the educational process marks another significant difference between high school and college. The principle of parent participation under IDEA affirms that parents are required members of their child's educational team and affords parents or legal guardians the right to procedural safeguards and due process. In contrast, the Family Educational Rights and Privacy Act (FERPA, 1974) in college transfers the right to access and disclose educational records from parents to students once they turn 18 or enter college, so colleges legally cannot provide families with information without written consent from the college student. Understandably, this shift in family involvement in the educational process is often as challenging for families as it is for students (Griffin, McMillan, & Hodapp, 2010).

High School to College Transition Framework

College is a time of student exploration, failure, accomplishment, and growth. It is a time when students carve a path to adulthood. One can think of the transition from high school to college as a "road trip" (see Figure 1). In this framework, the trip begins with transition planning in high school, which serves as an initial map for students to get to college and begin to access college supports and services. Barriers college students with autism commonly experience can be thought of as "bumps" in the road that they must avoid or overcome to successfully continue their trip. Conversely, available services and support strategies in college can serve as "rest stops" for students by providing necessary and effective provisions during their travel. Finally, families are often expected to "get out of the car" or, at minimum, "take a

backseat” once their young adult begins the college road trip, resulting in families navigating their own route alongside their college student. In this manuscript, we outline each stage of the college road trip with recommended practices for college professionals, resources that students, high school educators, college professionals, and families can use (see Table 1), and action steps these stakeholders can take (see Figure 2) to help students overcome barriers and reach their final destination- college graduation.

The College Road Trip

Transition Planning: The Map to College
 IDEA mandates that Individualized Education Programs (IEPs) for students aged 16 years or older include transition services required to achieve postsecondary goals related to outcomes such as employment and independent living (IDEA, 2004). At this time, IEP teams are also required to invite students to attend their IEP meetings and ensure that student preferences and interests

are taken into account during the development of goals and identification of needed services. Because transition goals and services serve as an initial “map” for students and their families to navigate the way to college, IEP team members should discuss college options early, ensure students enroll in courses required for college admission, and target developing skills that students will need in college. In this section, we offer several recommendations, including steps listed on Figure 2 that high school educators can take to facilitate a positive transition to college.

Research recognizes essential skills that support positive outcomes for college students with autism, including (a) skills related to identifying social cues such as personal boundaries (Dente & Coles, 2012); “(b) self-advocacy and decision-making skills (Taylor & Colvin, 2013); (c) communication skills, including initiating and maintaining conversations (Dente &

Figure 1. The college road trip. This displays the road bumps (barriers) and rest stops (support strategies) that college students with autism and their families experience.

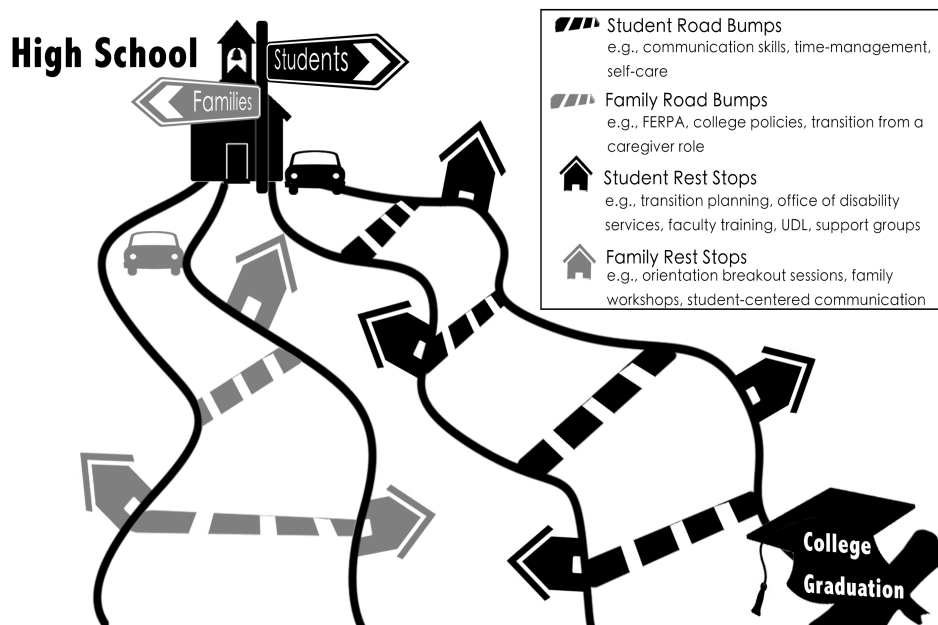


Table 1. *High School, College, and Family Resources*

Resource	Description
	<i>High School</i>
National Technical Assistance Center on Transition (NTACT) http://transitionta.org	Provides info about effective transition-related practices and resources
Transition Coalition http://transitioncoalition.org	Provides various transition-related links, resources, and tools
Think College http://www.thinkcollege.net	Provides information about college programs for students with intellectual and developmental disabilities
I'm Determined http://www.imdetermined.org	Provides resources for educators, parents, and young adults to develop self-determination among young adults with disabilities
The 411 on Disability Disclosure: A Workbook for Youth with Disabilities http://www.ncwd-youth.info/411-on-disability-disclosure	Workbook designed to teach young adults with disabilities to make informed decisions about disclosure
Partners for Youth with Disabilities https://www.pyd.org/youth-leadership-forum.php	The Youth Leadership Forum conference for individuals to develop leadership skills and goals for employment, education, and community living.
Greenlight https://www.greenlightcard.com	App allows users to divide money into categories for specific uses (e.g., specific stores, types of stores)
	<i>College</i>
Association on Higher Education and Disability https://www.ahead.org	Association for higher education practitioners involved in disability-related policies and services
College Autism Network http://collegeautismnetwork.org	Organization provides evidence-based practices to improve student access, experiences, and outcomes
Autism Society http://www.autism-society.org	Includes numerous resources related to living with autism, including transitioning into college
The National Autistic Society http://www.autism.org.uk/studentmentors	Provides strategies college staff to support students with autism
Spectrum U https://spectrumu.wordpress.com	Provides information about college programs and services
College Autism Spectrum http://www.collegeautismspectrum.com	Provides resources and support to college student and professionals, as well as families
Habitica https://habitica.com	App functions as a video game by turning daily tasks into missions users conquer
Sit With Us http://www.sitwithus.io/#!/Home	App allows users to connect with each other in public spaces
	<i>Family</i>
Association of Higher Education Parent/Family Program Professionals http://www.aheppp.org	Includes resources and networking opportunities for members
The Arc of the United States http://www.thearc.org	National advocacy organization with local chapters that provide information and services (e.g., supported employment, respite, financial planning) to families and individuals with disabilities
Center for Parent Information and Resources http://www.parentcenterhub.org	Serves as hub for families to locate their local Parent Training and Information Resource Center and Community Parent Resource Center
Parent to Parent USA http://www.p2pusa.org/p2pusa/sitepages/p2p-home.aspx	Organization connects parents of children with disabilities with trained "support parents" for emotional and informational support
Understood https://www.understood.org/en/school-learning/choosing-starting-school/leaving-high-school	Provides families information about college, including selecting a college and helpful accommodations
BrightNest https://brightnest.com/	App supports independent living by providing tips, tools, and reminders
Glympse http://glympse.com	App allows users to share their location with other selected users for a set duration of time

Figure 2. Recommended actions for students, families, and high school and college professionals.

Stakeholder	High School	College
Students	<ol style="list-style-type: none"> 1. Attend and actively participate in IEP meetings and transition planning. 2. Research and visit colleges as early as freshman year. 3. Access resources for skill development and planning (e.g., I'm Determined). 	<ol style="list-style-type: none"> 1. Register with the college's office of disability support and share accommodations paperwork with professors at the start of each course. 2. Collaborate with office of disability support staff to determine available academic, employment, and social resources on campus. 3. Enroll in a freshman-level course that focuses on transition skills.
Families	<ol style="list-style-type: none"> 1. Attend and actively participate in IEP meetings and transition planning. 2. Use technology to teach essential skills for college (e.g., Greenlight app for budgeting). 3. Access resources for information and planning (e.g., The Arc). 	<ol style="list-style-type: none"> 1. Adjust to advisory (supportive) role and make decisions <i>with</i> not <i>for</i> young adult children. 2. Research FERPA and discuss FERPA waiver options with young adult children. 3. Access resources for information and planning (e.g., University parent groups).
Professionals	<ol style="list-style-type: none"> 1. Incorporate student preferences into transition planning. 2. Discuss FERPA and disclosure issues. 3. Invite college professionals to transition meetings. 	<ol style="list-style-type: none"> 1. Provide alternative orientation sessions that blend online and face-to-face activities. 2. Follow Universal Design for Learning guidelines. 3. Access resources for information and planning (e.g., The Association of Higher Education Parent/Family Program Professionals).

Coles, 2012; Van Hees et al., 2014); (d) skills to adapt to changes in routines (Pugliese & White, 2014); and (e) self-care skills, including personal hygiene and mental and physical health (Dente & Coles, 2012). Research also suggests evidence-based teaching strategies for transition-age youth, such as direct instruction (Taylor & Colvin, 2013), student-centered transition planning (Uphold & Hudson, 2012), simulated instruction, task analysis, and audio prompting (Richter, Mustian, & Test, 2012).

IEP teams may also support students to identify strengths, needs, and available resources they can access in college (Cai & Richdale, 2016), as well as how to access services in college. Therefore, discussions about FERPA, the decision to disclose a

disability in college, and the differences between IDEA and Section 504 are other import discussions to have with students and their families (Cai & Richdale, 2016; Longtin, 2014). If a student decides to disclose their disability in college, the IEP team may also discuss strategies such as emailing professors prior to class about needed accommodations (Brazier, 2013). The team can also invite a representative from the college's office of disability support to attend an IEP meeting and provide information about college procedures, services, and supports. Likewise, high school staff may facilitate the transition to college by maintaining relationships with office of disability support staff to stay apprised of (and possibly inform) college policies and practices (Dente & Coles, 2012). Further,

there are numerous resources that high school educators can access to support skill development and better prepare students for college (see Table 1). For example, technical assistance centers and organizations such as the National Technical Assistance Center on Transition, the Transition Coalition, Think College, and I'm Determined provide various resources, tools, and information about effective teaching strategies and transition practices for educators, students, and families. Guidebooks such as "The 411 on Disability Disclosure" and the "Postsecondary Educational Opportunities Guide" can help students understand options, roles, rights, and responsibilities they will encounter after graduation. Finally, personal technology, including apps, can help students build skills needed in college. For example, educators may suggest that families use the Greenlight app, with which they can load a predetermined amount of money to an account, decide how the money should be spent (e.g., specific stores, specific types of stores), and track account balances to practice spending, budgeting, and monitoring money from a debit account. Families can use apps such as Greenlight to teach budgeting skills before students transition into college and are afforded the equivalent of a (seemingly bottomless) debit card to purchase meals and other necessities on campus.

Iris and her teacher, Mr. Marler, talk about the differences between community college and four-year institutions. "I want to live on campus, but not too far away from home," Iris concludes. Iris' teacher takes notes as Iris describes other aspects of college she desires (her own room, a quiet roommate, history classes) and things about college that make her nervous (getting lost, making friends, homework). "I think our next step is put your wants and concerns into a PowerPoint to discuss at your IEP meeting next month," Mr. Marler suggests. "We can also look at some

colleges located within a 2-hour drive and contact them to ask about how they can support the areas that make you nervous." Recognizing Iris' difficulty initiating and maintaining causal conversations and her strong desire to make friends, Iris and Mr. Marler collaborate to create social narratives about different college scenarios to review and role play (e.g., asking questions and participating in class, finding someone to sit with in the dining hall, resolving conflicts with peers), as well as critique videos of other's social interactions. Mr. Marler and Iris also discuss the pros and cons of disclosing her autism in college as well as where and how she might disclose (e.g., during admissions, once she starts class). Despite Mr. Marler's encouragement, Iris is resolute not disclose in college because she doesn't want to be labeled "special edu" like she was in high school.

Common Barriers: Bumps in the Road

Many barriers college students with autism face once they enter college contribute to the discouraging 39% graduation rate (Newman et al., 2011). Research documents the varied needs of college students with autism, including social and communication skills (Dente & Coles, 2012), building peer relationships (Grogan, 2015), executive functioning skills (e.g., problem-solving skills, time management, organization; Cai & Richdale, 2016), adapting to change and experiencing failure (Browning & Miron, 2007), adjusting to dynamic college norms and schedules (e.g., group work, asking questions in class, eating at the dining hall; Wenzel & Rowley, 2010), requesting accommodations or support (Burgstahler & Russon-Gleicher, 2015), and self-care (e.g., coping with stress, depression, anxiety, sensory issues; Gelbar, Smith, & Reichow, 2014; Taylor & Colvin, 2013).

College students with autism report social skills (e.g., interpreting sarcasm, slang, and

figurative language, engaging in casual conversations and academic discourse with professors; Shmulsky, Gobbo, & Donahue, 2015) are more challenging than academics (Grogan, 2015). Students report struggling asking and answering questions, staying on topic during class discussions, and effectively working in groups (Longtin, 2014), all of which have a negative influence on their ability to succeed academically and socially (Pugliese & White, 2014). Although current legislation provides academic accommodations in higher education settings, none support the provision of social accommodations in these settings (Brown & DiGaldo, 2011; Longtin, 2014). Unsurprisingly, students with autism report that they do not receive adequate support to mitigate social skills barriers in college (Cai & Richdale, 2016).

Another bump students with autism experience on their college road trip is a lack of executive functioning skills, including difficulty creating and adhering to schedules, managing their time (including downtime), keeping appointments, managing long-term assignments, meeting deadlines, and pacing course readings (Longtin, 2014; Pugliese & White, 2014). Further, college professionals report feeling unprepared to teach students with disabilities (Dipeolu, Storlie, & Johnson, 2015; Odom & Wong, 2015) and needing specific strategies to support students with autism in the areas of organization, time management, classroom discussions, language comprehension, and appropriate classroom behavior (McKeon, Alpern, & Zager, 2013). This barrier is exacerbated when students determine that disclosing their disability is not in their best interest because they do not receive services from the office of disability support (Dipeolu et al., 2015).

Another common bump in the road involves self-care and mental health issues. At a time

when their peers revel in newfound freedom, many college students with autism feel immobilized with anxiety, stress, depression, and isolation (Cai & Richdale, 2016; Glennon, 2001; Van Hees et al., 2014). While in high school, families are present to help their children manage anxiety and stress, college students often find themselves withdrawn without a strong family support system. While some college students with autism report using a variety of coping tools such as reading in a quiet place or talking to a counselor, others report that they experienced emotional breakdowns and felt completely overwhelmed (Cai & Richdale, 2016).

Sensory sensitivities and overstimulation in college also contribute to anxiety and depression among college students with autism (Dallas, Ramisch, & McGowan, 2015; Van Hees et al., 2014). Students with autism report great difficulty with noise sensitivity in both classrooms and residential environments (Cai & Richdale, 2016). These sensitivities can cause students to withdraw socially and academically, which can exacerbate anxiety and depression. Without effective coping skills, self-care and mental health barriers have been found to contribute to college dropout (Brown & DiGaldo, 2011; Pugliese & White, 2014; Taylor & Colvin, 2013; Van Hees et al., 2014).

Iris and her parents decide on a state college approximately an hour away because the school offered a private room in a two-person suite. Iris met Jasmine, her assigned roommate, by phone prior to school starting and tried to share important information about herself such as her interest in history and first-person video games and objection of loud noises. Jasmine seemed nice enough on the phone, but Iris quickly learned that she talks loudly on her phone or watches loud YouTube videos most of the time she is in the

suite. Iris took her mom's suggestion and asked Jasmine to use headphones, but Jasmine never followed through. Overwhelmed by the amount of chatter in the residence hall and too nervous to explore campus by herself, Iris spends most of the day in her room playing her favorite video game. Her eating habits are off kilter because she does not like eating in the dining hall and, as a result, she has nearly exhausted her entire meal account on snack food from the campus bookstore. Her sleeping habits are also disrupted due to midday naps, the noise her roommate makes, and staying up late playing video games. She is falling behind on classes, unsure where to get help, and feeling like a failure.

College Strategies: Rest Stops Along the Road

Although bumps on the college road trip are well documented, there exists a growing body of research focused on strategies that promote the success of students with autism in college that college professionals can integrate into their practice. Like rest stops along a road that provide travelers with needed amenities and provisions (including a place to rest and regroup), colleges can use varied strategies to provide needed support and services to students with autism.

All colleges who receive federal funds must provide disability-related information and services through a disability support office (Dente & Coles, 2012). These offices are likely the most visible and helpful rest stop on the college road trip for students with autism, as they provide support and guidance for students as they look for campus resources to help solve problems and answer questions (Taylor & Colvin, 2013). Students with autism who disclose their disability to the college office of disability support and provide up-to-date documentation of their diagnosis may receive academic

accommodations and other supports (e.g., extended deadlines, extra time on exams, distraction-free testing environments, alternate assignments for group projects and assignments that require public speaking; Gobbo & Shmulsky, 2012; Longtin, 2014; Van Hees et al., 2014).

In addition to services provided through offices of disability support, the literature offers recommendations for professors (i.e., college professionals who teach courses) to better support students with autism. Some professors find it helpful to include clear expectations within their syllabi, including explicit language about expected student behavior in class (e.g., not monopolizing class discussions), and to break down large assignments into smaller parts for students with autism (Burgstahler & Russon-Gleicher, 2015; Van Hees et al., 2014). Additional supports that professors may consider providing students with autism include tape recording lectures, providing notes prior to the class session, providing extra time on tests, and facilitating peer study groups (Burgstahler & Russon-Gleicher, 2015). Professors can also check for understanding by requesting that students repeat directions and expectations back to them (McKeon et al., 2013), provide prewriting assistance in the form of outline development, and provide feedback on written work often, early, and in a variety of ways (Brazier, 2013). One of the most effective methods of supporting all students, including those with autism in classrooms, is following Universal Design for Learning (UDL) guidelines (Grogan, 2015; Longtin, 2014). Professors should consider (a) providing structured lesson content and materials; (b) using direct, explicit instruction; (c) integrating visual organizers; (d) incorporating concrete learning tools such as pictures, videos, and social scripts; (e) ensuring the accessibility of all classroom materials (e.g., closed captions,

font size); and (f) using audible signals as cues as reminders in class (Longtin, 2014; Taylor & Colvin, 2013; Wehmeyer, Agran, Martin, Mithaug, & Palmer, 2007).

The literature also provides recommendations for college staff (e.g., college professionals who provide services, support, or programming) to provide optimal support to students with autism. Predicting and planning for issues that students may face in advance (e.g., roommate concerns, sensory issues, navigating campus), is another strategy that college departments should consider (Shmulsky, Gobbo, & Donahue, 2015). For example, colleges may create "rest zones" around campus to serve as quiet places for students who need to escape sensory overstimulation (Taylor & Colvin, 2013). Developing autism awareness training programs for faculty, staff, and college students that provide information about the autism spectrum, address ableism, and offer basic strategies to support students with autism is another strategy to plan and prevent common barriers (Dipeolu et al., 2015; Sayman, 2015; Shmulsky et al., 2015; Van Hees et al., 2014). Ideally, these programs should be developed in concert with and facilitated by individuals with autism. College counselors and offices of disability support can also collaborate with faculty, peer mentors, families, and students with autism to anticipate probable barriers and brainstorm support strategies (Pillay & Bhat, 2012; Shmulsky et al., 2015). For example, freshmen orientation sessions are overstimulating and overwhelming for many students with autism (Taylor & Colvin, 2013). College staff can survey students to determine their needs and preferences. Then, using a UDL approach, colleges can create alternative orientation formats including a blend of online and face-to-face elements. Creating opportunities for college students with autism to enroll in a specific course

designed to support students with autism to transition successfully into college by focusing on academic strategies, self-advocacy, social skills, university resources, organization skills, campus involvement, sexuality and safety, hygiene, and stress management is another strategy for consideration (Wenzel & Rowley, 2010; Williams, 2010; Van Bergeijk, 2014). Colleges may also provide more individualized support by connecting students to a transition coach to support choice-making, answer questions, assist with problem-solving, and support study skills (Van Hees et al., 2014).

One of the largest bumps in the road involves negotiating varied and dynamic daily social interactions on campus. In fact, some students with autism find it helpful to continue to live at home in order to avoid the stress of being on campus (Gelbar et al., 2014; Pillay & Bhat, 2012). Strategies such as Social Stories (Glennon, 2001), social support groups (MacLeod & Green, 2009), video modeling (Mason et al., 2012), and cognitive behavioral interventions (Pugliese & White, 2013) can help students adjust to negotiating living space and campus life. College counselors can also serve as an important rest stop on the college road trip by teaching stress-reduction techniques (e.g., exercise, visualization, cognitive reframing) to help students with autism provide better self-care (Dipeolu et al., 2015). In addition, students may benefit from online social coaching and mentoring, peer-mediated support groups, special interest groups, and support to access extracurriculars on campus (Cai & Richdale, 2016; Cullen, 2015; Odom & Wong, 2015; Taylor & Colvin, 2013; Van Hees et al., 2014).

An additional area for consideration involves preparing students for life after college, especially competitive employment (Roberts,

2010). Strategies such as interest inventories, internships, job search strategies, and assistance with resume development are commonly used by college counselors and staff from career services to assist students identify employment opportunities following graduation (National Association of Colleges and Employers, 2013). For students with autism, additional strategies such as role-playing workplace scenarios (Wolf, Thierfeld Brown, & Bork, 2009) or videotaping and analyzing mock interviews can support post-college success (Dipeolu et al., 2015). On-the-job coaching (Dente & Coles, 2012) and collaboration between staff from career services, office of disability support, and counseling can collaborate to develop strategies to reduce work-related anxiety (Longtin, 2014).

Resources such as professional organizations also serve as sources of support for college professors and staff (see Table 1). For instance, the Association on Higher Education and Disability provides information, resources, and professional development opportunities for college professionals. Other websites supported by autism-related organizations such as the Autism Society, College Autism Network, and the National Autistic Society provide information for college students with autism, as well as suggestions for college professors to better instruct students with autism. In addition, websites such as Spectrum U and College Autism Spectrum provide information about college programs and services to students with autism, as well as strategies and resources for students, college staff, and families (e.g., information about Universal Design, consultation services). Professionals may also direct students to use technology such as social media, which can serve as a conduit for students with autism to connect with other students with autism or who share similar interests (e.g., “Cool

Apsies” on Facebook) to reduce isolation. Designed by a teenager who experienced bullying and sat by herself at lunch, the app Sit With Us can also reduce isolation and cultivate relationships by acting as an electronic beacon to connect users with similar profile interests to each other in public spaces such as the student center or the campus food court. Habitica is another app that turns daily tasks (e.g., getting to class on time, completing course readings) into monsters that users have to “conquer” as in a video game that students might find useful and engaging. Figure 2 provides other steps that college professionals may consider taking to better support students.

Iris walked into her Thursday morning class fatigued and dejected. Dr. Snider took notice of Iris’ posture and disinterest in class activities, which were especially concerning to her given Iris’ string of late arrivals and missing assignments. After class Dr. Snider sent Iris an email expressing her concern and asking Iris to meet in her office before class next week. Iris never responded, so Dr. Snider was surprised to see her in her office the following Thursday. Dr. Snider began by communicating her general concerns about Iris’ well-being and Iris readily described issues such as playing video games all night, her roommate being too loud, and feeling out of place and alone. The professor affirmed Iris’ concerns and shared similar issues she experienced in college. Dr. Snider pulled up several campus resources such as the health and wellness center and the office of student retention on her computer, discussed each resource, and sent the information to Iris in an email. She also offered to walk over to the offices with Iris after class. As the time for class to start neared, Dr. Snider asked how she could support Iris in her course, providing suggestions such as lecture notes. Iris said she wasn’t sure, but that she would think about it. As they walked to class, Dr.

Snider remembered seeing flyers for a gaming club and led Iris on a slight detour through the student center.

Once they found the flyer, Iris was visibly uncomfortable with the suggestion of attending the next meeting, mostly, she explained, because she did not want to go by herself. Dr. Snider provided encouragement and suggestions such as wearing earphones playing soft music to increase her comfort level, asking her roommate or residential hall advisor to go with her, or seeing if a mentor from the center for health and wellness might be interested in going. Dr. Snider also modeled some ways she excuses herself from uncomfortable meetings such as sitting near the exit to sneak out easier and acting like she has to take a phone call.

Parting ways with Dr. Sinder and taking her seat in class, Iris feels a sense of direction and relief. She decides to call her mom after class to talk about the information Dr. Snider emailed. While uploading her PowerPoint, Dr. Snider continues to think about how support students like Iris (she has several) and makes a note to reach out to the center on teaching excellence to discuss Universal Design for Learning strategies as well as possible college-wide initiatives to make the campus more welcoming to students who are uncomfortable in social situations. She thinks she will email the director of student affairs to discuss how to use popular apps such as Sit With Us or Pokémon Go across campus to help students meet each other.

Family Support in College: A Trip of Their Own

Families (e.g., parents, caregivers, or close extended family members) often serve as life-long sources of support for individuals with disabilities, providing guidance and assistance throughout college and beyond (Boehm, Carter, & Taylor, 2015; Dallas et

al., 2015). Family involvement in their young adult's education results in numerous benefits, including self-determination and independence skills (Griffin, McMillan, & Hodapp, 2010; Martinez, Conroy, & Cerreto, 2012). However, family roles drastically change once young adults enter college as a result of college policies that may discourage family involvement and the provisions of laws such as FERPA which transfer educational rights from parents to students (Folk, Yamamoto, & Stodden, 2012), resulting in families experiencing their own road bumps which can cause considerable stress and anxiety for both families and students (Glennon, 2001). As a result, families also embark on a trip of their own alongside their young adults- a trip in which they transition from a caregiver who makes decisions *for* young adults to an advisor who makes decisions *with* young adults (Francis, Fuchs, Johnson, Gordon, & Grant, 2016). Just as students need support to develop skills such as self-advocacy in college, families too are often in need of support to develop advisor skills (e.g., engaging in supported decision-making, allowing their young adult to experience natural consequences). Fortunately, the literature provides several strategies that college staff can use to provide families this needed support.

At the onset, college staff should explain FERPA regulations to students and family members (Van Bergeijk, 2014), including the option for and implications of students signing FERPA waivers. Regardless of FERPA waivers, staff can connect with families prior to students beginning classes through orientation activities. Creating campus orientation strands specifically for families of students with autism can address concerns in ways that may be unique to these families (Shmulsky et al., 2015). For example, orientation strands designed for families of students with autism may include

small group conversations with campus police about student needs or outlining procedures for using meal cards and other campus resources so families can guide or troubleshoot with their young adult, if needed.

In addition to providing information, college staff can create mechanisms of family support. Support may begin as early as orientation with a strand dedicated to connecting families to each other as a source of peer support. Providing families examples and non-examples of serving as an “advisor” for their students in various scenarios would provide families language to engage their young adults in ways expected by colleges (Francis et al., 2017). In order to prevent a reversion back to “caregiver mode,” families are often in need of support to help their

college students cope with difficult emotions, as well as manage their own anxiety related to their young adult attending college (Folk et al., 2012). This can be accomplished through family workshops or other activities hosted by the college or an invested community stakeholder (e.g., Parent Training and Information Center) designed to provide emotional support and strategies to cope with stress. Figure 3 provides an example of a scenario that college staff may provide or role-play with families during orientation to help them better understand how to support their child in college.

College staff may also access research-based and promising practices for working with families through professional organizations and other resources (see Table 1). For

Figure 3. Caregiver to advisor example. This figure provides an example and non-example of language that families can use to support their young adult with autism attending college. College staff can include examples such as this in family handbooks and discuss them during orientation sessions. Figure adapted from (Francis et al., 2017).

Scenario: Laura is furious with her roommate who constantly has on the television or music playing and is extremely messy. Her roommate’s partner also spends the night at least twice a week and they always eat Laura’s food.	
- Caretaker Response: Doing For -	+ Advisor Response: Doing With +
<p>“This has gone on long enough. I’m going to email the residential hall director. I’m not paying for your roommate to eat all of your organic food- that stuff is expensive!”</p> <p>“Give me her email. I’m going to ask that we all meet to talk about this together. I’ll ask your roommate to invite her parents, too.”</p> <p>“I’ll just pick you up and you can spend weekends at home so you don’t have to be around her.”</p>	<p>“Living with roommates is tough. Let’s take a second and write down everything that you don’t like about living with your roommate. Then we can brainstorm solutions.”</p> <p>“I once had a roommate who moved in his girlfriend without even asking me first. Here’s what I did about it...”</p> <p>“I suggest making a list of everything you’ve done to get your roommate to follow the roommate contract. After that you could schedule a meeting with your hall advisor to brainstorm what you should do next. Do you want to make the list together?”</p>

example, The Association of Higher Education Parent/Family Program Professionals is an association for college professionals that provides information, resources, and professional development opportunities about supporting families of all college students. Additional resources that college staff may share with families include contact information for local family support organizations such as The Arc or Parent to Parent USA. Organizations such as these provide families with information, resources, services, and training opportunities related to myriad topics important to families with members who have disabilities (e.g., special needs trusts, supported employment, respite care, emotional support).

College staff can also alert families to websites such as Understood.org as another resource that families may access to learn more about strategies and available resources to support their young adult in college. Finally, numerous forms of technology may provide families with a means to stay connected to their young adult while also reducing their amount of direct involvement. For instance, the app BrightNest provides users information and reminders to address household tasks (e.g., test smoke alarms, prepare for cold weather, detox bathrooms). Families can use this app to coach their young adults to live safely and more independently. Also, unlike a GPS tracker installed in a phone that allows families to track student movement and locations, apps like Glympe allow users to request another user's location and share their real-time location for a predetermined amount of time. Apps such as this allow families and young adults to collaborate to determine if, when, and for how long they will share locations and how they might reduce location-sharing over time.

First-time empty nesters, Iris' parents, Maggie and Andy, feel a mix of pride and

loss with all three of their children now in college. "Nervous" did not quite capture how they felt driving away from campus after moving Iris, their youngest and only daughter, into her dorm. Driving home they couldn't help but laugh at the irony of them wanting to keep her at home after working so hard to help her become independent. As the semester progressed, Iris seemed to grow more and more depressed. Maggie and Andy felt unsure how to support Iris from so far away without the ability to get information from college staff about how she was doing. They received an exciting call last week from Iris about some resources one of her professors shared, but they are unsure if she followed through with any of the steps they discussed.

While reviewing materials from freshmen orientation, Andy came across contact information for a local support group for parents of adults with autism. With nothing to lose, they decided to attend the next meeting. During the meeting, they shared their family story with other families who really understood their experiences. Families in the group also provided suggestions for supporting Iris, such as (a) encouraging her to consider disclosing her disability to the office of disability support by highlighting support they provide and her ability to determine what information is shared; (b) establishing a "Sunday check in" through Skype so they can "see" how she is doing and even share screens when talking about items such as upcoming events, campus resources, classwork, and meal plan balances; (c) practicing self-calming skills by downloading a mindfulness app; and (d) searching Iris' interests on Meetup.com to determine if there are any groups or activities she can join to get her out of her room. For the first time in a longtime, Maggie and Andy feel supported to parent Iris as a college student.

Conclusion

For most students, college is a time that is as exciting as it is uncertain. For students with autism, college may also be the first time they experience failure, engage in independent decision-making, and navigate an educational system without support. Thinking of the college experience as a “road trip” can provide a framework for students, high school educators, college professionals and families to consider steps they need to

take (such as those included in Figure 2), as well as identify needed supports and available resources (such as those included in Table 1) during each phase of the trip. Although numerous barriers may present themselves throughout college, effective transition planning in high school, meaningful strategies during college, and considerations for family involvement and support can result in fewer bumps and detours on the student’s college road trip.

References

- Boehm, T. L., Carter, E. W., & Taylor, J. L. (2015). Family quality of life during the transition to adulthood for individuals with intellectual disability and/or autism spectrum disorders. *American Journal on Intellectual and Developmental Disabilities, 120*, 395-411.
- Brazier, J. (2013). Having autism as a student at Briarcliffe College. *Research & Teaching in Developmental Education, 29*(2), 40-44.
- Brown, J. T., & DiGaldo, S. (2011). *Post-secondary and career issues faced by individuals with autism spectrum disorder*. Hartford, CT: University of Hartford.
- Browning, S., & Miron, P. (2007). Counseling students with autism and Asperger's syndrome: A primer for success as a social being and a student. In Lippincott R. B. & Lippincott J. A., (Eds.), *Special populations in college counseling: A handbook for mental health professionals* (pp. 273–285). Alexandria, VA: American Counseling Association.
- Burgstahler, S., & Russon-Gleicher, R. J. (2015). Applying universal design to address the needs of postsecondary students on the autism spectrum. *Journal of Postsecondary Education and Disability, 28*, 199-212.
- Cai, R. Y., & Richdale, A. L. (2016). Educational experiences and needs of higher education students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 46*, 31-41.
- Camarena, P. M., & Sarigiani, P. A. (2009). Postsecondary educational aspirations of high functioning adolescents with autism spectrum and their parents. *Focus on Autism and Other Developmental Disabilities, 24*, 115-128.
- Cullen, J. A. (2015). The needs of college student with autism spectrum disorders and Asperger's syndrome. *Journal of Postsecondary Education and Disability, 28*(1), 89-101.
- Dallas, B. K., Ramisch, J. L., & McGowan, B. (2015). Students with autism spectrum disorder and the role of family in postsecondary settings: A systematic review of the literature. *Journal of Postsecondary Education and Disability, 28*, 135-147.
- Dente, C. L., & Coles, K. P. (2012). Ecological approaches to transition planning for students with autism and Asperger's syndrome. *Children & Schools, 34*(1), 27-36.
- Dipeolu, A. O., Storlie, C., & Johnson, C. (2015). Transition to college and students with high functioning autism spectrum disorder: Strategy considerations for school counselors. *Journal of School Counseling, 12*, 175-190.

- Family Education Rights and Privacy Act (FERPA) of 1974, 20 U.S.C. § 1232g; 34 CFR Part 99. (1974).
- Folk, E. D. R., Yamamoto, K. K., & Stodden, R. A. (2012). Implementing inclusion and collaborative teaming in a model program of postsecondary education for young adults with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities, 9*, 257-269.
- Francis, G. L., Fuchs, E., Johnson, A. D., Gordon, S., & Grant, A. (2016). Developing parent-professional partnerships in a postsecondary education program for students with disabilities. *Psychology in the Schools, 53*, 1045–1056.
- Francis, G. L., Gordon, S., Kliethermes, A. J., Grant, A., Register, A., & Baldini, D. (2017). Developing and implementing a postsecondary education program for students with intellectual disability: Processes and procedures. Manuscript submitted for publication.
- Gelbar, N. W., Smith, I., & Reichow, B. (2014). Systematic review of articles describing experience and supports of individuals with autism enrolled in college and university programs. *Journal of Autism and Developmental Disorders, 44*, 2593-2601.
- Glennon, T. J. (2001). The stress of the university experience for students with asperger syndrome. *Work, 17*, 183–190.
- Gobbo, K., & Shmulsky, S. (2012). Classroom needs of community college students with Asperger's Disorder and Autism Spectrum Disorders. *Community College Journal of Research and Practice, 36*, 40–46.
- Griffin, M. M., McMillan, E. D., & Hodapp, R. M. (2010). Family perspectives on post-secondary education for students with intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 45*, 339–346.
- Grogan, G. (2015). Supporting students with autism in higher education through teacher education programs. *SRATE Journal, 24*(2), 8-13.
- Individuals with Disabilities Education Improvement Act (IDEA) of 2004, 20 U.S.C. § 1400 *et seq.* (2004).
- Katz, I., Madjar, N., & Harari, A. (2015). Parental support and adolescent motivation for dieting: The self-determination theory perspective. *The Journal of psychology: interdisciplinary and applied, 149*, 461–479.
- Longtin, S. E. (2014). Using the college infrastructure to support college students on the autism spectrum. *Journal of Postsecondary Education and Disability, 27*(1), 63-72.
- MacLeod, A., Lewis, A., & Robertson, C. (2013). ‘Why should I be like bloody rain man?!’ Navigating the autistic identity. *British Journal of Special Education, 40*, 41–49.
- Martinez, D. C., Conroy, J. W., & Cerreto, M. C. (2012). Parent involvement in the transition process of children with intellectual disabilities: The influence of inclusion on parent desires and expectations for postsecondary education. *Journal of Policy and Practice in Intellectual Disabilities, 9*, 279-288.
- Mason, R. A., Rispoli, M., Ganz, J. B., Boles, M. B., & Orr, K. (2012). Effects of video modeling on communicative social skills of college students with asperger syndrome. *Developmental Neurorehabilitation, 15*, 425–434.
- McKeon, B., Alpern, C. S., & Zager, D. (2013). Promoting academic engagement for college students with autism spectrum disorder. *Journal of Postsecondary Education and Disability, 26*, 353-366.
- National Association of Colleges and Employers. (2013) *Professional competencies for college and university career services practitioners*. Bethlehem, PA: Author.

- Newman, L., Wagner, M., Knokey, A.-M., Marder, C., Nagle, K., Shaver, D., & Wei, X. (2011). The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International. Retrieved from <https://ies.ed.gov/ncser/pubs/20113005/pdf/20113005.pdf>
- Odom, S., & Wong, C. (2015). Connecting the dots: Supporting students with autism spectrum disorder. *American Educator*, 39, 12-20.
- Pillay, Y., & Bhat, C. S. (2012). Facilitating support for students with asperger's syndrome. *Journal of College Student Psychotherapy*, 26, 140-154.
- Pugliese, C. E., & White, S. W. (2014). Brief report: Problem solving therapy in college students with autism spectrum disorders: Feasibility and preliminary efficacy. *Journal of Autism and Developmental Disorders*, 44, 719-729.
- Rehabilitation Act (1973). Public Law No. 93-112. (1973)
- Richter, S. M., Mustian, A. L., & Test, D. W. (2012). Teaching strategies. In D. W. Test (Ed.), *Evidence-based Instructional strategies* (pp. 29-44). Baltimore, Maryland: Brooks Publishing.
- Roberts, K. (2010). Topic areas to consider when planning transition from high school to postsecondary education for students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 25, 158-162.
- Sayman, D. M. (2015). I still need my security teddy bear: Experiences of an individual with autism spectrum disorder. *Learning Assistance Review*, 20(1), 77-98.
- Shmulsky, S., Gobbo, K., & Donahue, A. (2015). Groundwork for success: A college transition program for students with ASD. *Journal of Postsecondary Education and Disability*, 28, 235-241.
- Taylor, C. M., & Colvin, K. L. (2013). Universal design: A tool to help college students with Asperger's Syndrome engage on campus. *About Campus*, 18(3), 9-15.
- Uphold, N., & Hudson, M. (2012). Student-focused planning. In D. W. Test (Ed.), *Evidence-based Instructional Strategies* (pp. 29-44). Baltimore, Maryland: Brookes.
- Van Bergeijk, E. (2014). Ten questions to ask when exploring post secondary educational options for students on the autism spectrum. *Exceptional Parent Magazine*, 40(9), 16-17.
- Van Hees, V., Moyson, T., & Roeyers, H. (2014). Higher education experiences of students with autism spectrum disorder: Challenges, benefits and support needs. *Journal of Autism and Developmental Disorders*, 45, 1673-1688.
- Wehmeyer, M. L., Agran, M., Hughes, C., Martin, J. E., Mithaug, D. E., & Palmer, S. B. (2007). *Promoting self-determination in students with developmental disabilities*. New York, NY: Guildford Press.
- Wenzel, C., & Rowley, L. (2010). Teaching social skills and academic strategies to college students with Asperger's Syndrome. *TEACHING Exceptional Children*, 42, 44-50.
- Williams, S. (2010). Student with Asperger's overcomes obstacles: Devon's journey to independence. *Exceptional Parent Magazine*, 40, 23-24.
- Wolf, L. E., Thierfeld Brown, J., & Bork, G. R. (2009). *Students with Asperger syndrome: A guide for college personnel*. Shawn Mission, KS: Autism Asperger Publishing.

Correspondence concerning this article should be addressed to Grace L. Francis, George Mason University, Finley Building 216, 4400 University Drive, MS 1F2, Fairfax, VA 22030. E-mail: gfranci4@gmu.edu

College-Bound Young Adults with ASD: Self-Reported Factors Promoting and Inhibiting Success

Amy L. Accardo
Rowan University

This cross-sectional descriptive study captured the perspectives of 14 college-bound students with ASD at the critical period of transition from high school using an open-ended prompt. The aim was to capture (1) student definitions of success as a college student, (2) the factors they identify as most influential leading to becoming a college student, and (3) the factors they identify as obstacles to becoming a college student. Findings suggest that college-bound young adults with ASD define success in terms of both academic and non-academic factors, identify factors leading to their success that suggest a need for educators to collaborate with parents and to utilize evidence-based practice to support student self-determination, and request supports in relation to overcoming mental health issues (anxiety, fear, stress) and navigating college life with a disability. The study reports initial results of a larger mixed methods investigation to document and understand the transition and progress of college students with ASD, with the purpose of providing increasingly effective supports and services.

Young adults with autism spectrum disorder (ASD) are now transitioning to college in increasing prevalence. Despite limitations, high school students with ASD have postsecondary aspirations in-line with their typical peer groups (Anderson, McDonald, Edsall, & Lounds Taylor, 2016; Camarena & Sargiani, 2009), resulting in increasing college enrollment numbers. Data from the National Longitudinal Transition Study-2 (NLTS2) indicate that roughly 43% of students with ASD participate in some level of postsecondary education (Chiang, Cheung, Hickson, Xiang, & Tsai, 2012). Along with these increased numbers comes an increased need to provide access and supports to students at the college level. This need has led to attention on the topic of expanding postsecondary supports for students with ASD (Hart, Grigal, & Weir, 2010), however, limited data is being maintained relevant to the outcomes of this population (Barnhill, 2016).

Understanding the expectations of college students with ASD is essential to meeting their unique needs, yet research on the experiences of these students is also limited (Barnhill, 2016; Gelbar, Smith, & Reichow, 2014; White et al., 2016). Gelbar et al. (2014) conducted a review of the literature investigating the experiences of students enrolled in degree awarding college programs and found only 20 studies, two group design studies with the largest sample size of 12, and 18 case studies, leading to a call for surveying or interviewing college students with ASD to gather first-hand perspectives. Similarly, White and colleagues (2016) note a dearth in research-based programming for young adults with ASD, and a lack of research gathering the perspectives of these students at the time of transition to college.

Transition

The transition from high school is a critical period for young adults with ASD (Shattuck

et al., 2013), and quality of life outcomes for this population include limited employment, social isolation, and reduced levels of independent living (Friedman, Warfield, & Parish, 2013). Research and support services to increase transition from high school to postsecondary education programs for such young adults may prove critical to increasing outcomes (White et al., 2016), yet related transition planning may be lacking (Zeedyk, Tipton, & Blacher, 2016). Shattuck et al. (2012) conducted an assessment of NLTS 2 data related to postsecondary education and students with ASD, and found that 2 years after high school over 50% of young adults with ASD were not participating in postsecondary education and were not employed, and 6 years after high school only 35% were participating in college and only 55% held paid employment. At greatest risk are youth with ASD from low-income families and youth with low levels of functioning (Shattuck et al., 2012). An urgent need to provide support at the transition to adulthood, the time systematic support services end, has emerged along with evidence that existing transition services are not successfully preparing young adults for secondary education or employment (Friedman et al., 2013).

Postsecondary transition is a time of increased stress for young adults with ASD (Pinder-Amaker, 2014), and youth with ASD are at risk for “being completely disengaged from any kind of postsecondary education or employment” post high school (Shattuck et al., 2013, p. 1046). These findings warrant investigation of how transition planning throughout high school can more effectively support productive postsecondary outcomes, e.g. by identifying student reported needs and related gaps in transition planning, by analyzing the focus of services provided, by removing barriers

to participation, and by increasing supports for students in low income families.

The Americans with Disabilities Act (ADA, 1990) ensures appropriate services and accommodations are provided to assist college-bound students with autism both inside and outside the classroom (Smith, 2007), and it is recommended that youth with ASD be supported across college settings (e.g. across classrooms, dorm rooms, and social activities) (Pinder-Amaker, 2014). VanBergeijk, Klin, and Volkmar (2008) considered the legal foundation for supporting youth with ASD in college settings; The Individuals with Disabilities Education Act (IDEA) authorized in 1990 provides federal mandate to educate children with disabilities aged 3 through 21 in the least restrictive environment. Section 504 of the Vocational Rehabilitation Act of 1973 requires any program receiving federal funds, including universities, to provide equal treatment for people with disabilities. Moreover, ADA mandates all universities provide reasonable services to students with ASD. According to VanBergeijk and colleagues, “to be in compliance with the ADA universities must learn to address the social and organizational difficulties of this population” (2008, p. 1362). While academic supports are provided through accommodations at the university level, the question emerges as to how to support the social and emotional needs of college-bound young adults with ASD.

First-hand Accounts

Anderson et al. (2016) investigated the expectations of high school students with ASD through a cross-sectional descriptive study of what high school students expect post-secondary life to be like, and how they define adulthood. Anderson and colleagues (2016) found that students with ASD

identified postsecondary schooling as a primary marker of obtaining adulthood, and as a gateway to obtaining friends, employment, and independence. Yet, Smith (2007) concluded that the supports being provided to young adults with ASD in college settings are those developed for other disability populations, and warned that it is essential to provide support and services based on the understanding of the individual needs of each student with ASD. College-bound young adults with ASD are a heterogeneous population resulting in a need to capture the first-hand perspectives of individuals to better support the larger group, however, a lack of research capturing student perspectives prevails (Van Hees, Moyson, & Roeyers, 2015).

Gelbar, Smith, and Reichow (2014) conducted the first literature review of the first-hand experiences of college students with ASD and reported as a major finding the overall scarcity of research capturing student voice. Since the literature review, Van Hees and colleagues (2014) conducted semi-structured interviews capturing the perspectives of 23 college students with ASD in Belgium, asking students the challenges they face and their support service needs. Resulting interview themes were primarily non-academic, with the reported needs of college students with ASD emerging as struggling with: change, social contacts, the processing of information, doubts about disclosing their disability, and mental health issues (e.g. anxiety, stress, and depression). Van Hees et al. (2014) concluded capturing the first-hand perspectives of students living the college experience enhances the understanding of how to provide supports to this population. Moreover, White et al. (2015) captured the perceptions of parents, educators, and college students with ASD participating in a mixed methods study and identified social

needs, self-determination needs, and self-regulation needs as challenges faced by college-bound young adults with ASD. Student survey participation was noted as a study limitation, however, and the researchers identify a need to capture the perspectives of students with ASD at the point of transition from high school to college (White et al., 2015).

Framework

The present study was designed to address the paucity of research capturing the first-hand perspectives of young adults with ASD transitioning from a high-school to college setting, and to emphasize the importance of the post high school transition period. To understand the expectations and experiences of young adults with ASD transitioning to a university setting, it is important to capture first-hand accounts and to recognize transition to college is seen by many as a societal pathway to independence. Postsecondary education is a natural progression from inclusive K-12 education experiences and benefits related to experiencing the valued social role of *college student* include improved quality of life outcomes (Hart et al., 2010).

Purpose

This study aims to capture the perspectives of college-bound students with ASD at the intersection of transition and postsecondary education. Building on the research of Anderson et al. (2016) this study extends questioning how students with ASD define adulthood to questioning how they define college success, and what factors they report as promoting or inhibiting success. In order to capture the perspectives of college-bound students with ASD at the critical period of transition from high school, we used an open-ended prompt to ask the following three questions:

- (1) How do you define success as a college student?
- (2) What factors have been most influential leading to you becoming a college student?
- (3) What factors have been obstacles to you becoming a college student?

Method

This article reports upon the qualitative analysis of initial year 1 data from a larger study of predictors of college success for students with ASD. This cross-sectional descriptive study reports initial results of a longitudinal study designed to document the transition and progress of college students with ASD at one university, with the purpose of providing increasingly effective supports and services.

Setting

The study took place during a specialized freshman orientation for students with disabilities organized by the university disability services center. The week-long orientation allowed students to move into their dorm one week prior to the general campus population and provided options to participate in daily structured social activities such as video game or movie night, university-wide activities such as a healthy campus initiative, and workshops designed to enrich academics and support students in accessing accommodations. On the second day of the week-long orientation university instructors, including the author, led students in a 2-hour academic workshop which included an interactive presentation on accessing university writing supports and using study strategies. Content included previewing university writing course expectations, and building executive functioning by identifying learning preferences and related study strategies for the first college semester. All students participated in discussion related to

workshop content and a supportive relationship was established with the university instructors. At the end of the orientation, students were asked to participate in a study regarding predictors of college success. All students agreed to study completion.

Participants

Fourteen incoming students with ASD took part in the study. All participants were male, received disability support services, and provided the university with a documented diagnosis of autism, autism spectrum disorder, or Asperger's syndrome. Ninety-three percent of participants attended a public high school, with 92-93% participating in high school English and mathematics classes in the inclusion setting. All participants received accommodations in high school. See Table 1 for general participant information.

Data Collection

Data was collected using a mixed methods survey. One component of the survey focused on capturing student voice related to their definition of success at the university along with the factors that have both lead to becoming a college student, and hindered becoming a college student. Students were provided with a paper survey with three open-ended prompts (1) How do you define success as a college student? (2) What factors have been most influential leading to you becoming a college student? And (3) What factors have been obstacles to you becoming a college student?

The prompts were read to the students aloud by the author and all students responded to the prompts in writing. After completion of the open-ended prompts students were asked to check a box to indicate interest in participating in related follow-up semi-structured interviews. Twelve of the 14

Table 1. *General Information About Student Participants*

Variable	<i>n</i> (%)
High School History	
<i>Attended public high school</i>	13 (93)
<i>Attended private high school</i>	1 (7)
<i>Participated in general ed./inclusion setting for mathematics</i>	13 (93)
<i>Participated in learning support/resource setting for mathematics</i>	1 (7)
<i>Participated in general ed./inclusion setting for English</i>	12 (92)
<i>Participated in learning support/resource setting for English</i>	1 (7)
<i>Participated in self-contained/autistic support setting for English</i>	1 (7)
<i>Received accommodations in high school</i>	14 (100)
<i>Received support of a 1:1 aide in high school</i>	4 (28)
College Major	
<i>Computer Science</i>	1 (7)
<i>English</i>	1 (7)
<i>Law/Justice</i>	1 (7)
<i>Liberal Arts</i>	1 (7)
<i>Mechanical Engineering</i>	2 (14)
<i>Management Information Systems</i>	1 (7)
<i>Psychology</i>	1 (7)
<i>Radio, Theater, Film</i>	2 (14)
<i>Undeclared</i>	4 (28)
College Living	
<i>Plan to live at home and commute</i>	3 (21)
<i>Plan to live in a single room dorm or apartment</i>	3 (21)
<i>Plan to live in a dorm with roommates</i>	8 (56)

Note. *N*= 14 males transitioning to the same university

students indicated interest in participation. The present article reports solely upon the student experiences shared through the three open-ended writing prompts coded and analyzed as a first step in capturing the perspective of young adults with ASD beginning their college experience. The open-ended prompts were designed to provide the researchers with initial data that will become the foundation for the follow-up semi-structured interviews, and inform the criterion variable of *success* for a later regression analysis on predictors of college success for students with ASD.

Data Analysis

Open-ended responses were reviewed and coded in a cyclical manner using open coding, with responses read in full, then reread, and emerging codes compared for

similarities leading to themes. The grounded theory open coding approach was selected to allow for flexibility capturing student perspectives using in vivo and descriptive codes (Saldana, 2009) and to provide a student-centered foundation for semi-structured interview questions. As a quality check, all student responses were coded by a second researcher with discrepancies discussed reaching 100% agreement.

Results

Defining Success

Open-ended prompt 1 asked, how do you define success as a college student? A first cycle open-ended review of the student responses resulted in the identified codes of grades, academic success, graduation, social involvement, employment, self-awareness, and enjoyment (see Table 2 for a complete

list). Independent review and coding resulted in 80% inter-rater agreement, followed by discussion and agreement of the codes “feeling accomplished,” and *feeling successful* leading to 100% agreement. Themes emerging in response to defining success as a college student in order of frequency reported include getting good grades; feelings of self-efficacy; participating in social opportunities; and graduating.

Getting good grades. A majority of students ($n = 8$) indicated getting good grades as the primary indicator of college success. One student reported, “Success as a college student is receiving a B, B+ or an A, A- and fully understanding concepts.” Similarly, another reported, “Success as a college student is being on top of your assignments and getting good grades on them.” Students also mentioned good grades in combination with other factors defining success such as forming friendships. “Success as a college student is having good grades while making social interactions and having friends.”

Feelings of self-efficacy. Five out of the 14 students noted both self-efficacy and social opportunities as indicators of college success. Self-efficacy emerged in relation to feeling accomplished and successful as in the student response, “Success as a college student is completing your desired major on a schedule that was comfortable and reasonable while also feeling accomplished and confident.” Students also noted the importance of learning about themselves and feeling successful as in the student definition of success excerpts, “Feeling like you surpassed many challenges,” “Learning about yourself and what works for you,” and “Success as a college student depends solely on the students ability to balance work, play and rest.”

Participating in social opportunity. Successful navigation of social opportunities or the development of friendships was reported as an indicator of success by five out of 14 young adults. Students indicated the desire to develop social relationships as evidenced by one student’s response, “Success as a college student is a healthy social life.” Young adults with ASD transitioning to college life were further found to frequently identify a goal of participating in social clubs and opportunities. “Success as a college student is excelling in social situations and getting involved with clubs and other groups,” and “Success as a college student is trying new things, making new friends...”

Graduating. Graduation from college was noted by 21% of students, and was mentioned in the context of feeling successful in your major of choice. “Success as a college student is managing to graduate,” “Success is leaving college with the degree you want,” and “Success as a college student is completing your desired major.”

Identifying Factors Influencing Success
Open-ended prompt 2 asked students, what factors have been most influential leading to you becoming a college student? Inter-rater agreement of coding was 100%, with emergent student themes including parental impact; self-determination; goals of employment; provided resources and accommodations; and general support (with one student reporting support of a friend, and one reporting support from school). See Table 3.

Support from parents. Only one factor, parent impact, was indicated by approximately half of students (43%) as instrumental in their pathway to college. Parental impact was noted in terms of

Table 2. *Defining Success as a College Student*

Sample Codes	Themes	Sample Student Response	n (%)
Academic success, Grades/ good grades, Assignments	Getting Good Grades	“Being on top of your assignments and getting good grades on them.”	8 (57)
Feeling accomplished, feeling successful	Felings of Self-efficacy	“Completing your desired majors on a schedule that was comfortable and reasonable while also feeling accomplished and confident.”	5 (36)
Social involvement, Connections, Friends, Relationships	Social Opportunities	“Good grades, communication and interactons. Insuring success, involved in clubs, organizations, societies- good social life. Maintaining healthy relationships.”	5 (36)
Degree, Graduate/ graduation	Graduation	“Managing to graduate with the best grades possible while still having an enjoyable experience.”	3 (21)

Note. N = 14; Additional emerging themes:Employment 7% (n = 1); Enjoyment 7% (n = 1); Self-awareness 7% (n = 1)

support, help, motivation, and expectation. The impact of parental expectation was captured in the student response, “A factor influencing me to become a college student is the expectations from my parents to receive a higher degree of learning...”

While motivation stemming from a parent was captured in the response of another student, “My mother has two college degrees. I want to someday have the intellectual and critical thinking skills that my mother and my great aunt have,” the necessity and impact of parental help was also captured, as in the student response, “If I had to pick it would be my mother and father. I could never of paid for college if my father hadn’t helped me take out a loan...”

Identifying Obstacles to Success

Open-ended prompt 3 asked students, what factors have been obstacles to you becoming a college student? Inter-rater agreement of coding was 100%. Student reported

obstacles to success in order of frequency reported consist of mental health issues including anxiety, fear and stress; poor study skills; poor social skills; having a disability that impedes success; and worry about college professors (see Table 3).

Mental health issues. Only one factor, mental health issues including anxiety, fear, and stress, emerged as common in a majority of student responses (57%). Students were reflective and expressed concern that their own mental health issues may potentially hold them back and inhibit their success at the college level. Anxiety and fear were indicated most frequently as a student concern, as evidenced in the student identified obstacles to becoming a college student, “Embarking on this journey alone (is an obstacle) because it is nerve wracking,” “Anxiety and panic attacks, fear of failure, approaching other students and working in groups,” and “...general anxiety and fear of failure.” Stress and recognition of mental health issues also emerged as a

Table 3

Factors Reported as Promoting and/or Inhibiting College Success

Factors Identified as Promoting Success	<i>n</i> (%)	Factors Identified as Obstacles to Success	<i>n</i> (%)
1. Parental Impact	6 (43)	1. Anxiety/Fear/ Stress	8 (57)
2. Self-determination	4 (29)	2. Poor Study Skills	5 (36)
3. Goal of Employment	3 (21)	3. Poor Social Skills	4 (29)
4. Resources & Accommodations	2 (14)	4. Having a Disability	3 (21)
5. General Support	2 (14)	5. College Professors	2 (14)

Note. *N* = 14

concern as captured in the student responses, “It’s sort of stressful now since I’m away from home,” and “Myself has been the biggest obstacle towards college...since I always bring myself down and then rise back up so I stop myself from going places.”

Discussion

The increase in young adults with ASD transitioning to post high school life is a pressing topic. The student first-hand definitions of success and accounts of factors contributing to and inhibiting success shared in the present article add to our understanding of how to promote access and success at the college level for young adults with ASD. Findings have led to the conclusions that college-bound young adults with ASD (1) define success in terms of both academic (grades, and graduation) and non-academic (social relationships, and feeling efficacious) factors, (2) identify factors leading to their success that require a move beyond accommodations, suggesting a need to collaborate with and support parents and to utilize evidence-based practice

(EBPs) to support student self-determination, and (3) identify obstacles to success as expressed concerns with mental health, study skills, social skills and disability identity. The college-bound young adults are seemingly requesting support in relation to overcoming mental health and social skills issues, and navigating college life with a disability.

Gelbar and colleagues (2014) found reports of anxiety, loneliness, and depression emerging from the 18 case studies investigated through literature review leading to a suggested need for non-academic support services at the college level. The findings of the present study, in which a majority of incoming college freshman with ASD reported obstacles to success to be mental health issues, and non-academic stressors, echo the findings of Gelbar et al. and suggest a clear need for non-academic social and emotional support services to be in-place starting at the point of university orientation for incoming students with ASD. Students noted the desire to get good grades and to form social relationships

in college, yet reported - as a majority- the realization that they have to overcome their own anxiety and fears to achieve these goals.

Limitations

This article reports the initial results of a three-question open-ended probe with a sample size of 14 young adults with ASD. Results are preliminary and will be used to inform follow-up semi-structured interviews. While typical of the sample size of studies in the literature, a large-scale sample is needed to further validate emergent themes as those held in the wider population of college-bound students with ASD. Furthermore, this article reports on the perspectives of college-bound young adults with ASD only, and as a result, is not representative of the larger group of all young adults with ASD transitioning from high school settings. Young adults with ASD in the present study were purposefully questioned during the time of transition to a college setting. This cross-sectional analysis may not indicate the definitions of college success, or the factors promoting and inhibiting success, that these same young adults may hold at other points in time, or after participating in college experiences.

Implications for Research and Practice

Research appears warranted not only to determine specific non-academic support services to provide young adults with ASD in college settings, but also to provide non-academic support services in formats and ways that are most inviting and effective for young adults with ASD. For example, VanBergeijk, Klin, and Volkmar (2008) recommend higher functioning students with ASD matriculate into community college courses while still in high school as a transition plan to gain supported exposure to the academic and social demands of college settings; and recommend high school IEP

transition plans include academic modifications, independent living skills goals, socialization goals, vocational goals, and mental health supports to help identify a college fit for each individual with ASD. In considering the emergent theme that students with ASD transitioning to college settings are anxious, stressed, and concerned with social situations, it appears effective transition plans from high school to college should include a system of non-academic supports that start at the high school level. Furthermore, transition teams should empower students with ASD with EBPs and strategies to reduce anxiety, to understand their own disability, to self-advocate in a college setting, and to seek out colleges with the appropriate social and emotional supports in place throughout the application and decision-making process.

With the emerging data indicating a need to recognize and support the social emotional needs of college students with ASD in the present study, faculty training in how to implement strategies and EBPs related to social emotional needs at both the high school and college level emerge as priority, along with the need for high school and university support service offices to collaborate. In contrast, Zeedyk et al. (2016) note there is limited research designed to gather data leading to designing programs and faculty training in higher education for students with ASD, White et al. (2015) indicate there is limited research to establish interventions specific to college-bound young adults with ASD, and Gerber et al. (2014) indicate limited research identifying EBPs for young adults with ASD transitioning to college. Finally, college-bound students with ASD identified parents as the number one factor leading to attaining participation in postsecondary education. This suggests research investigating means to increase parent impact, e.g. through

collaboration among parents, middle and high school transition teams, high school teachers, and/or college disability service offices must be added to our prior list of research needs.

Conclusion

This cross-sectional analysis is the first step of a larger research project, and our next steps for research include student semi-structured interviews at the end of their first year of college life. Resulting student definitions of success will inform our follow-up semi-structured interview

questions, and will inform the identification of criterion variable(s) that will define success (e.g. the student reported factors of grades, graduation, and self-efficacy will be used in a quantitative regression analysis to identify predictors of college success). In addition, the tracking of student progress and perspectives through longitudinal studies emerges as a recommendation for future research, along with the need for multi-university studies of student needs and outcomes encompassing larger numbers of college-bound students with ASD.

References

- Americans with Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990).
- Anderson, K. A., McDonald, T. A., Edsall, D., Smith, L. E., & Lounds Taylor, J. (2016). Postsecondary expectations of high-school students with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 31*, 16-26. doi: 10.1177/1088357615610107
- Barnhill, G. P. (2016). Supporting students with Asperger syndrome on college campuses: Current practice. *Focus on Autism and Other Developmental Disabilities, 31*, 3-15. doi:10.1177/1088357614523121
- Camarena, P. M., & Sargiani, P. A. (2009). Postsecondary educational aspirations of high-functioning adolescents with autism spectrum disorders and their parents. *Focus on Autism and Other Developmental Disabilities, 24*, 115-128.
- Chiang, H., Cheung, Y. K., Hickson, L., Xiang, R., & Tsai, L. Y. (2012). Predictive factors of participation in postsecondary education for high school leavers with autism. *Journal of Autism and Developmental Disorders, 42*, 685-696. doi:10.1007/s10803-009-0721-8
- Friedman N. D. B., Warfield, M. E., & Parish, S. L. (2013) N. D. B., Warfield, M. E., & Parish, S. L. (2013). Transition to adulthood for individuals with autism spectrum disorder: Current issues and future perspectives. *Neuropsychiatry, 3*, 181-192. doi: 10.2217/NPY.13.13.
- Gelbar, N. W., Smith, I., & Reichow, B. (2014). Systematic review of articles describing experience and supports of individuals with autism enrolled in college and university programs. *Journal of Autism and Developmental Disorders, 44*, 2593-2601. doi:10.1007/s10803-014-2135-5
- Hart, D., Grigal, M., & Weir, C. (2010). Expanding the paradigm: Postsecondary education options for students with autism spectrum disorder and intellectual disabilities. *Focus on Autism and Other Developmental Disabilities, 25*, 134-150.
- Individuals with Disabilities Education Act of 1990, 20 U.S.C. § 1400 (1990).

- Pinder-Amaker, S. (2014). Identifying the unmet needs of college students on the autism spectrum. *Harvard Review of Psychiatry*, *22*, 125-137. doi:10.1097/HRP.0000000000000032.
- Saldana J. (2009). *The coding manual for qualitative researchers*. Los Angeles, CA: SAGE.
- Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M. & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*, *129*, 1042-1049.
- Smith, C. P. (2007). Support services for students with Asperger syndrome in higher education. *College Student Journal*, *41*, 515-521.
- VanBergeijk, E., Klin, A., & Volkmar, F. (2008). Supporting more able students on the autism spectrum: College and beyond. *Journal of Autism and Other Developmental Disorders*, *38*, 1359-1370. doi:10.1007/s10803-007-0524-8
- Van Hees, V., Moyson, T., & Roeyers, H. (2015). Higher education experiences of students with autism spectrum disorder: Challenges, benefits and support needs. *Journal of Autism and Developmental Disorders*, *45*, 1673-1688. doi:10.1007/s10803-014-2324-2
- White, S. W., Elias, R., Salinas, C. E., Capriola, N., Conner, C. M., Asselin, S. B.,...Getzel, E. E. (2016). Students with autism spectrum disorder in college: Results from a preliminary mixed methods needs analysis. *Research in Developmental Disabilities*, *56*, 29-40. doi:10.1016/j.ridd.2016.05.010
- Zeedyk, S. M., Tipton, L. A., & Blacher, J. (2016). Educational supports for high functioning youth with ASD: The postsecondary pathway to college. *Focus on Autism and Other Developmental Disabilities*, *31*, 37-48. doi:10.1107/1088357614525435

Correspondence concerning this article should be addressed to Amy L. Accardo, 3050 James Hall, 201 Mullica Hill Road, Glassboro, NJ 08028. E-mail: accardo@rowan.edu

Seeking the Perspectives of Transition-Age Students with Significant Disabilities in Research since 1990

Samantha Walte
University of Illinois at Chicago

Lisa S. Cushing
University of Illinois at Chicago

Lindsay S. Athamanah
University of Illinois at Chicago

Kasandra Posey
University of Illinois at Chicago

With the long-standing emphasis on self-determination and self-advocacy in the field of transition, it seems logical that the discussion of how best to prepare students with disabilities for adulthood would include the students themselves. The voices of students with significant intellectual and developmental disabilities (SIDD) have historically been sparse in transition research. Grappling with validity and methodological concerns, researcher most often turn to students with milder disabilities, teachers, parents, and other stakeholders for input about transition services. The purpose of this literature review was to highlight articles published about transition topics that included the perspectives of students with SIDD. This review emphasized research questions, topics, methodologies, demographics, tools, and trends in these studies. Between 1990 and 2015, 11 studies were published that sought input from students with SIDD as stated in the purpose or research questions of the articles in the top 22 special education journals. Specifically, the authors identified strategies used by researchers to facilitate the inclusion of the perspectives of students with SIDD. By acknowledging challenges and presenting examples of solutions to understanding the various points of view represented by this population of students, this review aimed to empower more researchers to design studies to seek their input.

Historically segregated and excluded from mainstream society, individuals with disabilities embraced the mantra, “Nothing about us without us,” during the 1990s to drive home the importance of their involvement in decisions about their lives (Charlton, 1998). Individuals with significant intellectual and developmental disabilities (SIDD) were often not given the liberty to speak for themselves on important issues (Harbour & Maulik, 2010). However, in the past two decades, individuals with SIDD have attained more control through self-determination or “acting as the primary causal agent in one’s life and making decisions regarding one’s quality of life free

from undue external influence or interference” (Wehmeyer, 1996, p. 24). Self-determination is a strong predictor of positive post-school outcomes for individuals with disabilities (Cobb, Lehmann, Newman-Gonchar, & Alwell, 2009) and causal agency is critical to achieving and maintaining those outcomes (Wehmeyer & Field, 2007).

Transition-age students with SIDD (ages 14-21) are increasingly determining their own futures. The Individuals with Disabilities Education Act (IDEA) requires that students over the age of 16 are invited to their transition planning meetings and that all

goals and services reflect their preferences (2004). Active involvement in transition planning is linked with better outcomes and more successful lives. Well-researched strategies support and facilitate this involvement such as student-led individualized education plans (IEPs) (e.g., Kelley, Bartholomew, & Test, 2013; Martin et al., 2006), the Self-Determined Learning Model of Instruction (e.g., Agran, Cavin, Wehmeyer, & Palmer, 2006; McGlashing-Johnson, Agran, Sitlington, Cavin, & Wehmeyer, 2003), and person-centered planning (e.g., Lohrmann-O'Rourke & Gomez, 2001). With improved strategies to promote their involvement, more students with a wide range of disabilities are becoming the agents of change in their transition planning.

Student Involvement in Transition Research

Reflective of the increased emphasis on student involvement at the individual level, student perspectives are also being incorporated into transition research. Researchers acknowledge the invaluable addition students' input can add to the field and have sought reactions from students with learning disabilities (LD) about their IEP meetings to inform professionals about how to support them (e.g., Agran & Hughes, 2008; Mason, McGahee-Kovac, Johnson, Stillerman, 2002), surveyed youth who were deaf about barriers to successful transition (Freeburg, Sendelbaugh, & Bullis, 1991), conducted focus groups with students with EBD about self-determination to learn what they felt would help them become more self-determined (Leake & Boone, 2007), and assisted youth with disabilities to conduct a study in which other young adults evaluated the transition services they received (Powers et al., 2007). This research reveals that student input can enhance transition programs and promote better post-school outcomes, but students with more severe

disabilities are rarely included in these studies.

Studies utilizing student input most often targeted students with LD, emotional and behavioral disorders (EBD), or mild intellectual disabilities (ID). Input from students with SIDD remains largely absent from the research. Given the importance of self-determination for all students, it is disheartening that this population of students is excluded from the opportunity to provide insight. Concerns with ethics and protocol, comprehension, ability to respond, and validity have led many researchers to rely on input from other stakeholders such as parents (Carter et al., 2013) or teachers (Agran, Snow, & Swaner, 1999) to "speak for" the student.

Barriers and Safeguards to Student Involvement in Research

Many students with SIDD have complex communication needs and require intensive supports to access content, bringing into question their ability to provide meaningful input. Some researchers have voiced skepticism about the validity of responses from students with SIDD (e.g., Carter, Owens, Trainor, Sun, & Swedeen, 2009; Reid, Everson, & Green, 1999), specifically concerning response bias, or the tendency to report untrue responses. For students with SIDD, acquiescence bias (choosing the option they believe the researcher wants them to choose) and recency effect (choosing the option most recently presented) pose particular concerns (Heal & Sigelman, 1995). These issues have excluded students with SIDD.

Methodological safeguards have been developed to access input from students with SIDD. Heal and Sigelman (1995) recommend the use of a menu of options, rather than yes/no for individual items in

interviews with adults or youth with ID to increase their comprehension of research topics and avoid response bias. Bogdan and Biklen (1992) suggest that researchers use a combination of interviews, observation, and document analysis to validate student responses. An increased emphasis on identifying techniques that protect the validity of student responses would mean more researchers could involve students with SIDD in their research.

When individuals with disabilities actively participate in research, the results provide authentic depictions of the problem and unique solutions to those problems (Balcazar, Keys, Kaplan, & Suarez-Balcazar, 2006). As transition-age students with SIDD have rarely been included in this type of research, it is likely that innovative information would be gained by incorporating their perspectives. Therefore, the purpose of this literature review was to identify strategies employed by researchers to elicit input from youth with SIDD. Specifically, it was designed to answer the following research question: What methods and strategies were used to elicit input from transition-age students with SIDD? We were also interested in identifying the topical and demographic features of those articles to emphasize gaps in this literature.

Method

The aim of this review was to examine published research studies for methods and measures used to elicit input from transition-age students with SIDD, as well as to ascertain the topics of those studies. Articles were selected from an existing pool of 744 transition-related research studies (as per Kohler, 1996; Morningstar & Clark, 2003) that was a subset of a broader review about transition methods and topical foci (Cushing, Parker-Katz, Athamanah, Walte, & Posey, in preparation). Studies from this

pool were published between 1990 and 2015 and located in the top 22 special education journals as identified by their impact factors in the 2012 Journal Citation Report (Thomson Reuters). This section will describe how the studies in the current review were selected and analyzed.

Inclusion Criteria

To be included in this review, each article met three criteria. First, studies must include participants with disabilities between the ages of 14 and 22. Some transition-related articles from the original pool consisted of other stakeholders (e.g., parents, teachers, adult self-advocates), but this review was interested in looking specifically at the ways input was gathered from the students themselves. An age limit was imposed to identify studies that elicit input from youth who are receiving transition services. This resulted in a total of 258 studies.

Second, studies with at least two-thirds of the participants categorized as students with SIDD were selected. Studies that explicitly reported participant with the primary diagnoses of ID, ASD, or MD were included. Furthermore, participants in those studies must be described as having moderate to severe disabilities (by label or IQ), received services in programs designed for students with moderate to severe disabilities, or qualified for alternate testing (Carter et al., 2010). A review of the literature indicated that students with SIDD require unique supports to participate in research that students with milder disabilities would not. Thus, to provide readers with authentic examples of methods for collecting input from students with SIDD, we excluded studies in which the participants' disabilities could not be determined by the information provided or if authors did not differentiate between intensity levels of disability (e.g., mild,

moderate, or severe). This criterion highlighted which topical areas were more likely to use input from students with SIDD. A total of 103 articles resulted upon application of these conditions.

Third, authors needed to explicitly state their intention to obtain input from students with SIDD in the purpose of the study or a research question. This condition allowed us to target studies that treated the experiences of students with SIDD as a key element, rather than supplementary to the study, such as social validity. We surmised that authors who prioritized student input were more likely to describe their data collection procedures in detail.

For the purpose of this synthesis, student input is defined as opinions, beliefs, perspectives, or perceptions. This definition purposefully emphasizes subjective data that has been traditionally challenging for researchers to acquire from students with SIDD (Biklen & Moseley, 1988; Dennis, 2002). If a study contained student input only for social validity and not as a goal of the research, it was excluded. Additionally, articles were excluded if students were primarily asked to report demographic information (e.g., employment status) or to participate in tests or assessments (e.g., Transition Competence Battery). This review required that students contribute insights that neither demographic surveys nor assessments offer. For the same reason, studies that converted student input into composite scores rather than maintaining individual student perspectives were excluded (e.g., ARC Self-Determination Scale). A total of 36 articles remained after this criterion was applied.

After further review and discussion among the researchers, another 25 studies were excluded due to lack of emphasis on student

input and ambiguous reporting of participants' disabilities. A total of 11 research studies that met all conditions. The majority of studies were either qualitative ($n = 6$) or descriptive-quantitative ($n = 3$). There was one group design and one was a single-case design. It is important to note, however, that the studies' primary designs occasionally differed from the specific methods they used to obtain participant input. For the purpose of this review, studies are described with respect to their methods of obtaining input from students with SIDD (e.g., interviews in Bouck et al., 2012). For example, Bouck, Satsangi, Bartlett, and Weng's (2012) used a single-case design to test the effects of assistive technology on independent living skills but they interviewed students to understand their evaluation of the intervention. Although this is similar to social validity, the article was included because the student opinions were sought to answer a specific research question (i.e., "What are the students' perspectives of audio recorders to support them in grocery shopping?").

Development of Coding Scheme

Each study was first read in its entirety to understand the purpose, the strategies that were used to gain input from students with SIDD, participant demographics, and the article's topical focus. Due to the dearth of research that sought input of students with SIDD, we attempted to mine as much information as possible from the 11 studies. To do this, theoretical coding (Saldaña, 2015) was used to create the coding scheme. Often used in grounded theory research, theoretical coding begins with a broad theme (i.e., "input from students with SIDD") and identifies all information pertinent to that idea. Rather than extracting only targeted data from each article, this process allows for the emergence of more nuanced information. For example, simply

identifying key words denoting methods in Cooney (2002) would have neglected an entire section in which the author expounds on challenges associated with students with unique communication styles. Though not a specific strategy, that section was useful for recognizing barriers that preclude researchers from seeking input from this population. To acquire a thorough understanding of the input provided by students with SIDD, studies were analyzed section-by-section for phrases or sentences pertaining to input. All relevant information was highlighted and memoed. Memoing is the act of taking rich, descriptive notes throughout the research process to uncover latent themes and turn raw information into cohesive, meaningful data (Birks, Chapman, & Francis, 2008).

After all information germane to “input from students with SSID” was extracted from the 11 articles, the memos were used to categorize the data. Five categories emerged from these studies: 1) specific methods and tools, 2) strategies to support validity, 3) strategies to support student participation, 4) demographics of the participants, and 5) reasons for including input from students with SIDD. Debriefing with the second author throughout this process was an important step in protecting the credibility of the theme generation. The categories were then used to create a coding scheme to unearth specific information from each article (Galvan, 2016).

Coding Procedure

First, each article was evaluated and grouped by methodology and measures (e.g., interviews, surveys) elicit input from students with SIDD. We did not record measures employed to gather data unrelated to student input. Interviews were further categorized as structured, semi-structured, or open-ended/unstructured. Surveys were

coded as forced-choice, open-ended, Likert-scale, or multiple-choice. If a specific tool was used (e.g., Choose and Take Action [Martin, et al., 2004]), its name and a brief description were noted.

Next, articles were examined for strategies to promote input from students with SIDD. Researchers employed strategies that either supported validity or student participation. We listed pertinent information described by authors in each category. For example, Cooney (2002) mentioned conducting participant observations in addition to interviews to “provide a great deal of insight into the meanings of information that might have otherwise gone unexplained” (p. 427). This was coded as “observations” under “strategies to support validity.” Washington, Hughes, and Cosgriff (2012) read “questions to each participant individually in a quiet area of the classroom...providing clarification or rewording as needed” (p. 17). These were coded as “strategies to support student participation.”

Reliability

After the coding scheme was developed from the qualitative analysis, the first author trained the second author on the coding manual. Once trained, the second author coded five (45%) of the articles. A spreadsheet was developed from the four categories in which both coders put synopses and notes from the articles. Using this method, reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100 (Miles & Huberman, 1994). Interrater reliability averaged 92.7% across all articles and ranged from 81.3% to 93.8%. The coders reviewed and resolved any disagreements.

Results

This review identified articles published since 1990 that included input from students with SIDD. The 11 articles are described below in terms of the following categories: 1) demographics, 2) topics, 3) method type and measures 4) strategies to support validity, and 5) strategies to support student participation (see Table 1).

Demographics

A total of 189 students with SIDD participated in these studies. However, demographic information was not reported for many of the studies in this review. Therefore, in the studies that included demographic information, a total of 24 students had moderate ID, 37 had severe ID, and 60 were listed as having moderate or severe ID. Students in the studies were aged 14-21 and approximately 49% of them was female. Of the four studies that reported student ethnicity, 48 students were African American, 26 were Caucasian, four were Hispanic and one was Asian.

Topics

All of the articles pertained to one of four transition-related areas: transition planning, employment, independent living, or post-secondary education. The majority of studies ($n = 6$) focused on students input about transition planning. Of these, three studies asked students about their involvement in and experience with the transition planning process (Cooney, 2002; Gallivan-Fenlon, 1994; Thoma et al., 2001), two studies focused on self-determination (Hughes, et al., 2013; Washington et al., 2013), and one concentrated on person-centered planning (Hagner et al., 1996). Of the six articles, four interviewed students and two conducted surveys.

Carter et al. (2010) and Martin et al. (2005) asked students for their input about

employment. Carter et al. (2010) determined students' levels of involvement in employment activities over the summer as well as their satisfaction with those experiences. In Martin et al. (2005), students indicated which types of jobs they preferred and those decisions were compared to what their caregivers thought they liked. Unlike most other studies, both of these included only students with severe disabilities.

Two studies focused on topics related to independent living. Bouck et al. (2012) elicited student perspectives about using assistive technology while with grocery shopping. Millar (2007) asked students about issues pertaining to guardianship. She sought to understand what students already knew about guardianship and what they envisioned for their future. Both of these studies included only students with moderate ID. Lastly, one study focused on post-secondary education. Page and Chadsey-Rusch (1995) interviewed two students with moderate ID who attended a community college. They aimed to learn about the students' "backgrounds, feelings, and beliefs about the campus experiences and factors in choosing the course and areas of study" (Page & Chadsey-Rusch, 1995, p. 88).

Method Types and Measures

A total of eight articles collected student input via qualitative methods. One study (Millar, 2007) collected data via focus groups and the remaining seven studies used interviews. Three of the interview studies employed semi-structured techniques, three were unstructured and open-ended, and one was structured. Gallivan-Fenlon (1994) used semi-structured interviews to ask students in their last year of high school about their experiences in transition and aspirations for their future. Thoma et al. (2001) used semi-structured interviews to inquire about students' involvement in transition planning

Table 1. *Studies that Sought Input from Students with SIDD*

Reference	Participants	Input-Related Research Question or Stated Purpose	Methods to Obtain Input	Strategies to Support Validity	Strategies to Support Student Participation
<i>Transition Planning</i>					
Cooney (2002)	9 young adults with severe disabilities	Examined the perspectives of young adults with severe disabilities to better understand how these perspectives influence the overall quality of the transition experience	Open-ended interviews, in person	<ul style="list-style-type: none"> • Observations • Document Analysis • Supplemental informal conversations 	<ul style="list-style-type: none"> • Gradually developed familiarity with participants • Prompting
Gallivan-Fenlon (1994)	11 young adults with moderate or severe disabilities	How do young adults with disabilities experience and perceive transition?	Semi-structured interviews, in person	<ul style="list-style-type: none"> • Tape-recorded interviews • Observations • Document analysis • Supplemental interviews with family and teachers 	<ul style="list-style-type: none"> • Gradually developed familiarity with participants • Familiar environment • Repetition of questions to support comprehension
Hagner, Helm, & Butterworth (1996)	4 young adults with moderate and severe ID	How do students view the person-centered planning process?	Open-ended interviews, in person	<ul style="list-style-type: none"> • Tape-recorded interviews 	<ul style="list-style-type: none"> • Not described
Hughes, Cosgriff, Agran, & Washington (2013)	47 young adults with moderate and severe disabilities	Obtained the perspectives of students with severe disabilities on IEP involvement and engagement in self-determination behaviors.	Survey with forced choice and open-ended questions	<ul style="list-style-type: none"> • Required students to provide examples of their responses to show their comprehension 	<ul style="list-style-type: none"> • Conducted as individual interviews • Familiar, quiet setting • Clarification and rewording, as needed
Thoma, Rogan, & Baker (2001)	8 young adults with moderate, severe, and MD	Provide and in-depth exploration of the transition planning process for eight students, including a focus on level of student involvement in the process	Semi-structured interviews, in person	<ul style="list-style-type: none"> • Observation • Document analysis • Tape-recorded interviews 	<ul style="list-style-type: none"> • Familiar environment • Parents present to “interpret” student responses
Washington, Hughes, & Cosgriff (2012)	19 young adults with moderate and severe disabilities	To what extent do students with severe intellectual disabilities attending a high-poverty high school report using self-determination and education planning skills?	Survey with forced choice and open-ended questions	<ul style="list-style-type: none"> • Required students to provide examples of their responses to show their comprehension 	<ul style="list-style-type: none"> • Conducted as individual interviews • Familiar, quiet environment • Clarification and rewording, as needed

Reference	Participants	Input-Related Research Question or Stated Purpose	Methods to Obtain Input	Strategies to Support Validity	Strategies to Support Student Participation
<i>Employment</i>					
Carter, Ditchman, Sun, Trainor, Swedeen, & Owens (2010)	65 young adults with severe disabilities	What are the summer employment experiences of youth with severe disabilities?	Structured interviews, telephone	Some students completed interview with another person (e.g., parent)	Some students completed interview with another person (e.g., parent)
Martin, Woods, Sylvester, & Gardner (2005)	8 young adults with severe ID	Determined whether caregivers' vocational choices matched those made by students and adults with cognitive disabilities	Survey with forced choices	<ul style="list-style-type: none"> • Repeated choice options to validate responses 	<ul style="list-style-type: none"> • Computer-based • Nonverbal responses • Familiar environment • Choices presented as video clips • Length of session and number of repetitions based on time, attention, and individual preference
<i>Independent Living</i>					
Bouck, Satsagi, Bartlett, & Weng (2012)	3 young adults with moderate ID	What are the students' perspectives of audio recorders to support them in grocery shopping?	Semi-structured interviews, in person	<ul style="list-style-type: none"> • Supplemental interviews with teachers 	Not described
Millar (2007)	13 young adults with moderate ID	Gain perspectives from young adults with disabilities who either have or do not have a legal, court appointed guardian	Focus groups	<ul style="list-style-type: none"> • Tape-recorded sessions • Praised questions to avoid bias 	<ul style="list-style-type: none"> • Questions presented in advance • Rules reviewed before each session
<i>Education</i>					
Page & Chadsey-Rusch (1995)	2 young adults with moderate ID	Provide a description of the community college experience for two students with mental retardation	Unstructured interviews, in person	<ul style="list-style-type: none"> • Observation • Document analysis • Supplemental interviews with other stakeholders 	<ul style="list-style-type: none"> • Not described

using questions such as, “Tell me about what you would like to do in school. Are you doing it?” (p. 21). Before and after implementing an assistive technology intervention, Bouck et al. (2012) conducted semi-structured interviews with students to inquire about their perceptions of grocery shopping, current mode of shopping, and evaluation of the devices they used in the study. Through the use of open-ended interviews, Cooney (2002) queried students about their post-school plans; Hagner, Helm, and Butterworth (1996) questioned how students viewed the person-centered planning process; and Page and Chadsey-Rusch (1995) probed the experience of attending community college with two young adults. The majority of interviews were conducted in person except for one study that interviewed students by phone about their satisfaction with summer work experiences (Carter et al., 2010).

Focus groups were used in one article to gain insight into the perspectives of six young adults with moderate ID who had legal guardians and another was made up of seven young adults with developmental disabilities who were their own guardians. Millar also included groups of parents and teachers and asked each group some common questions including, “What is the first thing that comes to mind when you hear the term guardian?” and “What are your experiences, if any, with someone who is of legal age and has a guardian?” (2007, p. 123).

Three studies employed quantitative survey methods to discern students’ perspectives. One study consisted of only forced-choice options (Martin, Woods, Sylvester, & Gardner, 2005) whereas two studies used at least one open-ended question. Martin et al. (2005) used the Choose and Take Action software, which presents forced-choice

questions to survey students about their job preferences. Hughes et al. (2013) and Washington et al. (2012) used the Student Self-Determination Survey (SS-DS), which used forced-choice questions about IEP involvement and self-determination, and one open-ended question about post-graduation goals.

Strategies to Support Validity

All authors in this review acknowledged concerns with respect to validity of responses and input from students with SSID and included specific strategies they implemented to combat the perceived threats to validity. These strategies could be grouped into three categories: a) cross-referencing, b) presentation of questions to prevent response bias, or c) techniques for the researchers to interpret student responses correctly.

Cross-referencing refers to studies that confirmed the credibility of participants’ responses through obtaining corroborating information from other sources (Bogdan & Biklen, 1992) and was used in six of the 11 studies in this review. Studies in this review cross-referenced students’ responses by observing and reviewing documents such as IEPs (Cooney, 2002; Gallivan-Fenlon, 1994; Page & Chadsey-Rusch, 1994; Thoma et al., 2001), or gathering supplemental input from others (e.g., parents, teachers); (Bouck, et al., 2012; Carter, et al, 2010; Gallivan-Fenlon, 1994; Page & Chadsey-Rusch, 1995).

Four studies described procedures for presenting questions to students in a manner that inherently accounted for response bias. The Choose and Take Action software was specifically designed for young adults with intellectual disabilities (Martin et al., 2005). The software repeats options to ensure students are responding consistently. If not,

the response was considered invalid and was not used. The SS-DS was field-tested with students with SIDD and, to prevent acquiescence bias, the authors introduced a new method of questioning (Hughes et al., 2013; Washington et al., 2012) in which students were given forced-choice questions (e.g., yes or no) and then asked to an example of the skill in question. If the example given did not support the answer, the response was considered invalid. Millar (2007) reported that focus group questions were “carefully phrased” to avoid biased responses, but did not elaborate. Researchers in four studies tape-recorded the students’ responses to ensure they were reported accurately (Gallivan-Fenlon, 1994; Hagner et al., 1996; Millar, 2007; Thoma et al., 2001), which allowed the authors to review the participants’ contributions and convey them thoroughly.

Strategies to Support Student Participation

Eight of the 11 studies reported employing specific adaptations to increase the likelihood of student input. The strategies that facilitate student participation were implemented either to support students’ comprehension of the questions, to support students’ ability to respond to the questions, or to create an environment conducive to optimal participation in the study.

In order to guarantee that students understood questions, the three survey studies reported reading questions aloud and two of those studies clarified or reworded as necessary. Martin et al. (2005) presented 20-second video clips on the computer for each choice to provide students with a concrete example of each option. Other studies used repetition and clarification of questions (Gallivan-Fenlon, 1994) and prompting for the participant to add detail (Cooney, 2002). Martin et al. (2005) described multiple nonverbal response options available to the

youth including keyboard or mouse, single switch, eye gaze, or verbalizations. Some students in Thoma et al.’s (2011) interviews used parental assistance to interpret responses.

The majority of accommodations or strategies described in the articles were intended to change the environment to enhance student participation. In five articles, researchers reported working with the students in a familiar location, such as their classrooms or schools (Hughes et al., 2013; Martin et al., 2005; Thoma et al.; Washington et al., 2012), their homes (Martin et al., 2005; Thoma et al., 2001) or a “home-like environment” (Gallivan-Fenlon, 1994, p. 13), and in the community or at their worksites (Martin et al., 2005; Thoma et al., 2001). Carter et al. (2010) conducted phone interviews. The wide range of environments listed in Thoma et al. (2001) and Martin et al. (2005) indicated that participants were provided a choice of where to complete the surveys. Hughes et al. (2013) and Washington et al. (2012) implemented the SS-DS with students individually in a quiet part of their classrooms. Cooney (2002) and Gallivan-Fenlon (1994) spent time with the young adults with SIDD before interviewing them to gradually develop a rapport. Cooney (2002) explained that this also familiarized the researcher with the students’ communication styles. Millar (2007) offered participants the focus group questions in advance and stated the rules before each session (e.g., “there were no right or wrong answers” and “what was said was to stay among the participants,” p. 120).

Discussion

Identifying valid strategies to promote student voices in research is a crucial component to advancing post-school outcomes and quality of life for transition

age youth with SIDD. An emerging body of research promotes the use of input from students', however, researchers seem reticent to include input from those with SIDD (e.g., Carter et al., 2009; Reid et al., 1999). Researchers cite concerns about the efficacy of strategies to include the perspectives of students with SIDD such as communication and comprehension barriers that lead to response bias. By presenting strategies designed to decrease bias, we hope more researchers will incorporate the voices of all students, including those with SIDD. This article extends the current research on student input by specifically looking at the participation of students with SIDD. The studies in this review reveal that it is possible to obtain and include valuable input from students with SIDD in transition research, but is rarely being done. Four findings emerged from the analyses.

Clear and Consistent Report of Demographics

The number of studies seeking input from students with SIDD published since 1990 remains low (an average of 0.69 per year), with a slight increase since 2007. Findings indicate that few students are included and that little is known about the students who do participate with respect to ethnicity, location, and specific disability. The lack of viable examples of students with SIDD participating in research and the ambiguity in description of the students may lead readers to make assumptions about the students who are able to provide input. The more detail we are able to provide as researchers, the better informed the research we produce will be.

Broader Range of Topics Relevant to Transition-Age Students

Although the topics ranged across four primary topic areas (i.e., transition planning employment, independent living, and post-

secondary education), there existed an uneven distribution with the majority of the studies eliciting input from students about the transition planning process. Most articles had some sort of connection to self-determination, which is consistent with Madaus et al.'s 2013 review of transition literature who found a heavy emphasis on self-determination. None of the articles asked for students' perceptions of their relationships with others, which is significant to note as researchers are often conducted studies about students with SIDD to improve their quality of life.

Use the Voices of Students with SIDD to Drive Research and Practice

There was a prominent theme of students feeling their views were not heard or acknowledged. Cooney (2002) admitted that it was not until much later in his career that he realized the importance of listening to students and not discounting what they say as unrealistic or insignificant. Gallivan-Fenlon (1994) found that young adults' desires were not reflected in their transition experiences and their parents and service providers were restrictive in their expectations. Martin et al. (2005) designed their study to measure the different between students' preferences and their caregivers' perceptions of what jobs the students would like. The disconnect they found between the students' opinions and what their caregivers thought they wanted speaks to what may be a large-scale problem. Decisions about what is best for transition-age students with SIDD are most often made by professionals without disabilities, who may have limiting expectations that stifle the progress of this group. Young adults were quoted as saying things like, "They teach us to say what we want, but they don't always listen" (Millar, 2007, p. 125), "These people are interfering in what I want to do" (Thoma et al., 2001, p.

25) and “We are adults. They need to accept that” (Millar, 2007, p. 125).

Including students in the conversation about their transition to adult life can keep the discussion positive and future-focused. Many participants in Hagner, et al.’s 1996 investigation of team members’ views of person-centered planning meetings said they felt the meetings became too critical and negative if students were not the focal point of the process. Increased input from the students themselves will lead to improved quality of life and more successful post-school outcomes for students with SIDD.

More Cross-Referencing and Flexible Methods

Consistent with the goal of gaining students’ perceptions, beliefs, and opinions, the majority of the articles in this review employed qualitative methods. As outlined in the results of this paper, the 11 articles included in this review represent feasible, replicable examples of methods to collect input from students with SIDD. This review includes numerous examples of research questions, measures, and strategies from which to borrow. Conducting written surveys as face-to-face interviews, cross-referencing one form of input with others (e.g., observation, document analysis, interviews with others), asking questions more than once in a variety of ways, offering a combination of forced-choice and open-ended questions, and providing clarification as needed were some of the most frequently used strategies for making participation accessible for the students in this review. Hughes et al. (2013) and Washington et al.’s (2012) method of asking students to provide an example if they said they experienced something the interviewers asked provides a promising strategy to account for acquiescence bias. Martin et al. (2005) was the only study to mention other

forms of communication (e.g., the use of a switch).

Limitations

This study included some factors that limited the scope of its impact. The inclusion criteria purposefully required authors to explicitly state in their purpose or research question that they sought the opinions, experiences, beliefs, perspectives, or perceptions of students with SIDD. This was important to gain an understanding of the importance placed on the viewpoints of that population, but excluded studies that included student input, but did not prioritize it. For example, many studies have asked students for their opinions or preferences regarding interventions for social validity (e.g., Seward, Schuster, Ault, Collins, & Hall, 2014). Some of these studies reported modifications to ensure the participation of students with SIDD like picture choices (Bouck, Savage, Meyer, Taber-Doughty, & Hunley, 2014) or using actual items to aid in comprehension and context (Mechling, Ayres, Bryant, & Foster, 2014). Unless the students’ responses were required to answer a research question or purpose (as in Bouck et al., 2012), however, the study was excluded.

Excluding studies in which more than one-third of the participants had high-incidence disabilities highlighted topics covered and methods used to elicit input from students with SIDD, but may have excluded unique and useful strategies for gathering input. For example, Kramer and colleagues (2013) created a survey with a panel of students with disabilities that Kramer, Roemer, Liljenquist, Shin, and Hart (2014) then used. This study was excluded because the participants were not explicitly described as having SIDD but the survey included pictures to support students’ comprehension, an evidence-based practice for students with

severe disabilities (Browder, Wood, Thompson, & Ribuffo, 2014).

Excluding studies that focused on students with high-incidence disabilities also prevented concluding that the topics addressed by the studies included in this review were of particular relevance to students with SIDD cannot be made without the addition of studies that sought input from students with all disabilities. Widening this review would shed light on which topics are emphasized with certain students more often.

Implications for Practice

In light of the unique communication and comprehension barriers often present when including students with SIDD in research, the professionals and family members who know the students best are integral in the process of conducting the research. For more research to incorporate the voices of students with SIDD, it is imperative that the gap between practitioners, family members, and researchers be closed. With the students' full network of support working together, it is more likely their voices will be accurately recorded and included in research that will affect their transition services and experiences.

Implications for Research

This review was the first to address the topic of using input from students with SIDD and demonstrates how little this group is involved in research about their transition services. The goal of transition services is to prepare students to work, learn, and live independently, and an integral piece of that aspiration is self-advocacy. Thus, research in transition should match the increasing student involvement seen in practice. Especially for students with SIDD, it is a feasible and just challenge for those conducting research to create studies that are accessible to all potential participants and are designed around a person-centered framework. Rather than retrofitting students with SIDD into research about their lives, or excluding their voices altogether, researchers can use the studies included in this review as examples of research questions, designs, and methods. The strategies used in these studies to modify existing tools can be adopted and adapted for future studies to expand the topics on which the perspectives of students with SIDD are included. The voices of the students within these 11 studies have made it clear: It is not a question of if we include input from students with SIDD, but how.

References

- Agran, M., Cavin, M., Wehmeyer, M., & Palmer, S. (2006). Participation of students with moderate to severe disabilities in the general curriculum: The effects of the Self-Determined Learning Model of Instruction. *Research and Practice for Persons with Severe Disabilities, 31*, 230-241.
- Agran, M. & Hughes, C. (2008). Asking student input: Students' opinion regarding their individualized education program involvement. *Career Development for Exceptional Individuals, 31*, 69-76.
- Agran, M., Snow, K., & Swaner, J. (1999). Teacher perceptions of self-determination: Benefits, characteristics, strategies. *Education and Training in Mental Retardation and Developmental Disabilities, 34*, 293-301.
- Balcazar, F. E., Keys, C., Kaplan, D. L., & Suarez-Balcazar, Y. (2006). Participatory action research and people with disabilities: Principles and challenges. *Canadian Journal of Rehabilitation, 12*, 105-112.

- Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative research: An introduction to theory and methods*. Needham Height: Allyn & Bacon.
- Biklen, S. K. & Moseley, C. R. (1988). "Are you retarded?" "No, I'm Catholic": Qualitative methods in the study of people with severe handicaps. *Journal of the Association for People with Severe Handicaps*, 13, 155-162.
- Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of Research in Nursing*, 13, 68-75.
- Bouck, E. C., Satsagi, R., Bartlett, W., & Weng, P. (2012). Promoting independence through assistive technology: Evaluating audio recorders to support grocery shopping. *Education and Training in Autism and Developmental Disabilities*, 47, 462-473.
- Bouck, E. C., Savage, M., Meyer, N. K., Taber-Doughty, T., Hunley, M. (2014). High-tech or low-tech? Comparing self-monitoring systems to increase task independence for students with autism. *Focus on Autism and other Developmental Disabilities*, 29, 156-167.
- Browder, D. M., Wood, L., Thompson, J., & Ribuffo, C. (2014). Evidence-based practices for students with severe disabilities. *CEEDAR Document NO. IC-3*. CEEDAR Center. Retrieved from <http://ceedar.education.ufl.edu/tools/innovation-configurations>
- Carter, E. W., Ditchman, N., Sun, Y., Trainor, A. A., Swedeen, B., & Owens, L. (2010). Summer employment and community experiences of transition-age youth with severe disabilities. *Exceptional Children*, 76, 194-212.
- Carter, E. W., Lane, K. L., Cooney, M., Weir, K., Moss, C. K., & Machalicek, W. (2013). Parent assessments of self-determination importance and performance for students with autism or intellectual disability. *American Journal on Intellectual and Developmental Disabilities*, 18, 16-31.
- Carter, E. W., Owens, L., Trainor, A. A., Sun, Y., & Swedeen, B. (2009). Self-determination skills and opportunities of adolescents with severe intellectual and developmental disabilities. *American Journal on Intellectual and Developmental Disabilities*, 114, 179-192.
- Charlton, J. I. (1998). *Nothing about us without us: Disability oppression and empowerment*. Berkeley: University of California Press.
- Cobb, B., Lehmann, J., Newman-Gonchar, R., & Alwell, M. (2009). Self-determination for students with disabilities: A narrative metasynthesis. *Career Development for Exceptional Individuals*, 32, 108-114.
- Cooney, B. F. (2002). Exploring perspectives on transition of youth with disabilities: Voices of young adults, parents, and professionals. *Mental Retardation*, 40, 425-435.
- Cushing, L. S., Parker-Katz, M., Athamanah, L. S., Walte, S., & Posey, K. (2017). *A literature review on trends in transition research since IDEA 1990*. Manuscript in preparation.
- Dennis, R. (2002). Nonverbal narratives: Listening to people with severe intellectual disability. *Research and Practice for Persons with Severe Disabilities*, 27, 239-249.
- Freeburg, J., Sendelbaugh, J., Bullis, M. (1991). Barriers in school-to-community transition. *American Annals of the Deaf*, 36, 38-47.
- Gallivan-Fenlon, A. (1994). "Their senior year": Family and service provider perspectives on the transition from school to adult life for young adults with disabilities. *Journal of the Association for Persons with Severe Handicaps*, 19(1), 11-23.
- Galvan, J. L. (2016). *Writing literature reviews: A guide for students of the social and behavioral sciences*. New York: Routledge.

- Hagner, D., Helm, D. T., & Butterworth, J. (1996). "This is your meeting": A qualitative study of Person-Centered Planning. *Mental Retardation*, 34, 159.
- Harbour, C. K. & Maulik, P. K. (2010). History of Intellectual Disability. In J. H. Stone & M. Blouin (Eds.), *International Encyclopedia of Rehabilitation* (pp. 1-6). Buffalo, New York: Center for International Rehabilitation Research Information and Exchange.
- Heal, L. W. & Sigelman, C. K. (1995). Response biases in interviews of individuals with limited mental ability. *Journal of Intellectual Disability Research*, 39, 331-340.
- Hughes, C., Cosgriff, J. C., Agran, M., & Washington, B. H. (2013). Student self-determination: A preliminary investigation of the role of participation in inclusive settings. *Education and Training in Autism and Developmental Disabilities*, 48, 3-17.
- Individuals with Disabilities Education Improvement Act of 2004, 20 U.S.C. § 1400, H.R. 1350.
- Kelley, K. R., Bartholomew, A., & Test, D. W. (2013). Effects of the self-directed IEP delivered using computer-assisted instruction on student participation in educational planning meetings. *Remedial and Special Education*, 34, 67-77.
- Kohler, P.D. (1996). *Taxonomy for Transition Programming*. Champaign: University of Illinois.
- Kramer, J., Barth, Y., Curtis, K., Livingston, K., O'Neil, M., Smith, Z., ... Wolfe, A. (2013). Involving youth with disabilities in the development and evaluation of a new advocacy training: Project TEAM. *Disability and Rehabilitation*, 35, 614-622.
- Kramer, J. M., Roemer, K., Liljenquist, K., Shin, J., & Hart, S. (2014). Formative evaluation of Project TEAM (Teens making Environment and Activity Modifications). *Intellectual and Developmental Disabilities*, 52, 258-272.
- Leake, D. & Boone, R. (2007). Multicultural perspectives on self-determination from youth, parent, and teacher focus groups. *Career Development for Exceptional Individuals*, 30, 104-115.
- Lohrmann-O'Rourke, S. & Gomez, O. (2001). Integrating preference assessment within the transition process to create meaningful school-to-life outcomes. *Exceptionality*, 9, 157-174.
- Martin, J. E., Huber Marshall, L., Wray, D., et al. (2004). *Choose and take action: Finding the right job for you*. Longmont, CO: Sopris West Educational Services.
- Martin, J. E., Van Dycke, J. L., Christensen, W. R., Gardner, J. E., & Lovett, D. L. (2006). Increasing student participation in IEP meetings: Establishing the Self-Directed IEP as an evidence-based practice. *Exceptional Children*, 72, 299-316.
- Martin, J. E., Woods, L. L., Sylvester, L., & Gardner, J. E. (2005). A challenge to self-determination: Disagreement between the vocational choices made by individuals with severe disabilities and their caregivers. *Research and Practice for Persons with Severe Disabilities*, 30, 147-153.
- Mason, C. Y., McGahee-Kovac, M., Johnson, L., & Stillerman, S. (2002). Implementing student-led IEPs: Student participation and student and teacher reactions. *Career Development for Exceptional Individuals*, 25, 171-192.
- McGlashing-Johnson, J., Agran, M., Sitlington, P., Cavin, M., & Wehmeyer, M. (2003). Enhancing the job performance of youth with moderate to severe cognitive disabilities using the Self-Determined Learning Model of Instruction. *Research and Practice for Persons with Severe Disabilities*, 28, 194-204.
- Mechling, L. C., Ayres, K. M., Bryant, K. J., & Foster, A. L. (2014). Comparison of the effects of continuous video modeling, video prompting, and video modeling on task completion by

- young adults with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 49, 491-504.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook (2nd ed.)*. Thousand Oaks, CA: SAGE.
- Millar, D. S. (2007). "I never put it together": The disconnect between self-determination and guardianship – Implications for practice. *Education and Training in Developmental Disabilities*, 42, 119-129.
- Morningstar, M. E., Clark, Gary M. (2003). The status of personnel preparation for transition education and services: What is the critical content? How can It be offered? *Career Development for Exceptional Individuals*, 26, 227-237.
- Page, B. & Chadsey-Rusch, J. (1995). The community college experience for students with and without disabilities: A viable transition outcome? *Career Development for Exceptional Individuals*, 18, 85-96.
- Powers, L. E., Garner, T., Valnes, B., Squire, P., Turner, A., Couture, T., & Dertinger, R. (2007). Building a successful adult life: Findings from youth-directed research. *Exceptionality*, 15, 45-56.
- Reid, D. H., Everson, J. M., & Green, C. W. (1999). A systematic evaluation of preferences identified through person-centered planning for people with profound multiple disabilities. *Journal of Applied Behavior Analysis*, 32, 467-477.
- Saldaña, J. (2015). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage Publications.
- Seward, J., Schuster, J. W., Ault, M. J., Collins, B. C., & Hall, M. (2014). Comparing simultaneous prompting and constant time delay to teach leisure skills to students with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 49, 381-395.
- Stack, E. & McDonald, K. E. (2014). Nothing about us without us: Does action research in developmental disabilities research measure up? *Journal of Policy and Practice in Intellectual Disabilities*, 11, 83-91.
- Thoma, C. A., Rogan, P. & Baker, S. R. (2001). Student involvement in transition planning: Unheard voices. *Education and Training in Mental Retardation and Developmental Disabilities*, 36, 16-29.
- Washington, B. H., Hughes, C., & Cosgriff, J. C. (2012). High-poverty youth: Self-determination and involvement in educational planning. *Career Development and Transition for Exceptional Individuals*, 35, 14-28.
- Wehmeyer, M. L. (1996). Self-determination as an educational outcome: Why is it important to children, youth, and adults with disabilities? In D. J. Sands & M. L. Wehmeyer (Eds.), *Self-determination across the life span: Independence and choice for people with disabilities* (pp. 17-36). Baltimore: Brookes.
- Wehmeyer, M. L., & Field, S. L. (2007). *Self-determination: Instructional and assessment strategies*. Corwin Press.

The research described in this article was supported in part by Grant H325H140001 from the Office of Special Education Programs, U.S. Department of Education. Nothing in the article necessarily reflects the positions or policies of the federal government, and no official endorsement by it should be inferred. Correspondence concerning this article should be addressed to Samantha Walte, University of Illinois at Chicago, 1040 W. Harrison #1416, Chicago, IL, 60607. E-mail: waltel@uic.edu

Secondary Interventions for Young Children with Behavior Difficulties

Cean R. Colcord
Whittier College

Sarup R. Mathur
Arizona State University

Stanley H. Zucker
Arizona State University

Rebecca I. Hartzell
University of Arizona

A multiple baseline across behaviors design was used to evaluate the effectiveness of a multicomponent Tier 2 intervention on increasing appropriate classroom behaviors for three elementary school children with developmental disabilities between 5 and 8 years of age. The intervention consisted of the components of Social Skills Training (SST), Check In/Check Out procedure (CICO) and Behavior Specific Praise (BSP). Interventions were delivered in a special education resource classroom and the effects were observed in the students' general education classrooms. Students increased their task readiness/preparedness, in-seat behavior, and academic engagement skills as a result of the intervention and showed maintenance of the learned behaviors. The study has implications for teachers who teach young children with developmental disabilities and behavior difficulties.

Many students with developmental disabilities demonstrate disruptive classroom behavior that interferes with the classroom learning environment and requires continuous teacher attention (Colcord, Mathur, & Zucker, 2016). Often times, disruptive behaviors such as task avoidance, escape, and attention seeking behaviors lead to social, behavioral, and academic deficits. As a result, many of these students receive less positive attention from peers and teachers and accumulate negative school experiences (Mathur, 2007; Walker, Colvin, & Ramsey, 1995). Furthermore, due to disruptive behaviors, this group of students face punitive disciplinary practices such as detention and suspension, thereby excluding them from the least restrictive environments as they are placed in more restrictive settings. According to Ryan, Katsiyannis, Peterson, and Chmelar (2007), removal of students with behavioral issues from classroom environments promotes

separatism and inequality in positive academic and social experiences. Thus, students with developmental disabilities need additional supports within their classroom environments to learn and practice prosocial behaviors so they can continue to effectively participate in less restrictive educational environments.

Through the tiered framework of School Wide Positive Behavior Supports (SWPBS), students with developmental disabilities in need of more intensive intervention supports, are able to access interventions at the Tier 2 level. In Tier 2 interventions, the focus is on additional instruction of functional social skills in small groups with ample opportunities to practice specific prosocial skills and receive praise for demonstrating newly acquired skills. Tier 2 interventions require frequent monitoring of progress in student behavior (Hawken, Vincent, & Schumann, 2008). Furthermore,

Tier 2 interventions are intended for students who are unresponsive to universal behavior expectations and as a result require more intensive and targeted interventions (Sandomierski, Kincaid, & Algozzine, 2007).

Social skills training (SST) has been used as a Tier 2 intervention to increase prosocial behaviors in students with behavior difficulties. According to Goldstein and McGinnis (1997), social skills instruction is a process in which teachers identify the specific individual needs of students and then help the students develop the skills using a variety of instructional strategies such as direct instruction, small group instruction, modeling, role-playing, and independent practice (Goldstein, 1993; McGinnis, 2011). Topics for social skills instruction for students with behavior difficulties may include following teacher directions, using appropriate conversational skills, managing aggression, using self-regulation, social problem solving, cooperation, friendship skills, apologizing, and sharing (Chen & Bullock, 2004; Coleman, Pfeiffer, & Oakland, 1992; Dubow, Huesmann, & Eron, 1987; Margalit, 1995; Miller, Midgett, & Wicks, 1992; Wilhite & Bullock, 2012). Bullis, Walker, and Sprague (2001) add that when SST is integrated within the SWPBS framework and not as a singular or isolated intervention, it produces positive results in promoting social behavior. SST integrated at all levels on a continuum of prevention and intervention increases student opportunities to learn and practice prosocial behaviors and contribute to a positive school climate (Albrecht, Mathur, Jones, & Alazemi, 2015).

Another Tier 2 behavior intervention that been used by researchers to decrease problem behaviors is Check In/Check Out (CICO). Todd, Campbell, Meyer, and

Horner (2008) conducted a study with three elementary school students and demonstrated reductions in problem behaviors through the CICO intervention. School personnel implemented the CICO intervention and obtained functional effects with students in kindergarten, first, second, and third grade. CICO has been shown to be effective in decreasing problem behaviors and increasing desirable prosocial behaviors. For example, McIntosh, Campbell, Carter, and Dickey (2009) investigated the effectiveness of CICO with 36 elementary school students who needed additional supports beyond universal SWPBS. They found significant improvement in prosocial behavior for students with attention-maintained behavior. CICO provided students regularly scheduled opportunities to access attention by exhibiting appropriate behavior as opposed to problem behavior.

Behavior Specific Praise (BSP) needs to continue through all the tiers in a multi-tiered framework. BSP is a praise statement that specifies behavior for which a student is praised (Sutherland & Wehby, 2001) and conveys explicit reference to a desirable behavior. Allday et al. (2012) found that providing higher rates of BSP impacted on-task behavior of students with or at risk for emotional and behavioral disorders. Following the teacher training, teachers increased BSP and target students increased their task engagement. In addition to increases in BSP, teachers reduced their use of corrective statements.

Ross and Sabey (2015) evaluated a novel approach to blending SST and the CICO system and found that implementation was functionally related to increased positive social engagement for four of the five participating students in an elementary school. Participating students showed problem behaviors of aggression,

noncompliance, teasing, gossip and disrespect. Findings indicated that the CICO+SST intervention was effective for the students who were not responsive to the basic CICO due to acquisition deficits.

The present study combines SST with CICO and BSP as a Tier 2 (secondary) intervention for three students with developmental disabilities in an elementary school. Students met the criteria for participation in Tier 2 intervention. All participants were identified as having developmental disabilities and demonstrated problematic behavior that was not adequately reduced through SWPBS Tier 1 practices. This study was guided by the following research question: In what ways do comprehensive interventions that combine the elements of SST, CICO, and BSP improve the on-task behavior of children with developmental disabilities? On task behavior consisted of three separate behaviors that included improvement in task readiness/preparation, in-seat behavior, and academic engagement/responding skills.

Method

Participants

Participants were students in an urban school located in the southwestern United States that served culturally and linguistically diverse students; 93% of students were from Spanish-speaking families. Total enrollment at the school was 784 students and 77 (9.8%) of these students were identified as students with disabilities. The school had adopted the SWPBS framework and all students were taught universal expectations at the Tier 1 level. After two years of Tier 1 implementation of SWPBS, the number of office discipline referrals (ODRs) were reduced from 142 to 75. Most of the students receiving ODRs were identified as having disabilities. Based on higher rates of ODRs with students with

disabilities, the school's leadership team decided to focus on students with disabilities for Tier 2 interventions.

Three elementary school students were identified as having developmental disabilities and behavioral challenges in their classrooms. At the time of this study, each student was placed in a general education classroom with resource support throughout the school day. Each of the three students was unresponsive to Tier 1 behavior expectations and each had ODRs for demonstrating disruptive behaviors. Each student had goals on his individualized education plan (IEP) targeting problem behavior, and was recognized by his classroom teacher as needing further interventions to reduce disruptive behavior in the classroom and to improve task preparedness, in seat time, and academic responding.

The first student, Joey was a 7 year-old second-grade student who was labeled as having a traumatic brain injury (TBI). He received speech and language interventions and resource support in reading, mathematics, and behavior. When Joey was 4 years old, he was hit by a truck and suffered a severe head injury that caused speech delays as well as difficulties with reading and mathematics. During classroom instruction, Joey often demonstrated off-task behavior in the classroom by not initiating or completing tasks. He talked with other students, looked through his desk, and rested his head on his desk after repeated requests by his teacher to pay attention to the classroom activities. At the time of this study, Joey had received 12 ODRs for demonstrating behaviors that included defiance and disrespect to his teacher, inappropriate language, and fighting which resulted in suspensions from school.

Kris was an 8 year-old third grader who had three ODRs prior to the intervention. The ODRs were given to Kris for causing disruptions in the classroom, bullying, and assaulting other students. Kris was diagnosed with attention-deficit/hyperactivity disorder (ADHD) and at the time of this study was placed in a general education classroom for part of the day, and in a resource support program to assist him with behavior, reading, and mathematics. Kris's IEP goals focused on improving his reading comprehension, interpretation of graphs and charts, and improving his on-task behavior. Kris's classroom teacher stated that Kris was often off-task during class and that he struggled to complete his work. He had been suspended from school and was at risk for retention. His behavior had negatively impaired his ability to be successful in his current educational placement.

Angel was a five-year-old student who demonstrated off-task behavior during structured activities lasting more than five minutes. Angel was identified as having autism in preschool and at the time of this study was enrolled in speech and language interventions and received resource support in reading, math, and behavior. Angel received one ODR for demonstrating disrespectful behavior to his teacher by ignoring her requests in the classroom. Angel also struggled to stay in his seat during group work and classroom instruction. He often got out of his seat, walked around the classroom, and talked to students during instruction and consequently, Angel disrupted the classroom learning environment.

Three general education teachers also participated in the study. They provided information on the selection of target behavior and social validity of intervention.

They were also trained to deliver BSP to the participants in their classrooms.

Target Behaviors

Three target skills were selected after classroom observations and discussions with the student's general education teachers. The three general educators suggested that the participants needed to improve their on-task behaviors by focusing on three behaviors that included task readiness/preparedness, proper in-seat behavior, and appropriate responding and engagement during classroom instruction. Task readiness was defined as putting previous assigned work in the correct location, obtaining the correct materials for the current task by having the required materials (i.e., pencils, books, workbooks, and folders), and writing his name on his work and reading directions for the assignment

Proper in-seat behavior was defined as having students seated in their seats with hands on their desk or table and their feet on the floor. In-seat behavior included making eye contact with the teacher, taking notes if needed, and raising their hands for permission before leaving their seat.

The final target behavior was academic engagement and appropriate responding to the classroom teacher. This included complying with teacher requests, responding to the teacher's questions using a calm voice and respectful language, and participate in the tasks assigned by the teacher. Inappropriate responses included not raising one's hand to speak, shouting out answers, and/or not verbally responding to direct questions.

Setting

Intervention setting. The intervention procedure took place in a K-3 special education resource classroom with the

special education teacher and one paraprofessional. The classroom table arrangement consisted of four 5 x 3 ft. long rectangular activity tables with four chairs at each table. These tables were used during whole group instruction. Two adjustable horseshoe tables with four chairs each were also placed in opposite corners of the classroom so that the teacher and paraprofessional could also provide small group instruction.

At the time of this study, the special education teacher had a caseload of 28 students and each student had an IEP. The majority of students receiving services in this classroom were “pulled-out” of their general education classrooms in order to receive academic interventions and social skills training. All 28 students on the special educator’s caseload received academic interventions, and three students had IEP goals that focused on improving prosocial behaviors. The three students in need of social skill training received instruction in the resource room for one hour daily during the intervention phase.

Observation settings. Three settings were used for observation of participants, a kindergarten classroom for Angel, a second-grade classroom for Joey, and a third-grade classroom for Kris. Each classroom had 30 students. In the kindergarten classroom, students sat in small desks in six small groups, each group consisting of five students. Students also sat on the rug for floor time. In second-grade classroom, the desks were arranged in rows and Joey’s teacher strategically sat Joey in the front row next to her. In the third-grade classroom, students sat in individual desks arranged in groups of six, but if a student had difficulty attending to instruction he or she was required to sit on the floor in the front of the class, nearest the classroom teacher.

Observers sat in the back of the classrooms unobtrusively to observe participants and to mark the occurrence of target skills on their check sheets.

Experimental Design

A multiple baseline across behaviors design was used to evaluate the effectiveness of social skills interventions paired with CICO and BSP in promoting the target skills for all three students. Data were collected for baseline and intervention phases for all three skills. Because three different general education classrooms were targeted for observing the three students (kindergarten, second, and third grade in three separate general education classrooms), a coin was flipped to determine which classroom observations would take place first each day.

Baseline. The baseline phase lasted for five sessions for task preparedness, 10 sessions for in-seat behavior, and 15 sessions for academic engagement/responding. No components of intervention were delivered during this phase.

Intervention. The students received the same sequence of intervention conditions across skills. Each participant received five 1-hour sessions of instruction in task preparedness and readiness, five sessions in in-seat behavior, and five sessions in academic engagement and responding. After establishing a 5-day baseline, students received intervention elements for the first skill in the sixth session. Task readiness was taught for 5 consecutive days, whereas the baseline condition continued for the second skill and third skill. In session 11, the same intervention components were applied to in-seat behavior. The baseline phase for the third skill continued. In session 16, the intervention was applied to the third target social skill, academic engagement /responding.

Maintenance. The maintenance phase started for task preparedness in session 11, for in-seat-behavior in session 16, and for academic engagement in session 21 and lasted for the remainder of the study. During this phase, students received BSP by general educators on their performance of the target skills.

Description of the Intervention

A multicomponent intervention package was developed for the participants based on the components of *SkillStreaming the elementary school child: A guide for teaching prosocial skills* (McGinnis, 2011), including CICO and BSP. The target skills for the intervention were task readiness/preparedness, in-seat behavior, and academic engagement and responding to their classroom teachers. Components of the comprehensive intervention package included: explanation and rationale, modeling, prompting, and role-play, BSP, CICO through daily point sheets, and transfer of training. Each of the intervention components is described as follows:

Explanation and rationale. During the intervention phase, the special education teacher began each lesson explaining the importance of the skill targeted for the intervention to the group of three participants. The special educator explained how demonstrating the skills in the general education classroom would help them to be more successful academically in school. This pattern was continued for each of the three skills.

Modeling, prompting and role-play. After the special education teacher clearly defined each of the three skills with a clear explanation and rationale for the behaviors and modeled the presence of the skill, and the absence of the skill, the teacher prompted individual students to model the

target skill. The students would take turns modeling the behavior. The teacher asked them to engage in role-plays to practice the skills and asked them to provide feedback to each other.

Behavior Specific Praise (BSP). During the instructional session, as the student modeled the target behavior, the special education teacher provided BSP. For instance, when a student modeled in-seat behavior, after the behavior had been demonstrated, the teacher would respond to the student by name and tell him that he did a great job at modeling the behavior. The special education teacher modeled BSP in the general education classroom in front of each general education classroom teacher and coached them on the use of BSP for demonstration of the three skills.

Check-in Checkout. The students were required to check-in with the special education teacher first thing in the morning to receive their daily point sheets and to review the goals for the target skill. Each student was also required to check out with the special education teacher at the end of the school day to review his progress and earn points. For each point earned, the students received a minute of playtime as a reinforcer. Depending on their point totals, the students would play video or board games during the last 30 minutes of the school day. If a student had more than 30 points, then he or she could also play a game in the morning before the morning bell rang.

Transfer of training. Ten minutes prior to the end of the daily 1-hour intervention, the special education teacher reviewed the specific target skill(s) that were the focus of the intervention. The special education teacher asked each student to take what they had learned in the classroom with them and

transfer the skills into their general education classroom.

Implementation of Intervention

After each day of instruction, the students were asked to transfer the learned skills into their general education classrooms where the classroom teacher monitored their behaviors and reinforced desired behaviors with points and BSP.

Task preparedness. After the baseline was recorded for five days, the first skill, task preparedness, was taught. First, the special education teacher explained why task preparedness was important. Then, asked the students what preparedness would look like in the classroom. The special education teacher modeled preparedness by putting his name and talking aloud each step: “I am prepared because I have all the materials ready for this task. I am prepared to start the task. After completing the task, I will put out the materials at the right place, so I am ready for the next task”.

Each student modeled preparedness, and the special educator gave BSP for the target skill. The class participated in delivering verbal praise such as, “great job reading the task directions and showing readiness for the task” after each presentation of the skill. As a closing activity, the special education teacher reminded the students to maintain high levels of task preparedness in their general education classrooms.

In-seat. The instruction of in-seat behavior began in session 11 of the intervention phase. Students were asked about the importance of in-seat behavior during classroom instruction and classroom learning activities. The special education teacher modeled in-seat behavior for the students for exactly 1 minute. Then, the special education asked students to practice

the skill using role-plays. Each student took turns demonstrating the skill and modeling in-seat time for 1 minute. Each minute that they took part in classroom learning activities and demonstrated in-seat behavior, they received a point. Each day the special education teacher encouraged them to demonstrate proper in-seat behavior for an additional minute to get the point and continued to increase the expectation by 1 minute each day. Toward the end of the lesson, the students were reminded to perform the learned social skills in the general education classroom.

Academic engagement and responding. In session 16, the students were taught how to engage in various academic tasks during the day. The students were asked to show behaviors of engagement in various academic tasks, going to small group, independent study, working with a buddy, reading a book, doing math, etc. If the student did not understand the task, they were encouraged to ask questions. The special educator then modeled academic engagement/response. The students took part in role-playing activities in which one student was a teacher and the other was a student to practice the academic engagement with various tasks. Toward the end of the lesson, the students were encouraged to perform the three target social behaviors in their general education classroom.

General education teachers received training in delivering BSP by the special education teacher and were encouraged to deliver BSP for demonstrating the three target skills to the participants. The special educator modeled BSP in each of the general education classroom and provided a practice session to the general education teachers to rehearse the skill.

Measurement Procedures

A paraprofessional was trained by the researcher on the definition of the target social skills. A protocol of each target behavior definition with examples was developed. Four training sessions were conducted with two nonparticipants from the resource classroom on all three behaviors. Reliability during the training sessions ranged from 90% to 100%.

Partial interval recording was used in 15-minute sessions using 10-second intervals (90 intervals per session). A trained paraprofessional served as an observer and recorded a minus (-) sign if the student was off-task at any time during the 10 second interval or a plus (+) sign if the student demonstrated any of the three identified target skills at any time during the 10 second interval. Each of the intervals was marked for the occurrence for the three behaviors with codes R for readiness, S for in seat, and E for engagement /responding. Data were collected daily over the course of 25 days for 15 minutes per day in each student's general education classroom.

Inter-observer Agreement

During the baseline, intervention and maintenance phases, 20 sessions out of 25 (80%) were randomly assigned for reliability observations. The two observers consisting of the special educator and a trained paraprofessional marked the intervals for the occurrence of the target social skills, R for readiness, S for in seat, and E for engagement. An inter-observer agreement (IOA) was calculated by calculating the number of agreements for social skills occurrences divided by the total number of agreements and disagreements multiplied by 100.

Fidelity of Implementation

The paraprofessional observed each lesson and recorded the occurrence or nonoccurrence of the lesson components that included the following 10 elements: rationale, modeling of the skill, small group guided practice using role plays, independent practice in modeling the skill, BSP, teacher giving instruction to perform the skill in the general education classroom, student check-in, teacher giving the student a daily point sheet, student check-out, and researcher getting the point sheet back at the end of the day. The paraprofessional recorded the occurrence or nonoccurrence for each element. At the end of each day, fidelity of implementation was calculated by dividing the number of yes check marks with the ten possible check marks each day.

Social Validity

To assess the importance of the intervention, a questionnaire was conducted with the three grade level teachers (see Table 1). The teachers were asked to rate their responses on a 6-point scale. The scores could be within 0 to 5, with 5 represented 100% agreement, 4 representing 80% agreement, 3 representing 60% agreement, 2 representing 20% agreement, 1 representing 10% of agreement, and 0 representing 0% agreement with the statement.

Results

Results of this study show positive outcomes that SST paired with CICO and BSP can be used as an effective Tier 2 intervention for students with developmental disabilities who demonstrate disruptive classroom behaviors. Tables 2-4 represent the percentage of intervals students were able to demonstrate task readiness, in seat behavior, and academic responding in the general education classroom. Table 2 represents the results for each phase of the study with intervention effect size for Joey. Table 3

Table 1. *Social Validity Measure*

Questions	
To what extent do you think the intervention was useful in improving task readiness and preparedness?	70%
To what extent do you think the intervention was useful in improving in-seat behavior?	80%
To what extent do you think the intervention helped in improving student engagement and responding?	86%
To what extent do you think the intervention was easy to apply for improving student on-task behavior during classroom instruction?	80%
To what extent did you find the intervention easy to apply for reducing disruptive behavior?	80%

represents the results for each phase of the study with intervention effect size for Kris.

Table 4 represents the results for each phase of the study with intervention effect size for Angel. Tau-U was calculated for each participant (Vannest, Parker, & Gonen, 2011).

Joey. Figure 1 represents Joey a 7-year-old student with traumatic brain injury was able to demonstrate task readiness, in seat behavior, and academic responding in his general education classroom. With the implementation of the intervention, Joey's task readiness from 0% during baseline (range=0) to 48% during intervention

Table 2. *Phase Means and Tau-U Results for Interval Percentages of Prosocial Behavior for Joey*

Behavior	Baseline	Intervention	Maintenance	Pairs	SD	Tau-U	P Value
Task	0	48	95	100	29.4	1.00	<.001
Engagement							
Seat Behavior	10	97	99	150	36.1	1.00	<.001
Academic Responding	9	78	99	150	36.1	1.00	<.001

Table 3. *Phase Means and Tau-U Results for Interval Percentages of Prosocial Behavior for Kris*

Behavior	Baseline	Intervention	Maintenance	Pairs	SD	Tau-U	P Value
Task	13	53	89	100	29.4	1.00	<.001
Engagement							
Seat Behavior	21	93	100	150	36.1	1.00	<.001
Academic Responding	17	74	99	150	36.1	.99	<.001

Table 4. Phase Means and Tau-U Results for Interval Percentages of Prosocial Behavior for Angel

Behavior	Baseline	Intervention	Maintenance	Pairs	SD	Tau-U	P Value
Task Engagement	11	96	97	100	29.4	1.00	<.001
Seat Behavior	11	76	100	150	36.1	1.00	<.001
Academic Responding	17	52	87	150	36.1	.99	<.001

(range=11-89) and 95% during maintenance phase (range=84-100) Joey's ability to stay seated during academic tasks increased from 10% during baseline (range=0-17%) to 97% during intervention (range=89-100) and 99% during maintenance (range=96-100) Joey's academic responding during baseline was 9% (range=0-17) to 74% during intervention phase (range=44-100), and 99% during maintenance (range=97-100). The Tau-U score for Joey's prosocial behaviors of task readiness, in seat behavior, and academic responding were all 1.00 and considered to be a significant effect size ($p = <.001$).

Kris. Figure 2 represents Kris, an eight-year-old student with attention-deficit/hyperactivity disorder (ADHD), was able to demonstrate task readiness, in seat behavior, and academic responding in his general education classroom. With the implementation of the intervention, Kris's task readiness from 13% during baseline (range=11-22) to 53% during intervention (range= 33-78) and 89% during maintenance phase (range=.89-100) Kris's ability to stay seated during academic tasks increased from 10% during baseline (range=0-17%) to 97% during intervention (range=89-100) and 99% during maintenance (range=96-100) Kris's academic responding during baseline was 17% (range=11-33) to 74% during intervention phase (range=44-98), and 99% during maintenance (range=97-100). The

Tau-U score for Kris's task readiness and in seat behavior were 1.00 and considered to be a significant effect size ($p=<.001$), academic responding calculated .99 for the Tau-U score and considered to be a significant effect size ($p = <.001$).

Angel. Figure 3 represents Angel's percentage of intervals Angel, a five-year-old student with autism was able to demonstrate task readiness, in seat behavior, and academic responding in his general education classroom. With the implementation of the intervention, there was an immediate increase in Angel's task readiness from 11% during baseline with a range of 8-13% to 96% during intervention with a range of 94-99 and 97% during the maintenance phase (range=91-100). Angel's ability to stay seated during academic tasks increased from 11% during baseline (range=0-22) to 76% during intervention (range=39-100%) and 100 percent during the maintenance phase (range=98-100). Angel's academic responding during baseline was 17% (range of 14-22) to 52% during intervention phase (range=22-100) and 87% during the maintenance phase (range=67-100). The Tau-U score for Angel's task readiness and in seat behavior were 1.00 and considered to be a significant effect size ($p=<.001$), academic responding calculated .99 for the Tau-U score and considered to be a significant effect size ($p=<.001$).

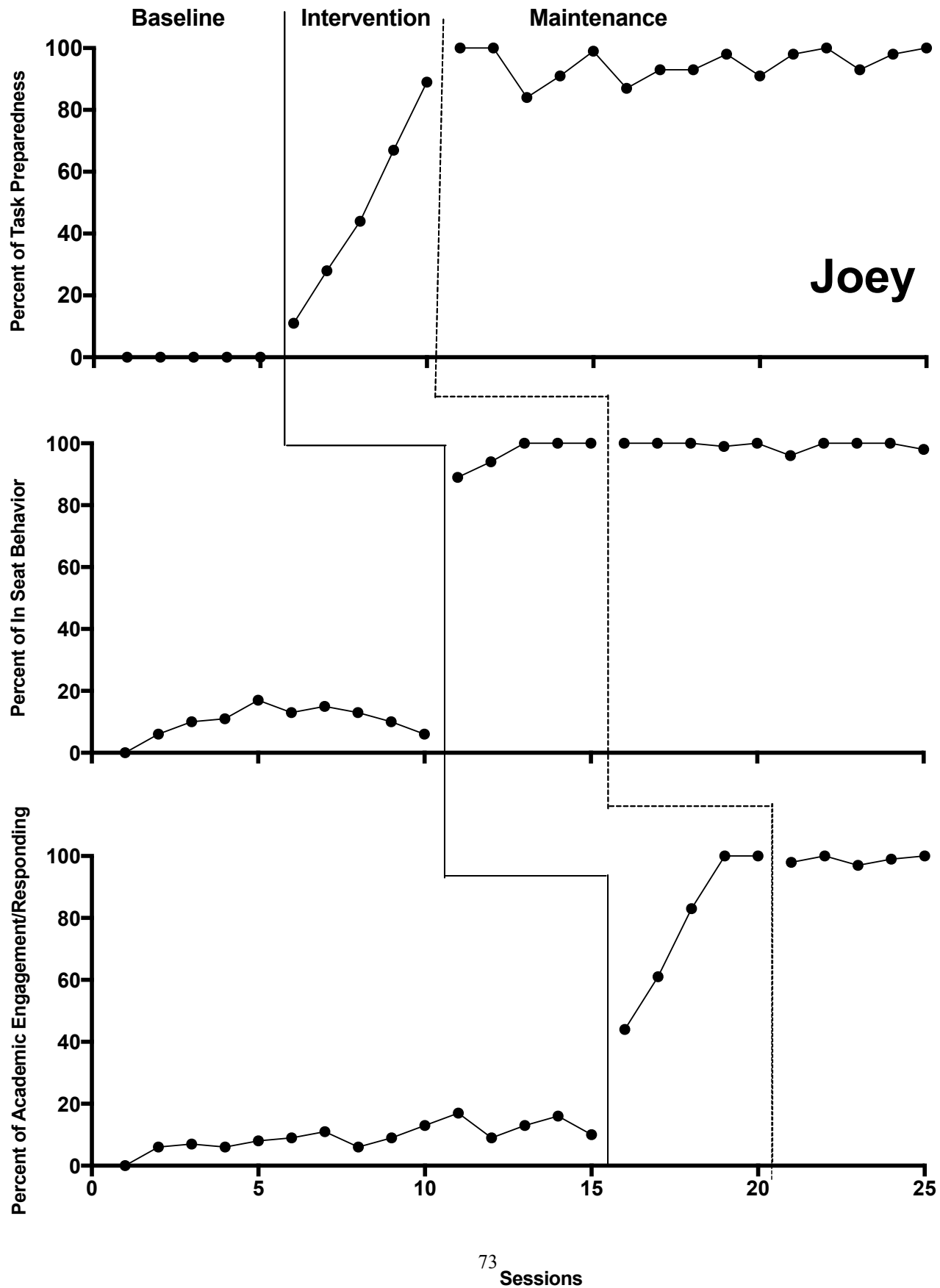


Figure 1. Results for Joey

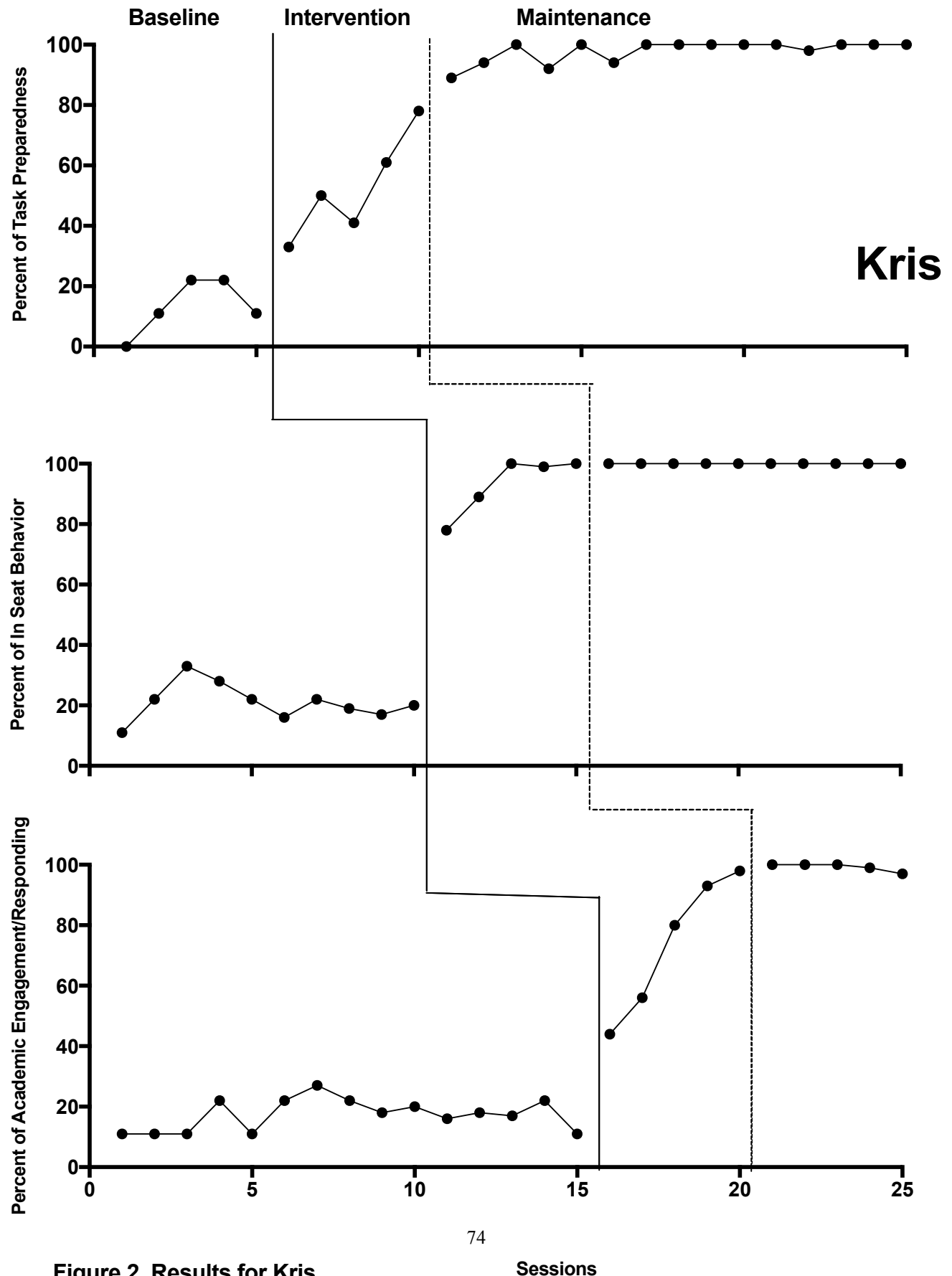


Figure 2. Results for Kris

Sessions

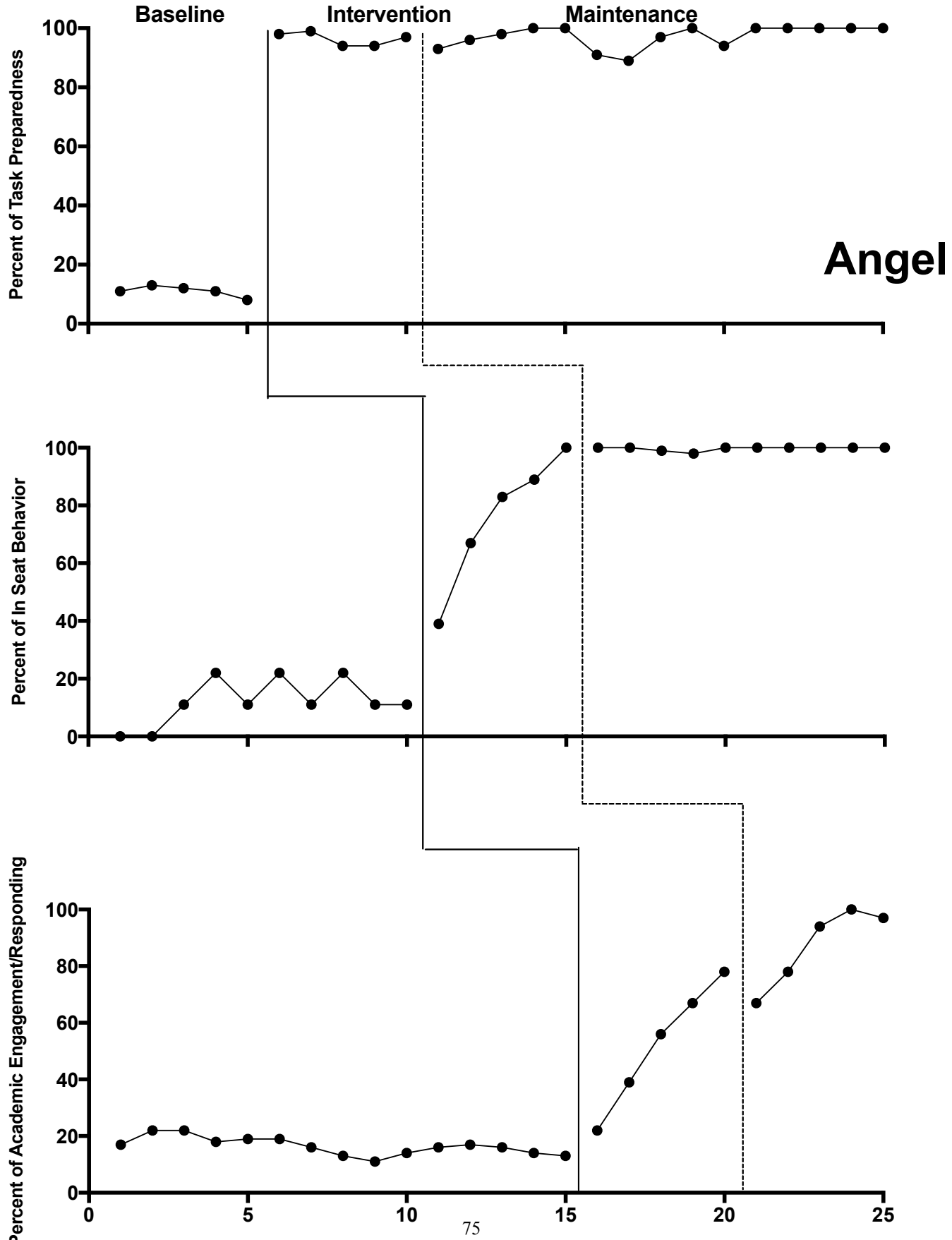


Figure 3. Results for Angel

Sessions

Inter-observer Agreement Results

The inter-rater reliabilities ranged from 95.6% to 100% with a mean of 98.8% for task readiness/preparedness, 97.8% to 100% with a mean of 99.9% for in-seat behavior, and 96.7 to 100% with a mean of 99.4% for academic engagement/ responding.

Fidelity of Implementation

The paraprofessional measured the fidelity of the intervention including the BSP sessions for 80% of the intervention and maintenance sessions (16 of the 20 sessions) and reported at 90%. The special education teacher and the paraprofessional independently observed the use for BSP by each of the three general educators by going to their classrooms for 50% of sessions during the study and measured agreement on the occurrence of BSP, which was found 100%. They marked the occurrence of BSP, if the general educator explicitly made a reference to the three target social skills and praised the participant for demonstrating the skills at least once during their class. Teacher A was observed for 13 of the 25 sessions, Teachers B and C for 12 of the 25 sessions during the study.

Social Validity

The social validity data were collected using a questionnaire completed with each of the general education teachers (see Table 1).

Discussion

The comprehensive package consisting of the components of SST, CICO and BSP increased the social behaviors of task readiness, in-seat behavior, and task engagement/responding of the three participants with developmental disabilities. Participants learned the skills in a resource setting and performed them in their general education classrooms. Tier 2 interventions can provide the additional supports needed for students with developmental disabilities

to be ready for learning, stay in their seats, and remain actively engaged in academic tasks. Students showed maintenance in these behaviors even after the SST and CICO components of the intervention were stopped and only BSP continued. Prior to the intervention, general education teachers were coached to redirect student behavior using positive reinforcement and to embed SST instruction into their daily academic instruction. Students also learned how to monitor their own behavior and to check in with their teacher to receive points on their daily point sheets to access preferred reinforcers (i.e., computer time, play time, recess time, and lunch bunch). BSP served as a generalization strategy and promoted the transfer of learned social skills in general education settings.

These findings add to the knowledge base of similar research that examined the use of behavior interventions in K-12 education systems (Fairbanks, Sugai, Guardino, & Lathrop, 2007; Licciardello, Harchik, & Luiselli, 2008; Wu, Hursh, Walls, Stack, & Lin, 2012). Schools can adopt SST and CICO to implement them as part of SWPBS program to provide additional supports to students with developmental disabilities who also have behavior problems (Bullis et al., 2001; Ross & Sabey, 2015). General educators can be taught to deliver BSP in their classrooms to the students showing performance of the targeted social skills (McIntosh et al., 2009). Additional supports can assist students who are at-risk for academic failure and repeated behavior incidents (Colcord et al., 2016).

Results also suggested the general education teachers perceived a need for the target students to participate in interventions aimed at increasing skills that are essential for academic success in the classroom. They also found the intervention to be useful in

producing the change in their behavior. Findings indicate that collaboration between special educators and general educators is needed for successful implementation and outcomes of the intervention.

Limitations and Future Research

Although results of this study provide valuable information regarding factors that may affect social skill interventions, some limitations are recognized. To begin, students enrolled in the intervention did not have functional behavior assessments (FBA) prior to being enrolled into the program. The special educator started the intervention development process with the existing IEP goals for the participants and did not have the opportunity to conduct the FBAs. FBAs aid in the identification of the target behavior as well as the identification of a functionally relevant replacement behavior by documenting causal relationships which helps in teaching socially acceptable replacement behaviors (Brown et al., 2000; Mildon, Moore, & Dixon, 2004; Stahr, Cushing, Lane, & Fox, 2006). Second, the interventions were created and taught by the special education teacher who was also one of the researchers of the study. The role of the researcher as a participant observer in this study may have influenced the findings. To control for that, the responsibility of data collection was with a seasoned and trained paraprofessional who was not aware of the purpose of the study and intervention phases. Although interventions that are

delivered by the school staff would be much more likely to be continued once the study is completed, future studies may be needed to clarify the roles of the researcher and the interventionist.

Although fidelity data for BSP were collected to ensure that the component was implemented as part of the intervention and maintenance strategy in the general education classroom, general educators' use of BSP was not collected as a dependent measure of the study. Future studies can evaluate the use of BSP by general educators as a dependent measure for the maintenance of social skills.

Implications

The present study presents a number of educational implications for practitioners involved in SST and CICO. First, students with developmental disabilities and behavioral challenges can learn social skills and perform them in the least restrictive environment of the general education classroom. Second, programming of transfer should be integrated in SST. Third, general educators can use BSP as a generalization strategy for producing durable results. While the present study could only show short-term effects of the intervention, future research can focus on producing long-term, and socially valid outcomes for students with developmental disabilities and behavioral challenges.

References

- Albrecht, S. F., Mathur, S. R., Jones, R. E., & Alazemi, S. (2015). A school-wide three-tiered program of social skills intervention: Results of a three-year cohort study. *Education and Treatment of Children, 38*, 565-586.
- Allday, R. A., Hinkson-Lee, K., Hudson, T., Neilsen-Gatti, S., Kleinke, A., & Russel, C. S. (2012). Training General Educators to Increase Behavior- Specific Praise: Effects on Students with EBD. *Behavioral Disorders, 37*, 87-98.

- Brown, K. A., Wacker, D. P., Derby, K. M., Peck, S. M., Richman, D. M., Sasso, G. M. ... Harding, J. W. (2000). Evaluating the effects of functional communication training in the presence and absence of establishing operations. *Journal of Applied Behavior Analysis*, 33, 53-71.
- Bullis, M., Walker, H. M., & Sprague, J. R. (2001). A promise unfulfilled: Social skills training with at-risk and antisocial children and youth. *Exceptionality*, 9, 67-90.
- Chen, K., & Bullock, L. (2004). Social skills intervention for students with emotional/behavioral disorders aged six through twelve years. *Emotional and Behavioral Difficulties*, 9, 223-238.
- Colcord, C. R., Mathur, S. R., & Zucker, S. H. (2016). Improving Disciplinary Practices in an Urban School: Solving the Problem of Practice. *Journal of Education and Training Studies*, 4, 148-155.
- Coleman, M., Pfeiffer, S., & Oakland, T. (1992). Aggression replacement training with behaviorally disordered adolescents. *Behavioral Disorders*, 18, 54-66.
- Dubow, E., Huesmann, R., & Eron, L. (1987). Mitigating aggression and promoting prosocial behavior in aggressive elementary schoolboys. *Behaviour Research and Therapy*, 2, 527-531.
- Fairbanks, S., Sugai, G., Guardino, D., & Lathrop, M. (2007). Response to intervention: Examining classroom behavior support in second grade. *Exceptional Children*, 73, 288-310.
- Goldstein, A. P. (1993). Interpersonal skills training interventions. In A. P. Goldstein & C. R. Huff (Eds.), *The gang intervention handbook*. Champaign, IL: Research Press.
- Goldstein, A. P., & McGinnis, E. (1997). *Skillstreaming for the elementary school child: New strategies and perspectives for teaching prosocial skills*. Champaign, IL: Research Press.
- Hawken, L. S., Vincent, C. G., & Schumann, J. (2008). Response to intervention for social behavior: Challenges and opportunities. *Journal of Emotional and Behavioral Disorders*, 16, 213-225.
- Licciardello, C. C., Harchik, A. E., & Luiselli, J. K. (2008). Social skills intervention for children with autism during interactive play at a public elementary school. *Education and Treatment of Children*, 31, 27-37.
- Margalit, M. (1995). Social skills learning for students with learning disabilities and students with behaviour disorders. *Educational Psychology*, 15, 445-456.
- Mathur, S. R. (2007). Understanding emotional and behavioral disorders: Are we paying the cost of borderline ethics? *Education and Treatment of Children*, 30, 11-26.
- McIntosh, K., Campbell, A. L., Carter, D. R., & Dickey, C. R. (2009). Differential effects of a tier two behavior intervention based on function of problem behavior. *Journal of Positive Behavior Interventions*, 11, 82-93.
- McGinnis, E. (2011). *Skillstreaming the elementary school child: A guide for teaching prosocial skills*. Champaign, IL: Research Press.
- Mildon, R. L., Moore, D. W., & Dixon, R. S. (2004). Combining noncontingent escape and functional communication training as a treatment for negatively reinforced disruptive behavior. *Journal of Positive Behavior Interventions*, 6, 92-102.
- Miller, M., Midgett, J., & Wicks, M. (1992). Student and teacher perceptions related to behavior change after skillstreaming training. *Behavioral Disorders*, 17, 291-295.

- Ross, S. W., & Sabey, C. V. (2015). Check-in check-out+ social skills: Enhancing the effects of check-in check-out for students with social skill deficits. *Remedial and Special Education, 36*, 246-257.
- Ryan, R. B., Katsiyannis, A., Peterson, R., & Chmelar, R. (2007). IDEA 2004 and disciplining students with disabilities. *NASSP Bulletin, 91*, 130-140.
- Sandomierski, T., Kincaid, D., & Algozzine, B. (2007). Response to intervention and positive behavior support: Brothers from different mothers or sisters with different misters. *Positive Behavioral Interventions and Supports Newsletter, 4*, 1-4.
- Stahr, B., Cushing, D., Lane, K., & Fox, J. (2006). Efficacy of a function-based intervention in decreasing off-task behavior exhibited by a student with ADHD. *Journal of Positive Behavior Interventions, 8*, 201-211.
- Sutherland, K., & Wehby, J. (2001). Exploring the relationship between increased opportunities to respond to academic requests and the academic and behavioral outcomes of students with EBD. *Remedial and Special Education, 22*, 113-121.
- Todd, A. W., Campbell, A. L., Meyer, G. G., & Horner, R. H. (2008). The effects of a targeted intervention to reduce problem behaviors elementary school implementation of check in—check out. *Journal of Positive Behavior Interventions, 10*, 46-55.
- Vannest, K. J., Parker, R. I., & Gonen, O. (2011). *Single case research: Web based calculators for SCR analysis*. College Station, TX: Texas A&M University.
- Walker, H. M., Colvin, G., & Ramsey, E. (1995). *Antisocial behavior in schools: Strategies and best practices*. Pacific Grove, CA: Brooks/Cole.
- Wilhite, S., & Bullock, L. (2012). Effects of why try social skills program on students with emotional and/or behavioral problems in an alternative school. *Emotional and Behavioural Difficulties, 17*, 175-194.
- Wu, C. H., Hursh, D. E., Walls, R. T., Stack Jr., S. F., & Lin, I. A. (2012). The effects of social skills training on the peer interactions of a nonnative toddler. *Education and Treatment of Children, 35*, 371-388.

Correspondence concerning this article should be addressed to Cean R. Colcord, Department of Education and Child Development, Whittier College, 13406 E. Philadelphia Street, Whittier CA, 90608. E-mail: ccolcord@whittier.edu

Increasing Food Variety and Intake Using High-Probability Sequencing

Hayley E. Johnson
Tennessee Technological University

Seth King
Tennessee Technological University

Individuals with ASD have an increased risk of food selectivity and related health concerns. High-probability (high-p) sequencing, a non-aversive procedure in which instructors preface the presentation of less preferred requests with preferred requests, is frequently used to address inappropriate behaviors in individuals with ASD. This single subject study used a multiple probe design to determine the effectiveness of using high-probability foods to increase acceptance of low-probability foods in an adolescent with autism and parent identified food selectivity. A paired choice preference assessment and reinforcer assessment was used to identify high-probability foods prior to baseline. The results indicated that acceptance of low-probability foods increased for all three foods upon implementation of the high-probability sequence intervention. These results support the consideration of using a high-probability approach in the absence of escape extinction to increase acceptance of low-probability foods.

Food selectivity is a common issue amongst individuals with autism spectrum disorder (ASD) for a variety of reasons including challenges pertaining to sensory processing as well as a preference for sameness and predictability (Ahearn, Castine, Nault, & Green, 2001). Selective eating disorders are not exclusive to individuals with ASD, nor a component of diagnostic criteria; however, food selectivity is more common for this subset of individuals (Schreck, Williams, & Smith, 2004). Individuals with ASD often experience issues with color, texture, presentation, or taste of certain foods making them more susceptible to food selectivity. Children with limited dietary options are at a greater risk of having health problems, which can lead to delays in development (Ewry & Fryling, 2015).

ASD is a pervasive developmental disorder characterized by neurological impairments, which affect social interaction, communication, sensory processing, and behavior; therefore children with ASD are at

an increased risk of having food selectivity than typically developing peers (Zimmer et al., 2012). Individuals with ASD may implement self-maintained dietary restrictions, which can cause issues surrounding overall health and nutrition (Ewry & Fryling, 2015). Individuals with ASD and food selectivity are at a greater risk for malnutrition, which may impede proper growth and development. Filling nutritional gaps and expanding the scope of dietary options for individuals with ASD has the potential to promote proper growth and development and minimize selective eating and rigidity within this population.

Extensive research has been conducted in the field of applied behavior analysis concerning various forms of intervention techniques to increase compliance with feeding demands in children with ASD and other developmental disabilities (Ahearn, 2003; Barahona, DuBard, Luiselli, & Kesterson, 2013; Koegel et al., 2012; LaRue et al., 2011; Mueller, Piazza, Patel, Kelley,

& Pruett, 2004; Najdowski, Wallace, Doney, & Ghezzi, 2003; Piazza et al., 2002; Piazza, Patel, Gulotta, Sevin, & Layer, 2003; Tarbox, Schiff, & Najdowski, 2010; Wood, Wolery, & Kaiser, 2009). The most common intervention technique used to increase food acceptance is escape extinction, which involves some sort of prevention measure that prohibits the individual from escaping the food until it is consumed (LaRue et al., 2011; Najdowski et al., 2003; Patel et al., 2006; Piazza et al., 2003; Tarbox et al., 2010). The escape extinction procedure is highly effective in increasing compliance with feeding demands in children with active food refusal and aberrant mealtime behaviors; however, because an escape from treatment is blocked this technique may be viewed as intrusive (Patel et al., 2006).

An alternative strategy involves the use of positive reinforcement to gradually increase feeding demands of previously rejected foods (Barahona, et al., 2013; Koegel et al., 2012; Wood et al., 2009). Barahona and colleagues (2013) used positive reinforcement to generalize acceptance of novel foods in children with ASD in a school environment as part of a school-based feeding intervention. Simultaneous presentation of high-probability (high-p) and low-probability (low-p) foods—or foods that are likely and less likely to be accepted—is another intervention technique that has been documented as a method to increase acceptance of low-p foods in children with ASD (Ahearn, 2003; Mueller et al., 2004; Piazza et al., 2002). The simultaneous presentation or blending technique combines high-p and low-p options to increase compliance with low-p demands. Although successful in treating mild food selectivity (Ahearn, 2003), research regarding the efficacy of simultaneous presentation in treating moderate to severe food selectivity is limited.

A related treatment with potential to address food selectivity is the high-p sequence, in which providing antecedent access to preferred (high-p) food items increases the likelihood of client engagement with non-preferred (low-p) food items. Rather than presenting the foods in combination, as in simultaneous presentation, items are presented sequentially (i.e., high-p, low-p). High-p sequencing procedures have been used extensively to combat non-compliance behaviors in individuals with developmental disorders (Banda & Kubina, 2006; McComas et al., 2000). McComas et al. (2000) examined the use of a high-p request procedure to increase compliance with low-p requests in three children with developmental delays. A combination of two different treatment packages was applied to each student. Both treatment packages combined elements of differential reinforcement with the high-p procedure, which resulted in an increase in compliance with low-p request for two of the three participants. Banda and Kubina (2006) examined the use of a high-p instructional sequence to decrease non-compliance during transitions, with the results suggesting that high-p request sequencing was effective in reducing the duration of transitions. Despite the extensive research concerning high-p sequencing, there is limited evidence to support its effectiveness as a treatment option for food selectivity.

Currently, few single case studies have examined the high-p sequencing method as an intervention for food refusal (Congdon, 2013; Dawson, 2001; Ewry & Fryling, 2015; Meier, Fryling, & Wallace, 2012; Patel et al., 2006; Patel et al., 2007, Penrod, Gardella, & Fernand, 2012). These studies typically featured few participants and varied considerably in quality. Notwithstanding experiments that assessed high-p sequencing among older children (>9

years; e.g., Penrod et al., 2012), studies typically involved young children (ages 1-5 years) with ASD in clinical settings (e.g., Dawson, 2001).

The majority of studies ($n = 5$) evaluated the effects of high-p sequencing in the absence of other interventions including escape extinction. Patel and colleagues (2007) implemented an ABAB reversal design to investigate the use of the high-p sequence method in the absence of escape extinction to increase food acceptance in a young child with ASD. The high-p request procedure included three presentations of an empty spoon followed by a single presentation of a spoon containing a bite of low-p food. The results demonstrated that the intervention was effective in increasing compliance with low-p demands in a child with active food refusal and ASD. Similarly, Ewry and Fryling (2015) found that acceptance of low-p foods in a child with ASD increased between 90 and 100% during intervention phases from essential non-acceptance in baseline. The authors also implemented a parent follow-up phase which demonstrated a 50% increase in acceptance of low-p foods were maintained seven months after intervention was withdrawn. Other findings, though generally positive, did not demonstrate a functional relation between acceptance and the high-p procedure due to issues of quality (e.g., frequency of observations; Meier et al., 2012).

Several studies evaluated the high-p sequence in combination with escape extinction procedures to increase compliance with feeding demands (Congdon, 2013; Dawson, 2001; Patel et al., 2006). Congdon (2013) evaluated the effects of the high-p request procedure with escape extinction on the treatment of food selectivity in three children with ASD within a school setting using a combined multiple

baseline across participants and alternating treatment design. Results indicated that acceptance of low-p foods increased for all participants. The high-p request sequence alone proved effective in increasing food acceptance in two of the three participants; however, the third participant showed no changes in responding until the escape procedure was implemented. Similarly, Dawson (2001) implemented the high-p sequence with and without the escape extinction and found that the addition of the escape extinction procedure had increased acceptance of low-p foods across all participants. Patel et al. (2006) implemented escape extinction procedures (i.e., non-removal) in addition to the high-p procedure across intervention phases for all three participants. Although their results suggest that acceptance of low-p foods increased for all participants during the high-p procedure, acceptance was maximized when the extinction procedures were applied concurrently.

Expanding the research on intervention techniques that increase compliance with feeding demands among students with ASD represents an important step towards addressing the nutritional needs among this population. The purpose of this study is to evaluate the effectiveness of a high-p sequencing technique, without escape extinction in treating food selectivity in an adolescent with ASD. Specific research questions include: (1) does pairing the high-p food sequence with low-p foods increase the variety of foods consumed?; (2) does pairing the high-p food sequence with low-p foods increase the quantity of foods consumed?; (3) to what extent do the increases in the variety and quantity of foods consumed transfer to the school setting?

Method

Participant and Setting

The participant in this study was an 11-year-old Asian female with parent identified food selectivity and a diagnosis of ASD. The participant was diagnosed with ASD at the age of five based on qualifying scores from the *Wechsler Preschool and Primary Scale of Intelligence-III* (WPPSI-III), *Vineland Adaptive Behavior Scales II*, and the *Autism Diagnostic Observation Schedule – Module 2* (ADOS). Her full-scale WPPSI-III IQ score was 70, with verbal and performance IQ scores of 67 and 82. Results of the Vineland suggest that her adaptive behavior functioning was in the delayed range (Adaptive Behavior Composite Standard Score = 61) at the <1st percentile. She obtained an ADOS score of 22, placing her well within the range of individuals with autism. At the time of the study, she attended elementary school and spent more than 50% of her day in the general classroom setting. She had one to two aids that assist her with academics, transitions, and leisure activities. She exhibited a broad vocal repertoire; however, she frequently engaged in scripting. The participant ate lunch in the school cafeteria amongst her peers, typically accompanied by an aid. If the lunchroom environment became loud she was allowed to eat her lunch in a secluded classroom upon request. Her parents indicated that food selectivity issues included sensitivity to texture, color, smell, and presentation.

Settings for this study included the participant's home and school. In the home setting, all sessions were conducted in the dining room. The dining room was equipped with a table and two chairs. School sessions were conducted in the context of a School Age Care (SAC) offered by the participant's school during summer months when school is not in session. SAC is a county funded

organization that offers childcare within the school setting. Teachers who work within the county are hired to work as SAC employees; however, they did not participate in this study. Generalization sessions were conducted within the school cafeteria where the participant typically eats lunch. The first author, a MA student with training in applied behavior analysis, administered all experimental procedures throughout the study.

Materials

Preference survey. The high-p foods used as the main form of intervention in this study were identified using a series of procedures. High-p foods were initially identified using a preference survey. The survey included instructions for the parent about how to complete the survey and five blank lines for the parent to list foods their child highly preferred and could consume independently. These foods were featured in later assessments.

Paired-choice preference assessment. Cooper, Heron, and Heward (2007) define a stimulus preference assessments as direct-assessment procedures designed to identify potential reinforcers. In the current study, a paired-choice preference assessment was administered to identify high-p foods and low-p foods. Multiple studies (DeLeon & Iwata, 1996; Lanner, Nichols, Field, Hanson, & Zane, 2010) suggest paired-choice assessments are effective in establishing and ranking reinforcers. Following the guidelines presented by DeLeon and Iwata (1996), the investigator presented two 2-D pictures of each food item until all the foods had been paired with each other. At the end of the assessment, percentage of preference and overall rank was obtained by dividing the number of times the item was chosen by the number of times it was presented. Once a percentage

was obtained, the foods were ranked accordingly, with the highest percentage being the most highly preferred food item; the middle being a moderately preferred (med-p) food item, and the lowest percentage being the least preferred of the food items.

Reinforcer assessment. The reinforcing value of preferred stimuli was assessed using an alternating treatment design. The three foods chosen for this assessment were foods that were ranked as high-p, med-p, and low-p foods based on the paired-choice preference assessment. Each treatment session consisted of five trials. Two sessions were conducted each day. During each session, the participant engaged in a matching task involving the selection of upside-down picture cards. At the start of every trial, the child was instructed to search for a match. If the subject attempted to locate a match within 30 seconds, the trial was scored as completed. A new trial was initiated if the child did not attempt a match within 30 seconds. During baseline sessions, no food or praise was provided following a matching attempt. Following baseline, different foods were systematically alternated across sessions. The child was provided with a single bite of food (i.e., amount approximating the size of a nickel) following a completed trial. The participant was deprived of assessed foods for at least one hour before the assessment sessions.

Video recorder. Video recordings of all preference assessments were collected using a video recording device. The recordings were uploaded onto a computer and transmitted to a flash drive to assist with the collection of interobserver agreement data. The recordings were used to monitor the percentage of non-preferred bites consumed per session.

Dependent Variable

Percentage of acceptance of low-p food per presentation was the primary dependent variable of the study. Acceptance was defined as food placed inside the participant's mouth within 6 seconds of instructions without subsequent expulsion (Meier et al., 2012). Percentage acceptance of high-p food was also recorded. Generalization probes were conducted using the same method of instruction illustrated in the intervention phase within the context of a school cafeteria setting. Maintenance probes were only conducted within the home setting. The parents implemented maintenance probes during mealtimes. These probes consisted of presenting the child with one of the three low-p foods used in this study and recording the frequency of unprompted bites accepted. Data on acceptance of low-p and high-p foods was collected using the pencil-and-paper method (Meier et al., 2012). An original data sheet was used for each session and contained the following information: date, setting, condition phase, and three columns to record trials per session and acceptance of foods.

Independent Variable

The independent variable was the implementation of the high-p request procedure. For each trial, the high-p request procedure consisted of presenting the participant with three bites of a high-p food followed by one bite of a low-p food. Each presentation was accompanied with verbal instructions (i.e., "Take a bite"). Additional high-p foods and low-p foods were presented immediately following consumption of the previous bite. The child was instructed by the researcher to take a bite. If the child did not consume the low-p food within 15s of instruction, the bite was removed and a new trial began.

Design

The effectiveness of using high-p foods to increase acceptance of low-p foods was determined using a multiple probe across behaviors (i.e., foods consumed) design. A multiple probe design is a variation of a multiple baseline design that includes intermittent probes during the baseline condition (Cooper et al., 2007). The design establishes a functional relation when visual analysis reveals a consistent pattern (i.e., three or more replications) of change in the dependent variable upon application of the independent variable is applied.

Procedures

Preference assessment. Following the guidelines presented by DeLeon and Iwata (1996), the investigator presented two pictures of food items identified by the parents until all the foods had been paired with each other. Each of the five foods was presented to the child eight times each for a total of 20-paired presentations. At the end of the assessment, percentage of preference and overall rank was obtained by dividing the number of times the item was chosen by the number of times it was presented.

Results of the preference assessment appear in Figure 1.

Reinforcer assessment. The effectiveness of the selected stimuli as reinforcers was assessed using an alternating treatment design. Throughout the assessment, the child was asked to match cards (i.e., turn two cards over from an array to see if the pictures are the same). Each session consisted of five trials (e.g., the subject flipped over two cards to see if they were a match). Engagement was defined as completing a trial (i.e., flipping the cards over). During baseline, the subject was given verbal instruction to find matches. If the subject attempted a match within 30 seconds it was recorded as engagement. If the subject did not take a turn within 30 seconds it was recorded as non-engagement. No food was administered during baseline. Baseline consisted of three sessions, after which treatment began.

The assessment phase consisted of nine sessions, which alternated treatment of three foods. The three foods chosen for this assessment were foods that were ranked as

Figure 1. Percentage of food selections during preference assessment sessions.

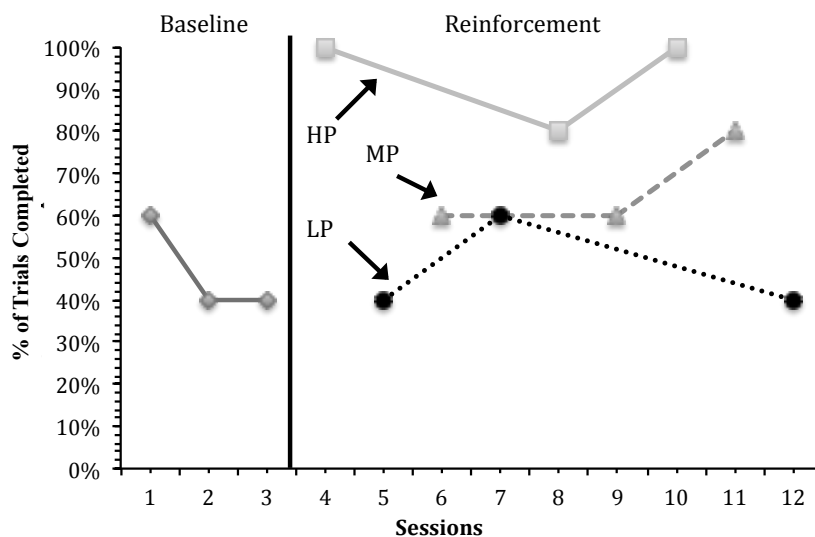


high-p (rice), med-p (cheese pizza), and low-p (Kit-Kat) foods based on the results of the paired-choice preference assessment. Each assessment session consisted of five trials and after every trial one bite was delivered. One food was presented per session. A different food was systematically alternated across sessions. If the child engaged in the game within 30 seconds of instruction she was presented with a single bite of food per trial. If the child did not engage in the game within 30 seconds of instruction the trial ended and a new trial began. Two sessions were conducted per day and each session lasted approximately 10 minutes. The reinforcer assessment confirmed the results of the initial preference assessment (Figure 2).

Experimental and control sessions. During baseline, a single low-p food was introduced in the absence of high-p foods for five bites with 15-second intervals between bites and

instruction. During the high-p intervention phase, three bites of the high-p food were introduced followed by one bite of the low-p food. Each session, aside from those in the baseline condition, consisted of five trials, with a total of four bites were presented per trial. Previous studies (e.g., Ewry & Fryling, 2015; Meier et al., 2012) conducted 10 trials per session. The current maintenance condition phase, consisted of study required fewer trials given the child's history of inattentiveness in similar tasks. Due to time constraints, the high-p sequence condition was terminated and a new food was introduced after a minimum of three sessions in which responding demonstrated therapeutic level or trend in comparison to baseline. Following the satisfaction of criterion across each food, the researcher and cooperating parent conducted maintenance and generalization sessions, respectively.

Figure 2. Reinforcer assessment data. Foods provided were rice (HP), cheese pizza (MP), and Kit-Kats (LP).



Fidelity and Interobserver Agreement

Fidelity and reliability were measured using self-created forms. All sessions were recorded using a video recorder. The second observer, a Board Certified Behavior Analyst (BCBA), collected interobserver agreement and fidelity data across 38% of taped sessions. Additionally, the primary researcher collected IOA data on the integrity of procedures. Fidelity of the implementation of procedures and IOA were assessed across researcher-administered conditions in baseline and intervention. IOA and fidelity were not conducted in maintenance sessions. Fidelity data was assessed at the completion of each session using a self-created fidelity checklist. The fidelity checklist surveyed key elements of treatment implementation (e.g., did the investigator say “take a bite” after presenting the child with a bite of food). Fidelity measures for baseline, intervention, and generalization probes were 97%, 97%, and 100%. Interobserver agreement (IOA) was calculated by dividing the number of agreements across five trials for each of the sessions by the total number of agreements plus disagreements. IOA for the dependent variable across conditions was 100%. IOA for fidelity was also 100%.

Social Validity

Social validity measures were obtained using a five point Likert-type scale (*1=strongly disagree, 5=strongly agree*). The questionnaire was administered to the parents following the completion of the study during the maintenance condition and examined issues related to procedural outcomes (e.g., “The intervention appears to be easy to implement”) and goals of the high-p intervention sequence (e.g., “I believe my child benefited from this intervention”). The parent questionnaire showed that the participant’s parents found this intervention technique to be successful

in improving their child’s acceptance of low-p foods ($M=5$). The parents also found that this intervention strategy could be applicable to increasing their child’s compliance concerning a multitude of areas outside the realm of food ($M=4$).

Results

The results of the experiment are depicted in Figure 3. During baseline conditions, acceptance was relatively low across all foods and remained at 0% during all probed baseline sessions for red bell peppers. Once the high-p sequencing intervention was implemented, acceptance of kale increased to 60% and remained stable throughout the intervention phase then dropped slightly to 40% for both generalization probes. Acceptance of cooked carrots gradually increased from 0% during the first high-p intervention session to 40% in the second, and 60% in the final intervention session. Data during generalization probes for cooked carrots show that acceptance decreased from 60% in the home setting to 20% when intervention was transferred to the school setting but increased to 40% during the second generalization probe. Baseline data remained at 0% across all sessions for red bell pepper and then spiked to 40% during the first intervention session using the high-p sequencing method. Acceptance of red bell peppers following the initial intervention session dropped to 20% and remained stable across the two remaining intervention sessions and generalization probes.

Once experimental sessions ended, maintenance probes were implemented by the parents in the home setting to see if acceptance of these low-p foods would be maintained in the absence of the high-p intervention sequence. Maintenance for kale initially dropped from 40% to 20% after intervention was withdrawn but then

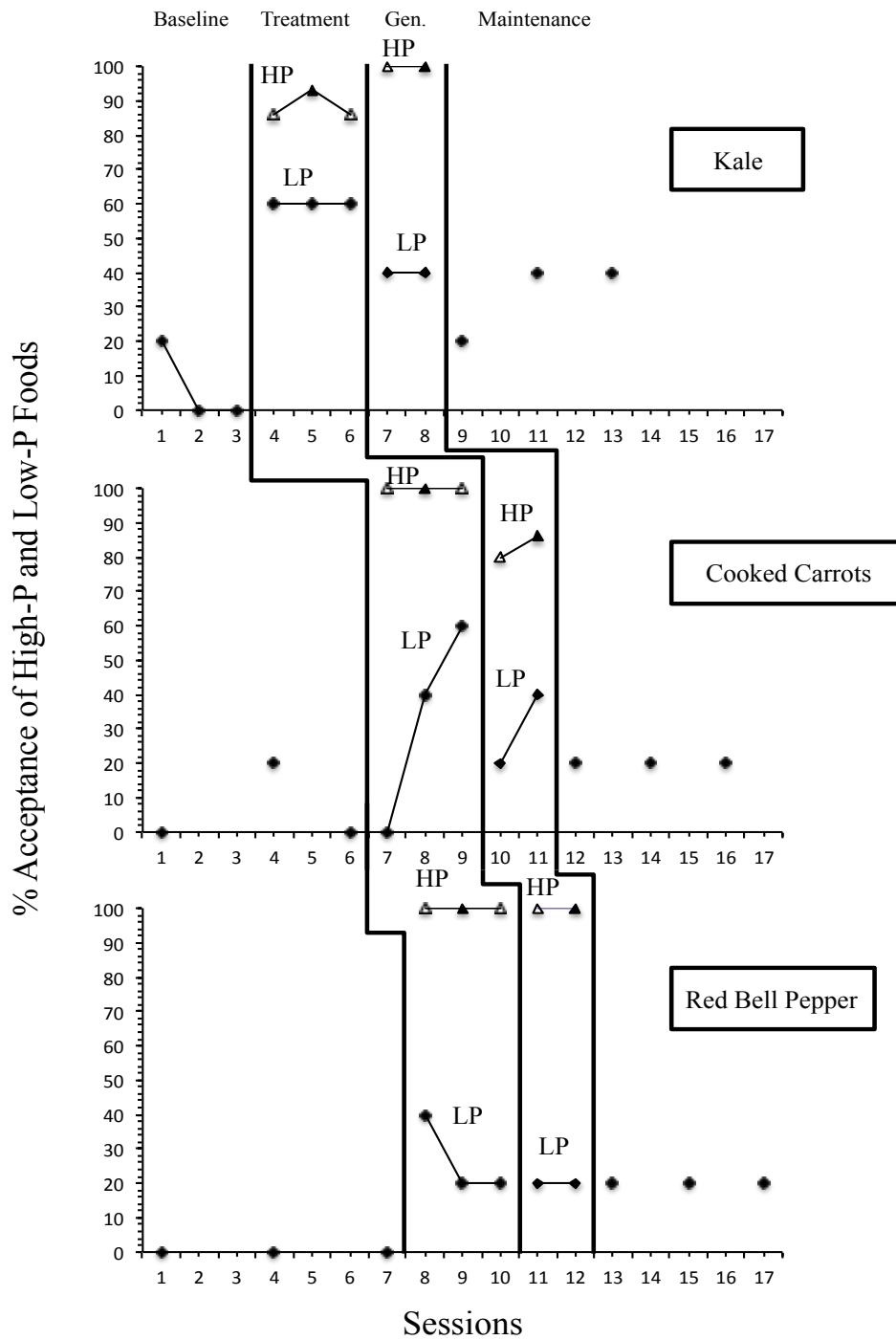


Figure 3. Percentage of acceptance of two alternating high-p foods and three low-p foods by a child with ASD. High-p foods include rice, represented by open triangles, and sesame chicken, represented by closed triangles. Low-p foods include kale, cooked carrots, and red bell pepper. Probes for generalization within a school setting across all three low-p foods were conducted. Maintenance probes reflect acceptance of low-p foods in the absence of treatment.

gradually increased and remained stable at 40%. Cooked carrots dropped from 40% acceptance to 20% acceptance and remained stable across all maintenance probes. Red bell peppers remained stable at 20% across generalization probes and maintenance sessions.

Discussion

Whenever possible, interventionists should address food selectivity in students with ASD using non-invasive procedures. The purpose of this study was to evaluate the efficacy of high-p sequencing in addressing the food selectivity of a young girl with ASD. A series of assessments designed to identify high-p and low-p foods was conducted prior to the experiment. Findings suggest that the use of a high-p sequence intervention strategy increased the variety and quantity of low-p foods consumed without recourse to escape extinction. Additional maintenance and generalization probes indicated that levels of food acceptance were relatively stable following the withdrawal of the intervention and within the school setting.

The results of the current study were consistent with other research concerning the high-p method's effect on combating food refusal without the use of an extinction procedure (Ewry & Fryling, 2015; Meier et al., 2012; Patel et al., 2007; Penrod et al., 2012). In addition, the current study contributes to the literature in a number of respects. Pre-assessment procedures, including preference assessment and reinforcer assessments, were completed and documented. These procedures may have contributed to the relative success of the intervention due to the accurate identification of high-p foods. In addition, this study assessed the generalization of food acceptance, collected social validity data, and evaluated the fidelity of treatment

procedures—practices that strengthen conclusions of the current study relative to earlier work.

Limitations

This study has several notable limitations. The only measure taken to control for motivating operations was ensuring food deprivation for at least one hour prior to intervention. Additional factors, such as sleep deprivation or illness, were beyond the control of the researchers. Another limitation concerns the relatively lax criteria for mastery. New foods were introduced once the change in responding permitted the establishment of a functional relation. Thus, it could be argued that the extent of acceptance across all foods is not clinically significant. Nonetheless, the clear change in acceptance, plus generalization and maintenance in relatively little time provides empirical support for the high-p sequence procedure. Generalization probes demonstrated that the participant accepted taught foods in environments outside of the instructional context; however, it is not clear if whether the high-p sequence intervention will promote the acceptance of untaught non-preferred foods in the future. Finally, the external validity of the current study is limited due to the inclusion of only one participant.

Directions for Future Research

Research regarding non-invasive approaches to food selectivity remains relatively scarce. Additional research concerning high-p sequencing and other interventions for individuals with ASD and other developmental disabilities is needed. Further research should attempt to anticipate factors that undermine non-invasive procedures via preference assessments and similar techniques prior to the intervention. In addition, factors associated with the success of such procedures (e.g., cognitive

functioning of participants) should be evaluated. As in previous studies, information regarding the participant's food selectivity was obtained from the parents. It is not clear if non-invasive procedures would be effective for children with more intensive issues identified through more formal procedures. As food selectivity is generally addressed through a combination of approaches (Luiselli, 2006), researchers should consider evaluating the efficacy of non-invasive techniques following the initial success of escape extinction in extreme cases. The extent to which the high-p procedure generalizes across novel foods and results in greater compliance with food-related demands should also be examined in future work.

Implications for Practice

The findings of this study support the use of the high-p sequence intervention to increase the variety and consumption of low-p foods in an adolescent with ASD and parent identified food selectivity. Given the aversive nature of escape extinction procedures, which are often used in conjunction with the high-p sequence, (Congdon, 2013; Dawson, 2001; Patel et al.,

2006), it is important for researchers to improve upon less intrusive intervention methods to increase food acceptance. We believe that the high-p sequence should be considered by practitioners who are working with children who have (a) sufficient receptive language skills to respond to requests and (b) a history of food consumption. Practitioners should consider performing both a preference assessment and a reinforcer assessment prior to the use of high-p procedures in order to increase the likelihood of the child's responsiveness. Identifying at least two high-p foods to alternate throughout the experiment may combat the effects of satiation. It is also important that the quality of the food administered (e.g., temperature) should be kept as consistent as possible to ensure acceptance. In contrast to earlier work, we recommend initially conducting a maximum of three to five trials per session during intervention and generalization probes to avoid satiation and maintain participant attentiveness and engagement. Conducting procedures in an environment with minimal distractions is another critical step in ensuring the child can focus on expanding their dietary habits.

References

- Ahearn, W. H. (2003). Using simultaneous presentation to increase vegetable consumption in a mildly selective child with autism. *Journal of Applied Behavior Analysis, 36*, 361-365.
- Ahearn, W. H., Castine, T., Nault, K., & Green, G. (2001). An assessment of food acceptance in children with autism or pervasive developmental disorder-not otherwise specified. *Journal of Autism and Developmental Disorders, 31*, 505-511.
- Banda, D. R. & Kubina, R. M. (2006). The effects of a high-probability request sequencing technique in enhancing transition behaviors. *Education and Treatment of Children, 29*, 507-516.
- Barahona, C., DuBard, M., Luiselli, J. K., & Kesterson, J. (2013). School-based feeding intervention to increase variety and quantity of foods consumed by an adolescent with autism. *Clinical Practice in Pediatric Psychology, 1*, 361-368.
- Congdon, M. (2013). *Increasing food acceptance in the school setting for children with autism spectrum disorder using high probability request sequences* (Doctoral dissertation). Retrieved from ProQuest Dissertation Database.

- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Pearson: Upper Saddle River, NJ.
- Dawson, J. (2001). *Effects of the high-probability sequence with and without extinction in children with feeding disorders*. (Doctoral dissertation). Retrieved from ProQuest Dissertation Database.
- DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforce preferences. *Journal of Applied Behavior Analysis, 29*, 519-533.
- Ewry, D. M., & Fryling, M. J. (2015). Evaluating the high-probability instructional sequence to increase the acceptance of foods with an adolescent with autism. *Behavior Analysis in Practice, 1*, 1-4.
- Koegel, R. L., Bharoocha, A. A., Ribnick, C. B., Ribnick, R. C., Bucio, M. O., Fredeen, R. M., & Koegel, L. K. (2012). Using individualized reinforcers and hierarchical exposure to increase food flexibility in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 42*, 1574-1581.
- Lanner, T., Nichols, B., Field, S., Hanson, J., & Zane, T. (2010). The clinical utility of two reinforcement preference assessment techniques: A comparison of duration of assessment and identification of functional reinforcers. *Behavior Analyst Today, 10*, 456-466.
- LaRue, R. H., Stewart, V., Piazza, C. C., Volkert, V. M., Patel, M. R., & Zeleny, J. (2011). Escape as reinforcement and escape extinction in the treatment of feeding problems. *Journal of Applied Behavior Analysis, 44*, 719-735.
- Luiselli, J. K. (2006). *Antecedent Assessment and Intervention: Supporting children and adults with developmental disabilities in community settings*. Baltimore, MD: Brookes.
- McComas, J. J., Wacker, D. P., Cooper, L. J., Peck, S., Golonka, Z., Millard, T., & Richman, D. (2000). Effects of the high-probability request procedure: Patterns of responding to low probability requests. *Journal of Developmental and Physical Disabilities, 12*, 157-171.
- Meier, A. E., Fryling, M. J., & Wallace, M. D. (2012). Using high-probability foods to increase the acceptance of low-probability foods. *Journal of Applied Behavior Analysis, 45*, 149-153.
- Mueller, M. M., Piazza, C. C., Patel, M. R., Kelley, M. E., & Pruett, A. (2004). Increasing variety of foods consumed by blending nonpreferred foods into preferred foods. *Journal of Applied Behavior Analysis, 37*, 159-170.
- Najdowski, A. C., Wallace, M. D., Doney, J. K., & Ghezzi, P. M. (2003). Parental assessment and treatment of food selectivity in natural settings. *Journal of Applied Behavior Analysis, 36*, 383-386.
- Patel, M. R., Reed, G. K., Piazza, C. C., Muller, M., Bachmyer, M. H., & Layer, S. A. (2007). Use of a high-probability instructional sequence to increase compliance to feeding demands in the absence of escape extinction. *Behavioral Interventions, 22*, 305-310.
- Patel, M. R., Reed, G. K., Piazza, C. C., Muller, M., Bachmyer, M. H., Layer, S. A., & Pabico, R. S. (2006). An evaluation of the high-probability instructional sequence to increase acceptance of food and decrease inappropriate behavior in children with pediatric feeding disorders. *Research in Developmental Disabilities, 27*, 430-442.
- Penrod, B., Gardella, L., & Fernand, J. (2012). An evaluation of a progressive high-probability instructional sequence combined with low-probability demand fading in the treatment of food selectivity. *Journal of Applied Behavior Analysis, 45*, 527-537.

- Piazza, C. C., Patel, M. R., Gulotta, C. S., Sevin, B. M., & Layer, S. A. (2003). On the relative contributions of positive reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis, 36*, 309-324.
- Piazza, C. C., Patel, M. R., Santana, C. M., Goh, H., Delia, M. D., & Lancaster, B. M. (2002). An evaluation of simultaneous and sequential presentation of preferred and nonpreferred food to treat food selectivity. *Journal of Applied Behavior Analysis, 35*, 259-270.
- Schreck, K. A., Williams, K., & Smith, A. F. (2004). A comparison of eating behaviors between children with and without autism. *Journal of Autism and Developmental Disorders, 34*, 433-438.
- Tarbox, J., Schiff, A., & Najdowski, A. C. (2010). Parent-implemented procedural modification of escape extinction in the treatment of food selectivity in a young child with autism. *Education and Treatment of Children, 33*, 223-234.
- Wood, B. K., Worley, M., & Kaiser, A. P. (2009). Treatment of food selectivity in a young child with autism. *Focus on Autism and Other Developmental Disabilities, 24*, 169-177.
- Zimmer, M. H., Hart, L. C., Manning-Courtney, P., Murray, D. S., Bing, N. M., & Summer, S. (2012). Food variety as a predictor of nutritional status among children with autism. *Journal of Autism and Developmental Disorders, 42*, 549-556.

Correspondence concerning this article should be addressed to Seth King, Department of Curriculum and Instruction, Tennessee Technological University, 1 William L. Jones Dr., Cookeville, TN 38505. E-mail: saking@tntech.edu

College Students with Intellectual Disability Using YouTube to Access Video Instruction and Acquire Vocational Skills

David F. Cihak
University of Tennessee

Byungkeon Kim
University of Tennessee

Don D. McMahon
Washington State University

Rachel Wright
Common Threads Family Resource Center

Jason Gordon
University of Tennessee

Melinda M. Gibbons
University of Tennessee

The purpose of this study was to investigate the effects of accessing video modeling instructional supports to acquire vocational skills for college students with intellectual disability. Three students participated in a single-subject multiple probe across behaviors/tasks design. Specifically, using a copy machine, data entry, and formatting a document were taught. The results indicated that all students increased performance across all vocational tasks. This study introduces a novel approach to using video modeling, in that all students were able to access customized first-person point of view YouTube videos and ultimately self-managed the learning of targeted tasks. In addition to study limitations, implications for practice for video self-prompting are discussed.

Individuals with disabilities experience many barriers to employment (Barnes, 2012; Wehman et al., 2014), which contribute to significantly higher unemployment rates compared to the general population. According to the U.S. Department of Labor (2014), the unemployment rate for individuals with disabilities is 12.5%, which is twice the rate for the general population. This issue is especially concerning for persons with an intellectual disability (ID). Only 20% of working-aged (i.e., 21 to 64) individuals with ID are working or looking for work (Butterworth et al., 2012). Furthermore, approximately 60% of individuals with an ID were unemployed after graduating high school according to the National Longitudinal Transition Study 2 (Newman et al., 2011). Employers are hesitant to hire individuals with ID, especially if they demonstrate little independence when

completing job tasks (Wehman et al.). Upon graduation, students with ID who are unemployed were often more isolated and dependent on their families or someone for their daily lives (Ayres, Mechling, & Sansosti, 2013; Newman et al.). Smith, Shepley, Alexander, and Ayres (2015) suggested that one of the primary reasons for these dire statistics is that workers with ID have extreme challenges self-directing themselves at work.

Vocational training can be divided into job skills and self-management skills. These two skills need to be provided to students with ID as an integrated intervention (Cronin, Patton, & Wood, 2007; Hanley-Maxwell & Collet-Klingenber, 2004). Job skills refer to specific skills required for productive effects and economic value for the business (Sitlington, Neubert, & Clark, 2010). Self-management is

a useful strategy to promote skill maintenance beyond the initial training period (Westling, Fox, & Carter, 2015). Self-management interventions are used to assist individuals with ID in learning how to self-direct, or manage, their own actions or regulate their behaviors across settings and situations appropriately and independently (Neitzel & Busick, 2009). As familiarity and understanding of the self-management routine is gained, the amount of the personal responsibility is transferred from person-support assistances (e.g., teacher, job coach) to the learner themselves. The effectiveness of technological-based strategies used to promote self-management for individuals with ID has been demonstrated to be highly effectively within vocational settings (Ayres, Shepley, Douglas, Shepley, & Lane, 2016; Cihak et al., 2007; 2008; Davies et al., 2002). These two skills are known to increase employability in adulthood in a mutually collaborative manner (Becker, 2000; Unger & Simmons, 2005). The goal of an effective job training program is to teach individuals how to complete tasks as independently as possible (Laarhoven, Winiarski, Blook, & Chan, 2012).

Video Modeling

One effective method for vocational training is video modeling (Berenzank, Ayres, Mechling, & Alexander, 2012; Laarhoven et al., 2012). Video modeling (VM) is an instructional strategy for teaching discrete and chained tasks in which the learner views a video clip of the correct performance of a targeted task, and then has the opportunity to practice the skill (Ayres & Langone, 2005; Bellini & Akullian, 2007; Hitchcock, Dowrick, & Prater, 2003; Mechling, 2005). Video-based interventions have been established as an evidence-based practice that meets the Council for Exceptional Children guidelines (Bellini & Akullian; Delano, 2007; Gelbar, Anderson, McCarthy, & Buggey,

2012; Hitchcock et al.; Mechling). Models used in VM interventions range from self (VSM) to videos with peers and adults acting as models, often referred to as “other” as the model. A third type of VM is first person point of view. During first person point of view, the video demonstrates a tasks or skill being completed correctly from the person’s vantage point that sometimes includes parts of the model (e.g., hand). Video modeling has the following advantages. First, viewers can observe the same model repeatedly and the video can be used and/or played for diverse learners (Charlop-Christy, Le, & Freeman, 2000). Second, viewers can review the video when needed to maintain their skills (Ayres et al., 2013). Lastly, the video can be used outside the classroom including vocational environments (Yi & Oh, 2012).

Advances in technology have allowed researchers to examine VM on mobile devices (Ayres et al., 2016; Berenzank et al., 2012; Smith, Shepley, Alexander, et al, 2015; Smith, Shepley, Alexander, Davis, & Ayres, 2015) in order to more closely approximate in-vivo training, as opposed to televisions and computer screens (Cihak, Kildare, Smith, McMahan, & Quinn-Brown, 2012). Several studies examined the effectiveness of video modeling to teach vocational skills for students with ID using mobile devices. Laarhoven and colleagues (2012) reported on the effectiveness of using video modeling via an iPad to teach employment skills to students with ID. In this study, each student was given two tasks to perform, where one task included a video model and the other was a control for each participant (no video modeling). Students had two weeks to watch the video for the one task. Upon reevaluation, they were able to more independently complete both tasks despite the fact that only one task had a video model. For the video modeled task, the average increase of improved independence was 24%, while the

average increase of improved independence for the control task was 14%. The researchers concluded that video modeling is shown to not only be effective in teaching a specific skill, but also in increasing the employment outcomes for students with ID.

Another study examined the effectiveness of using a video iPod as a prompting device to teach job skills in a community based employment setting (Laarhoven, Johnson, Laarhoven-Myers, Grider, & Grider, 2009). The researchers found that when a video iPod was used as a prompting device for a man with a developmental disability, there were “immediate and substantial gains in independent correct responding and a decrease in the number of prompts given from a job coach” (p. 119). This finding supports the job prospects of students with disabilities because it means that they can more independently function while working and need less assistance from job coaches or coworkers during acquiring new skills. Similarly, Berenzank et al. (2012) used video modeling via an iPhone as a self-prompting device to teach daily living and job skills to students with ASD (Berenzank et al.). The researchers found that when a video iPhone was used as a prompting device for students with ASD, performance across all target behaviors was increased.

Accessible Video Modeling Technologies

Mechling (2011) suggested students with ID can effectively and appropriately complete tasks and self-manage behavior when they receive the proper tools and technologies. One aspect of video modeling that makes it difficult to integrate into all job settings is how videos can be accessed. Mobile technologies can be an appropriate tool for this problem because a student’s needs can be met anywhere and anytime through mobile devices (e.g., iPod, iPhone) (Ayres et al., 2013; Traxler, 2007). For example, an

individual, who encounters a task that they do not know how to perform, can problem-solve by accessing a YouTube video, through mobile devices to complete the task.

There is great potential to using YouTube for individuals with ID to learn new skills, given the opportunity and materials to do so. One study examined how students with disabilities access videos on YouTube at home to improve their reading skills (Langhorst, 2007). A special education teacher recorded himself reading the text that they were reading aloud in class. Videos were uploaded to YouTube and made available to students with disabilities who were identified as behind in reading. Students watched the videos at home. The teacher reported that when students were given the opportunity to access the video outside of class and reviewed the materials at their own pace, it expanded students’ learning and students were able to maintain a similar pace of instruction to their peers during reading classes. This study supports the idea that students with ID might be able to and acquire new skills access from YouTube.

Asuncion and colleagues (2012) investigated social media use by students with disabilities ($n = 723$). Researchers found that 91% of participants use the video sharing site YouTube to watch videos for entertainment. YouTube has great potential as a video modeling access tool for several reasons. First, many students with disabilities are already familiar with, playing, pausing, and finding operating these videos. It is also free and is available across all computers, smartphones, and mobile devices. Additionally, users can create their own channel allowing easier access to save, organize, and share video files. YouTube is broadly available around the world with over 1 billion unique visitors per month approximately or one out of every seven

people on the planet. YouTube is available in 76 different languages covering 95% of all internet users (YouTube, 2016, April 19).

However, few studies have been conducted on video modeling using YouTube. The purpose of this study was to examine the effects of accessing YouTube instructional videos using customized first person point of view to acquire vocational skills for young adults with ID. Specifically, what were the effects of accessing instructional videos via YouTube to acquire vocational skills? Also, this study aimed to provide the basic data of evidence-based practice on video modeling using YouTube.

Method

Participants

Participating students included three young adults (two males and one female) enrolled in a postsecondary education (PSE) certificate program in the southeastern United States. All students attended classes full-time including university and program specific courses 5 days a week. Each student had basic computer and iPad operation skills including logging onto the computer, accessing YouTube videos, and signing into a Google account. We assessed these prerequisite skills prior to baseline probes. None of the students had been exposed to the instructional YouTube videos that were introduced in the intervention phase. Table 1 shows participants characteristics.

Abby. Abby was a 21-year-old Caucasian female who is in her first year of the PSE

program. Abby has an IQ of 49 as scored by the Wechsler Intelligence Scale for Children (WISC-IV: Wechsler, 2003). According to the Vineland Adaptive Scales-II (Sparrow, Cicchetti & Balla, 2005), Abby’s adaptive behavior is a 66. According to recent psychological evaluation, Abby has a moderate intellectual disability. The Brigance Transition Inventory (Brigance, 2010) scored Abby’s reading grade level equivalent at a first-grade level.

Ben. Ben was a 25-year-old Caucasian male who is in his first year of the PSE program. According to the WISC-IV, Ben’s IQ is 45. The Adaptive Behavior Assessment System (Harrison & Oakland, 2003) scored Ben’s adaptive behavior as a 49. According to recent psychological evaluation, Ben has a moderate intellectual disability Ben reads at a second-grade reading level as scored by the Brigance Transitions Skills Inventory (Brigance, 2010).

Chris. Chris was a 22-year-old Caucasian male in his second year of the PSE program. His IQ is 62 as scored by the WISC-IV (Wechsler, 2003). His adaptive score is 52 as scored by the Vineland Adaptive Scales-II (Sparrow et al., 2005). According to recent psychological evaluation, Chris has a mild intellectual disability Academically, Chris operates at a reading grade level that is lower than first grade as scored by the Brigance Transitions Skills Inventory (Brigance, 2010).

Table 1. *Participant Characteristics*

Name	Age	IQ	Adaptive Score	Reading GE
Abby	21	49 ^a	66 ^b	1 st grade ^d
Ben	25	45 ^a	49 ^c	2 nd grade ^d
Chris	22	62 ^a	52 ^b	>1st grade ^d

Note: IQ = intelligence quotient; GE = grade equivalent; a = Wechsler Intelligence Scale for Children (WISC-IV); b = Vineland Adaptive Scales-II; c = Adaptive Behavior Assessment System; d = Brigance Transition Inventory

Setting

This study was conducted on a large southeastern United States public university campus, with approximately 28,000 students enrolled. All three students were enrolled in a post-secondary education (PSE) program designed to provide college and vocational experiences to individuals with ID.

All phases of the study were conducted during the students' work-based internship on campus. All students worked in an office setting learning clerical related skills and tasks as part of their campus internship. Students worked in different offices across campus. Other university students, staff, and faculty who worked in the department typically were present.

Materials

One video and two screencasts were created using first person point of view demonstrating how to make copies, enter data, and format a document using an iPhone 5S and a MacBook Pro with screencast software. Verbal prompts of each task analyzed step were narrated as it was being demonstrated on the video and video and screencasts. The video of making copies was 118-s, the screencast for data entry was 122-s, and the screencast for formatting a document was 155-s. Both video and screencasts were then uploaded to each student's personal YouTube channel, which students accessed by selecting the YouTube icon on their iPad.

Tasks and materials. The tasks that were chosen for this study were selected based on conversations with the supervisors of the internship site where the students worked. The various tasks were similar to those which the students were expected to perform. Table 2 lists the task analyzed steps of each task. The first task was to make double sided copies using a commercial Konica-Minolta

Bizhub 363 copy machine. The task consisted of 13 task analyzed steps. Students were given a note card with the 4-digit copy code needed to use the copy machine and a stack of papers which they were instructed to make double sided and stapled copies. The second task was a data entry task that was 26 steps. Students transferred information from two completed job applications into a Microsoft Access database using a desktop computer. For the third task, students edited a word processing document on Google Docs and it consisted of 25 steps. Students also used the desktop computer to complete the task.

Variables and Data Collection

The independent variable was the systematic implementation of the YouTube first person point of view instructional videos. The dependent variables were the number of vocational task analyzed steps completed independently or assisted. An independent response was defined as initiating the first step in the task analysis within 10 s and completing each step within 10 s without checking the YouTube video for assistance. An assisted response was defined as accessing the YouTube video independently, watching the video of how to complete the task, and then performing the actions required to complete the step. Event recording procedures were used to record the number of task-analyzed steps completed independently or assisted. Data were collected through use of a prepared data sheet designed to record the controlled presentation of tasks analyzed chains.

The number of task-analyzed steps completed independently was divided by the total number of steps to calculate a percentage of task analyzed steps completed independently. The percentage of steps completed independently was graphed for visual analyses. Similarly, the number of

Table 2. *Target Tasks Analyses*

Tasks	Steps
Making Copies (13 steps)	(1) Place paper on machine feeder; (2) Press code 1, (2) Press code 3, (4) Press code 7, (5) Press code 9, (6) Press Login, (7) Dress Duplex/ Combine, (8) Press 1-Sided > 2-Sided, (9) Press OK, (10) Press corner staple on top, (11) Press the start button (Blue Light), (12) Remove the originals from below the feeder, (13) Pick up newly copied packet.
Data Entry (26 steps)	(1) Login username, (2) Login password, (3) Open Google Chrome, (4) Google Account Login Username, (5) Google Account Login Password, (6) Open Google Apps, (7) Open Google Drive, (8) Open "Video Modeling Project" Folder, (9) Open "Job Applicants", (10) Click "download", (11) Click "Job Applicants on left toolbar, (12) First Job Application: First name, (13) First Job Application: Last name, (14) First Job Application: Home Address, (15) First Job Application: Phone Number, (16) First Job Application: Position Title, (17) Second Job Application: First Name, (18) Second Job Application: Last Name, (19) Second Job Application: Home Address, (20) Second Job Application: Phone Number, (21) Second Job Application: Position Title, (22) Click File, (23) Click Save, (24) Click Okay, (25) Click Windows File Icon, (26) Press Log Out
Formatting a Document (25 Steps)	(1) Login username, (2) Login password, (3) Open Google Chrome, (4) Google Account Login Username, (5) Google Account Login Password, (6) Open Google Apps, (7) Open Google Drive, (8) Open "Video Modeling Project" Folder, (9) Select "Final CSEL", (10) Press Open, (11) Select all text, (12) Press Comic Sans, (13) Select Times New Roman, (14) Select size 9, (15) click size 12, (16) Deselect Bold, (17) Select line spacing icon, (18) Change to double, (19) Select tools, (20) Click word count, (21) Type the word count at the bottom of the page, (22) Select the drive icon at the top of the page, (23) Exit out of chrome, (24) Click Windows File Icon, (25) Log Out of Computer

task-analyzed steps completed with assistance or after watching the YouTube video also was divided by the total number of steps to calculate a percentage of task analyzed steps completed with assistance, and was graphed for visual analyses. In addition, the number of times students access YouTube to watch the videos were recorded.

Experimental Design

A single-subject multiple probe design across skills design (Hammond & Gast, 2010) was employed to evaluate the relation between the YouTube videos and the acquisition of vocational skills for three college students with ID. Acquisition was defined as completing all task analyzed steps independently for three consecutive sessions. An undergraduate student majoring in special education implemented all procedures. Procedures were implemented individually in both baseline and intervention phases since

students worked in different office buildings on campus. The implementation of the YouTube instructional videos was introduced for the first task (making copies) while baseline probes continued for entering data and formatting documents tasks. Contingent on task acquisition of the first task, the YouTube instructional videos was implemented for the second task (entering data) while baseline probes continued for the formatting documents task. Lastly, the YouTube instructional video was implemented for the third task (formatting documents) contingent upon students acquiring previous task.

Procedure

Baseline. During baseline, each student was asked to complete each of the three targeted tasks while working at their job on campus. Since students worked in different office buildings, procedures were implemented

individually. For task 1 (making copies), each student was handed a stack of papers and asked, “I need you to make three sets of double-sided stapled copies”. Students also were given the four-digit copy machine code written on a 7.62×12.7 cm post-it note. For task 2 (data entry), the students were given two completed job applications and ask, “Can you take the information from these job applications and input them into the Microsoft Access File found on the Google Drive?” Students were also given the login information to access the Google Drive account written on a 7.62×12.7 cm post-it note. Task 3 was editing a word processing document. Students were asked, “Can you make these changes to the Google Doc and save on the Google Drive?” Login information was also written on a 7.62×12.7 cm post-it note. For all tasks, students were instructed to “try your best” and no additional assistance was provided. Data were collected for a minimum of three sessions for each participant on each task until data were considered stable. An “80%-20%” stability envelope criteria used to establish stability; that is, data were considered stable if 80% of the data points varied no more than 20% of the mean (Hammond & Gast, 2010).

YouTube. Videos demonstrating how to complete each task were available only through a personal YouTube channel created for each student. The videos were labeled and an icon of the task or the machine used for each task was visually displayed. Similar to the baseline phase, students were asked to complete each task. However, students were informed that an instructional video regarding how to complete the task was available on their YouTube channel at the beginning of the session. Students also were informed that they could watch the video as many times as they needed to help complete the task if needed.

Social Validity

At the conclusion of the study, students were asked to complete a social validity questionnaire. The survey was a 5-point Likert-type scale with picture symbols of “thumbs-up” representing a 5 and “thumbs-down” representing a 1 on the scale. The six Likert questions were: I could access the YouTube videos easily; I like using the YouTube videos to learn how to do a new task for work; I think the videos helped me learn to do my job better; I would use YouTube videos again if I forgot how to do the task; I would use YouTube videos again to learn something new; I would recommend YouTube videos to a friend. The questionnaire also included three open-ended questions to allow students to describe their opinions in greater detail: What did you like best about the YouTube videos? What did you not like about the YouTube videos? Is there anything you would like to change about using the YouTube videos?

Interobserver Agreement (IOA) and Procedural Fidelity

A research assistant familiar with the study, variables, and data collection procedures recorded data simultaneously during 40% of the baseline and intervention sessions. The research assistant was trained in event recording data collection procedures, as well as operational definitions of independent and assisted with YouTube responses. The percentage of IOA was calculated for each student by adding the number of agreements and dividing by the total number of agreements and disagreements and multiplying by 100%. The percentage IOA was 100% for all students.

The research assistant also recorded data regarding procedural integrity. Intervention procedures included: (a) having all materials available for task completion, (b) asking the student to complete each task, and (c)

informing the student that videos demonstrating how to complete each task were located on their YouTube channel. Treatment integrity was assessed during 40% of the intervention sessions. Treatment integrity was calculated by dividing the number of observed behaviors by the number of anticipated behaviors and multiplying by 100% (Billingsley, White, & Munson, 1980). The overall mean treatment integrity was 100%.

Results

The percentage of steps performed independently and assisted using customized first-person point of view YouTube videos for each student across tasks is presented in Figures 1-3. The bar graph illustrates a solid bar that represents skill steps performed independently and a dotted bar that represents skill steps performed after watching the YouTube instructional videos or assisted. Overall, students were unable to complete any task independently; the independent mean performance during baseline was 38% (range 31-46%) for making copies, 24% (range 19-35%) for entering data, and 25% (range 12-40%) for formatting a document. All students increased independent task performance by accessing instructional videos via YouTube independently. During the intervention, the independent mean performance increased to 79% (range 31-100%) for making copies, 77% (range 19-100%) for entering data, and 82% (range 12-100%). On average, students required 7.3, 8.7, and 9.0 sessions to reach acquisition criteria for making copies, entering data, and formatting a document, respectively. Collectively, students accessed and independently watched the YouTube videos 103 times to assist with task completion during 44 sessions or an average of 2.3 times per session across all tasks. All students completed each vocational task

without the aid of personal support assistances.

Abby. Figure 1 displays the percentage of steps performed independently and assisted across tasks. The mean percentage of independent performance during baseline for making copies was 41% (range 38-46%), entering data was 24% (range 23-27%), and formatting a document was 23% (range 20-28%). During intervention, Abby's performance improved. She acquired all tasks by accessing and watching the first person point of view YouTube instructional videos. For making copies, her mean independent performance increased to 83% (range 46-100%) with 100% independence during the last three interventions sessions. Abby reached acquisition criteria following six sessions. She accessed and viewed the making copies video to assist with task completion a total of six times during three sessions or a mean of 2.0 times per instruction session. For entering data, the mean percentage of steps performed independently increased to 85% (range 27-100%) with 100% independence for the last three interventions sessions. Abby reached acquisition criteria following eight sessions, and she accessed and viewed the entering data video a total of 10 times during 4 sessions or a mean of 2.5 times per instruction session during intervention. For formatting a document, the mean percentage of steps performed independently increased to 81% (range 20-100%) with 100% independence for the last three interventions sessions. Abby reached acquisition criteria following eight sessions. She accessed and viewed the formatting a document video to assist with task completion a total of 11 times during 5 sessions or a mean of 2.2 times per instruction session during intervention.

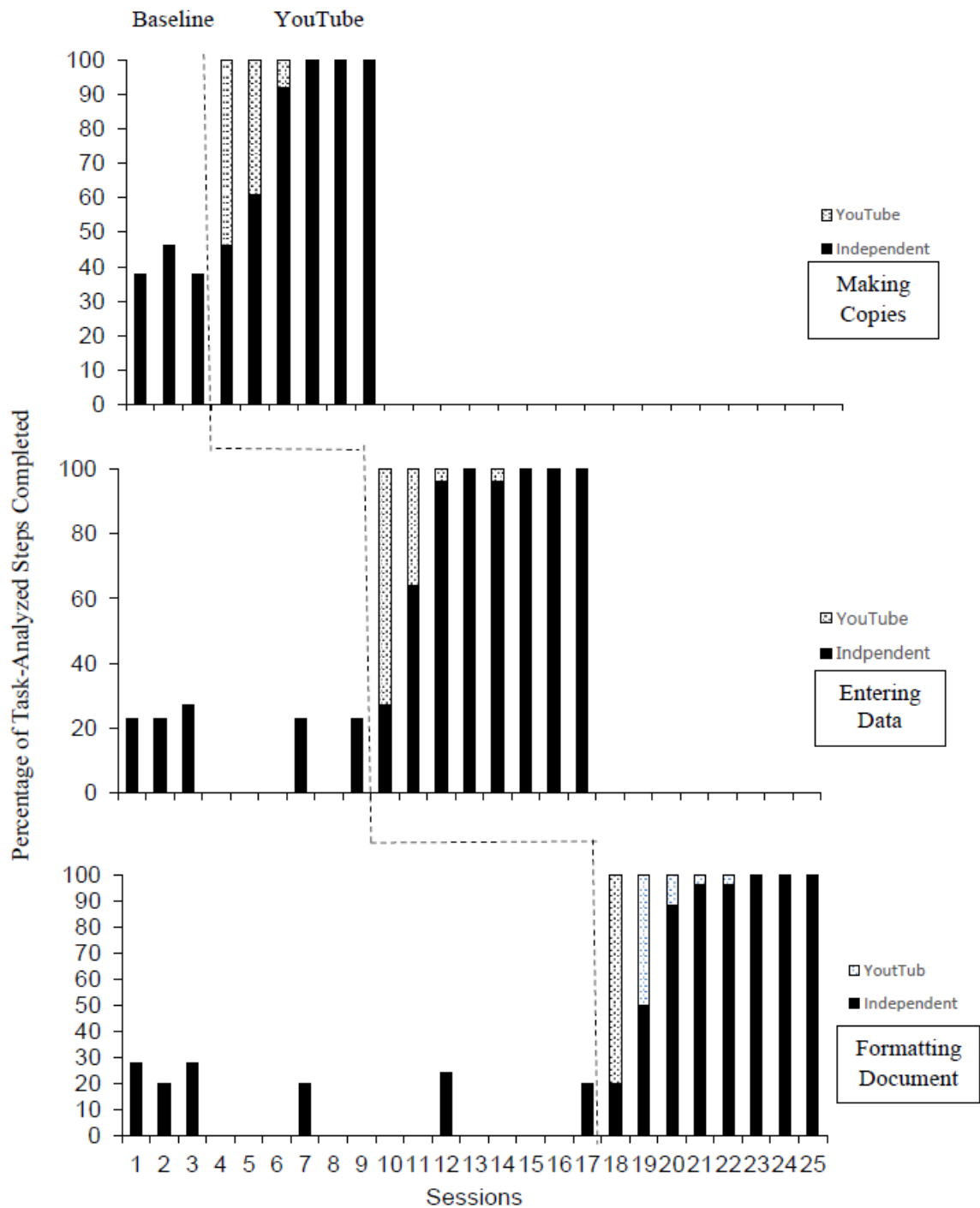


Figure 1. Abby's percentage of task-analyzed steps completed

Ben. Figure 2 displays the percentage of steps performed independently across tasks. The mean percentage of independent

performance during baseline for making copies was 38% (range 38%), entering data was 19% (range 19%), and formatting a

document was 12% (range 12%). During intervention, Ben's performance improved. He acquired all tasks by accessing and watching the first-person point of view YouTube instructional videos. For making copies, the mean percentage of steps performed independently increased to 75% (range 38-100%) with 100% independence for the last three interventions sessions. Ben reached acquisition criteria following eight sessions. He accessed and viewed the making copies video a total of 21 times during 5 sessions or a mean of 4.2 times per instruction session during intervention. For data entry, the mean percentage of steps performed independently increased to 73% (range 19-100%) with 100% independence for the last three interventions sessions. Ben reached acquisition criteria following seven sessions. He accessed and viewed the entering data video a total of eight times during four sessions to assist with task completion or a mean of two times per instruction session during intervention. For formatting a document, the mean percentage of steps performed independently increased to 82% (range 12-100%) with 100% independence for the last three interventions sessions. Ben reached acquisition criteria following eight sessions. He accessed and viewed the formatting a document video a total of eight times during five sessions or a mean of 1.6 times per instruction session during intervention.

Chris. Figure 3 displays the percentage of steps performed independently across tasks. The mean percentage of independent performance during baseline for making copies was 36% (range 31-38%), entering data was 29% (range 27-35%), and formatting a document was 39% (range 36-40%). During intervention, Chris' performance improved. Chris acquired all tasks by accessing and watching the first-person point of view YouTube instructional

videos. For making copies, the independent performance increased to 80% (range 31-100%) with 100% independence during the last three interventions sessions. Chris reached acquisition criteria following eight sessions. He accessed and viewed the making copies video to assist with task completion a total of 10 times during 4 sessions or a mean of 2.5 times per instruction session during intervention. For entering data, the mean percentage of steps performed independently increased to 73% (range 27-100%) with 100% independence for the last three interventions sessions. Chris reached acquisition criteria following 11 sessions. He accessed and viewed the entering data video a total of 16 times during 8 sessions or a mean of 2.0 times per instruction session during intervention. For formatting a document, the mean percentage of steps performed independently increased to 84% (range 40-100%) with 100% independence for the last three interventions sessions. Chris reached acquisition criteria following 11 sessions, and he accessed and viewed the video a total of 13 times during 13 sessions or a mean of 2.2 times per instruction session during intervention.

Social Validity

All students reported that they liked using the videos on their YouTube channel. They indicated that it helped them complete their work by themselves. They also agreed that they would like to include more videos of other tasks that they need help competing.

Discussion

The purpose of this study was to examine the effects of using customized first-person point of view YouTube instructional videos for college students with intellectual disability (ID) in a postsecondary education program to acquire vocational skills. All students independently accessed the videos successfully to complete three vocational

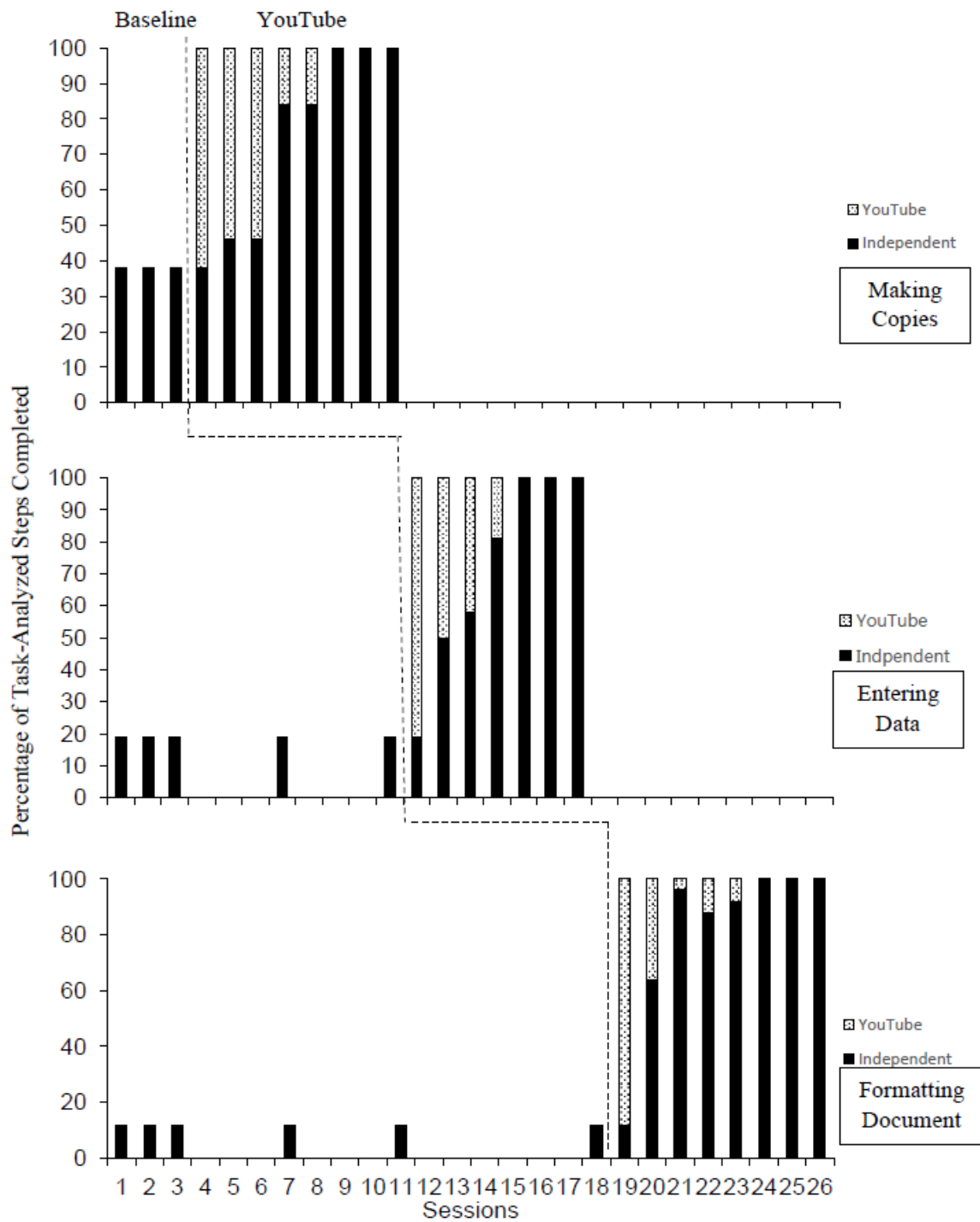


Figure 2. Ben's percentage of task-analyzed steps completed

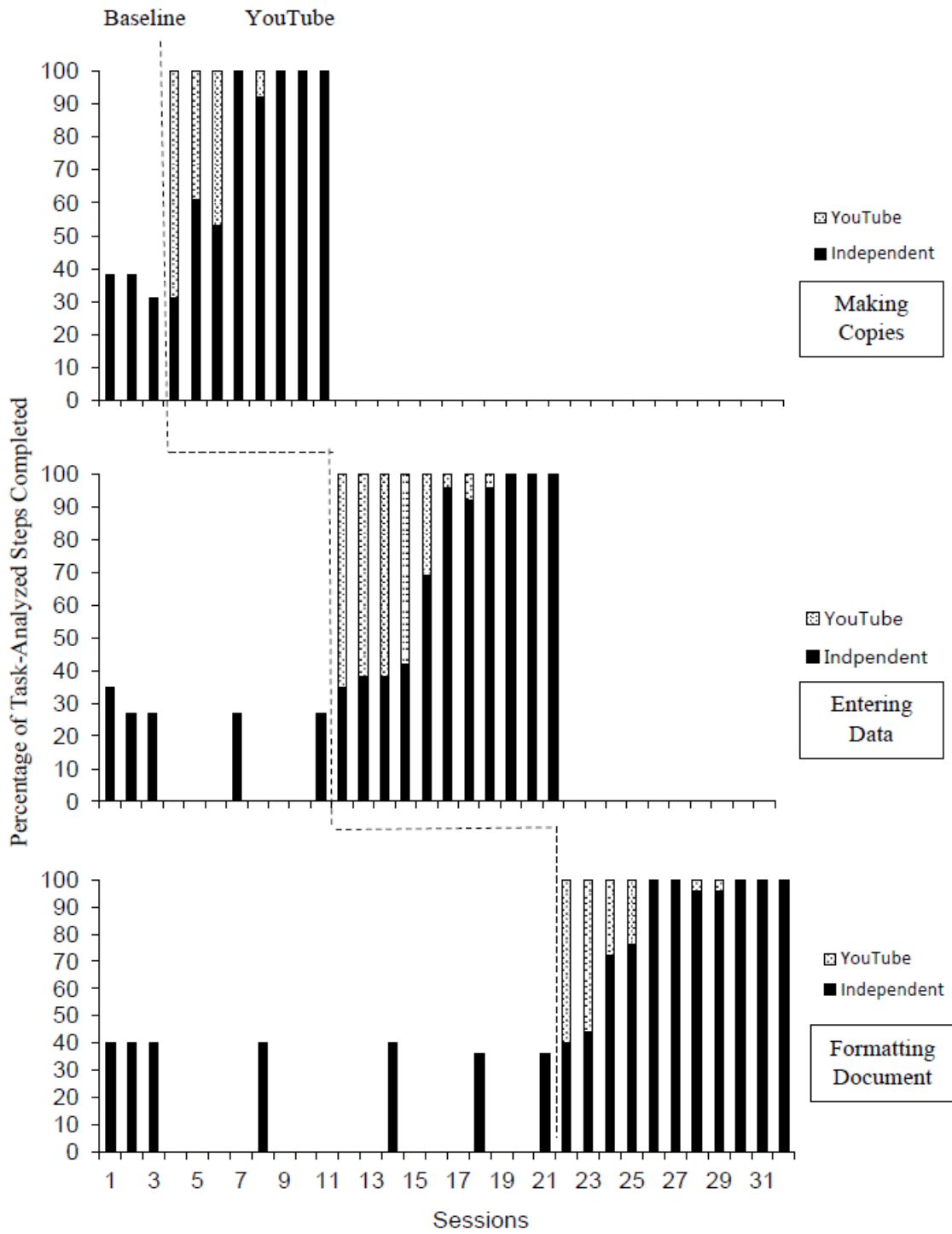


Figure 3. Chris's percentage of task-analyzed steps completed.

tasks. Prior to the study, students demonstrated basic technological skills (e.g. use iPad to access YouTube), but no one could complete the vocational tasks independently at their job. According to the multiple probe design, a functional relation was demonstrated between accessing personalized YouTube videos and an increase in the percentage of task-analyzed steps completed independently. A functional relation was established since experimental control occurred by demonstrating data variation patterns in at least three different series at three different points in time between the acquisition of vocational tasks and the introduction of the YouTube instructional videos (Horner et al., 2005).

Overall, the findings were consistent with the results of previous studies that reported video modeling was used successfully to teach students with ID job skills (e.g., Bereznak et al., 2012; Laarhoven et al., 2012; Laarhoven et al., 2009). In addition, teaching students how to independently access instructional videos had a positive effect on improving their job performance. Ensuring students acquire the skills needed for independent job performance is the ultimate goal of vocational training (Laarhoven et al., 2012). These results can be interpreted that using YouTube to access video modeling supports was an effective and efficient method for delivering video supports and of teaching job skills.

The findings in this study extend the literature in several ways. First, all students used the videos to teach themselves how complete the tasks. It confirmed that video modeling had a positive effect on job performance (Laarhoven et al., 2012; Laarhoven et al., 2009; Smith, Shepley, Alexander, & Ayres, 2015; Smith, Shepley, Alexander, Davis et al., 2015). Moreover, the effects of using video modeling for self-

instruction allowed students to display higher levels of autonomy (Bereznak et al., 2012; Smith, Shepley, Alexander, & Ayres; Smith, Shepley, Alexander, Davis et al.). Increased independence and the ability to manage one's own task performance continues to be an area of concern for individuals with ID (Mechling, 2007). The students directed their own supports and the need for supervision and prompting by others was not needed by creating a personal YouTube channel for students to access job related instructional videos. This approach deemphasized a student's tendency of dependence (Park & Kang, 2015) and provided the students with opportunities to actively participate and self-manage their learning when acquiring new skills.

Second, incorporating digital tools such as YouTube enables individuals with ID to be more fully included as digital citizens (Cihak, Wright, Smith, McMahon, & Kraiss, 2015). In this study, we incorporated the use of available digital information for students to problem-solve. Agran and Wehmeyer (1999) suggested that the ability to retrieve and process information and, in turn, propose a solution to a discernable problem represents a skill that will greatly advance a student's competence and independence. Problem solving involves using available information to identify and design solutions to problems. It is not guess work, but a systematic information processing strategy in which the student is taught to define and analyze a situation to identify potential problems and then identify and execute a solution to those problems (Mithaug, 1993). Unfortunately, many persons with ID lack the skills to solve problems in their lives (Belva & Matson, 2013; Ramdoss et al., 2012; Westling et al., 2015). All participants already knew how to access YouTube and often watched videos for recreational purposes. However, they never used YouTube to gain information to

implement a solution to problem solve or complete a task. Students were simply made aware that instructional videos were available for them if they had any problems completing their work on the job. Initially, students watched the videos multiple times, however, as they became more proficient they viewed the videos less often. Students self-faded the use of the video supports as they demonstrated greater independence. When students knew how to do the task, they simply did not access the YouTube videos as there was no need to problem-solve. Strategies associated with promoting self-management serve in part to help individuals solve problems (Agran & Hughes, 1997; Miller & Taber-Doughty, 2014). By becoming more effective problem solvers, students with ID were better able to identify potential response alternatives in the problem-solving process, and self-regulate learning.

Third, this study is significant in that it used YouTube, a media that is the most frequently used by students with disabilities in their daily lives as noted by Asuncion et al. (2012). Students with ID did not show any difficulties or resistances to using YouTube. In addition, there was no need for the participating students with ID to have separate specialized trainings because the platform used was familiar to them. Therefore, the findings of this study were considered to be free of novelty effects to some degree. Using a platform with which students with ID were familiar, such as YouTube, they acquired target job tasks in a relatively short period of time.

Currently, a limited amount of research exists studying the effectiveness of using video modeling for students with ID to self-manage their own learning of vocational skills. Findings from this study expand the establish evidence based practices of VM and the effectiveness of using digital platforms to

access a video modeling strategy to perform employment-related skills for students with ID.

Limitations and Future Research

To fully interpret and apply the conclusions of this study, several limitations should be considered. A small number of students participated in the study as in all single subject designs ($n=3$) and they shared similar characteristics (e.g., age, IQ range), which limit broad external generalized conclusions. Results from this study should be interpreted to participants with similar characteristics. Future research should consider the use of a larger sample size and diverse disability categories to increase external validity and generalizability.

This study also did not probe long-term effects or collect maintenance data to examine the improved vocational skills post intervention. Future research needs to investigate how long the effect of intervention continues after the completion of intervention by designing a study that includes the maintenance stage. Would participant's problem solve by accessing the YouTube videos if they forgot how to do a task weeks or months later? In addition, this study focused only on three different skills, although there are a variety of skills in vocational skills. Thus, future research needs to apply more diverse skills.

Implications for Practice

Video modeling has been demonstrated as an evidence-based strategy for acquiring new skills. This study employed YouTube, which is the most frequently used entertainment platform by students with disabilities (Asuncion et al., 2012), as a medium for the customized first person point of view video modeling. Fichten et al. (2001) suggested that technology can either stand as an obstacle or a facilitator in education for individuals with

ID. By using a familiar platform, such as YouTube, students were able to self-manage their learning of new vocational skills. Students readily access their YouTube channel and identify which video they need to watch to complete the corresponding task. The visual icon of the task limited any reading requirement. As individuals and practitioners develop videos, videos also can

be shared given the similarity of the task. A library of instructional videos can be made available for the individuals to use for when they encounter vocational tasks that they are unsure how to do. The fact that individuals with ID use YouTube means that YouTube has potential to deliver visual-based supports need to ensure successful employment.

References

- Agran, M., & Hughes, C. (1997). Problem solving. In M. Agran (Ed.), *Student-directed learning: Teaching self-determination skills* (pp. 171–198). Pacific Grove, CA: Brooks/Cole.
- Agran, M., & Wehmeyer, M. (1999). *Teaching problem solving to students with mental retardation*. Washington, DC: American Association on Mental Retardation.
- Asuncion, J. V., Budd, J., Fichten, C. S., Nguyen, M. N., Barile, M., & Amsel, R. (2012). Social media use by students with disabilities. *Academic Exchange Quarterly*, *16*(1), 30-35.
- Ayres, K. M., & Langone, J. (2005). Intervention and instruction with video for students with autism: A review of the literature. *Education and Training in Developmental Disabilities*, *40*, 183-196.
- Ayres, K. M., Mechling, L., & Sansosti, F. J. (2013). The use of mobile technologies to assist with life skills/independence of students with moderate/severe intellectual disability and/or autism spectrum disorders: Considerations for the future of school psychology. *Psychology in the Schools*, *50*, 259-271.
- Ayres, K. M., Shepley, S. B., Douglas, K. H., Shepley, C., & Lane, J. D. (2016). Mobile technology as a prosthesis: Using mobile technology to support community engagement and independence. In *Technology and the treatment of children with autism spectrum disorder* (pp. 131-145). NY: Springer Publishing Company.
- Barnes, C. (2012). Re-thinking disability, work and welfare. *Sociology Compass*, *6*, 472-484.
- Becker, R. L. (2000). *Reading-free vocational interest inventory: 2*. Columbus, OH: Elbern Publications.
- Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. *Exceptional Children*, *73*, 264-287.
- Belva, B. C., & Matson, J. L., (2013). An examination of specific daily living skills deficits in adults with profound intellectual disabilities. *Research in Developmental Disabilities*, *34*, 596-604.
- Bereznak, S., Ayres, K. M., Mechling, L. C., & Alexander, J. L. (2012). Video self-prompting and mobile technology to increase daily living and vocational independence for students with autism spectrum disorders. *Journal of Developmental and Physical Disabilities*, *24*, 269-285.
- Billingsley, F., White, O. R., & Munson, R. (1980). Procedural reliability: A rationale and an example. *Behavioral Assessment*, *2*, 229-24.
- Brigance, A. H. (2010). *Brigance transition skills inventory*. North Billerica, MA: Curriculum Associates.

- Brown, L., Shiraga, B., & Kessler, K. (2006). The quest for ordinary lives: The integrated post-school vocational functioning of 50 workers with significant disabilities. *Research Practice for Person with Severe Disabilities, 31*, 93-121.
- Butterworth, J., Smith, F. A., Hall, A.C., Migliore, A., Winsor, J., Domin, D., & Timmons, J. C. (2012). *StateData: The national report on employment services and outcomes*. Boston, MA: University of Massachusetts Boston, Institute for Community Inclusion.
- Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders, 30*, 537-552.
- Cihak, D. F., Kessler, K., & Alberto, P. A. (2007). Generalized use of handheld prompting systems. *Research in Developmental Disabilities, 28*, 397-408.
- Cihak, D. F., Kessler, K., & Alberto, P. A. (2008). Use of a handheld prompting system to transition independently through vocational tasks for students with moderate and severe intellectual disabilities. *Education and Training in Developmental Disabilities, 43*, 102-110.
- Cihak, D. F., Wright, R., Smith, C., C., McMahon, D., & Kraiss, K. (2015). Incorporating functional digital literacy skills as part of the curriculum for high school students with intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 50*, 155-171.
- Cihak, D.F., Kildare, L., Smith, C., McMahon, D.D., & Quinn-Brown, L. (2012). Using video Social Stories™ to increase task engagement for middle schools students with autism spectrum disorders. *Behavior Modification, 36*, 399-425.
- Cronin, M. E., Patton, J. R., & Wood, S. J. (2007). *Life skills instruction: A practical guide for integrating real-life content into the curriculum at the elementary and secondary levels for students with special needs or who are placed at risk* (2nd ed.). Austin, TX: Pro-Ed.
- Davies, D. K., Stock, S. E., & Wehmeyer, M. L. (2002). Enhancing independent time management skills of individuals with mental retardation using a palmtop personal computer. *Mental Retardation, 40*, 358-365.
- Delano, M. E. (2007). Video modeling interventions for individuals with autism. *Remedial and Special Education, 28*, 33-42.
- Fichten, C. S., Asuncion, J. V., Barile, M., Genereux, C., Fossey, M., Judd, D., ... Wells, D. (2001). Technology integration for students with disabilities: Empirically based recommendations for faculty. *Educational Research and Evaluation, 7*, 185-211.
- Gelbar, N. W., Anderson, C., McCarthy, S., & Buggey, T. (2012). Video self-modeling as an intervention strategy for individuals with autism spectrum disorders. *Psychology in the Schools, 49*, 15-22.
- Hammond, D., & Gast, D. L. (2010). Descriptive analysis of single subject research designs: 1983-2007. *Education and Training in Autism and Developmental Disabilities, 45*, 187-202.
- Hanley-Maxwell, C., & Collet-Klingenberg, L. (2004). Preparing students for employment. In P. Wehman & J. Kregel (Eds.), *Functional curriculum for elementary, middle, and secondary age students with special needs* (pp. 205-243). Austin, TX: Pro-Ed.
- Harrison, P., & Oakland, T. (2003). *Adaptive behavior assessment system (ABAS-II)*. San Antonio, TX: The Psychological Corporation.

- Hitchcock, C. H., Dowrick, P. W., & Prater, M. A. (2003). Video self-modeling intervention in school-based settings: A review. *Remedial and Special Education, 24*, 36-45.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S. L., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.
- Laarhoven, T., Johnson, J., Laarhoven-Myers, T., Grider, K., & Grider, K. (2009). The Effectiveness of Using a Video iPod as a Prompting Device in Employment Settings. *Journal of Behavioral Education, 18*, 119-141.
- Laarhoven, T., Winiarski, L., Blood, E., & Chan, J. (2012). Maintaining vocational skills of individuals with autism and developmental disabilities through video modeling. *Education and Training in Autism and Developmental Disabilities, 47*, 447-461.
- Langhorst, E. (2007). After the bell, beyond the walls. *Educational Leadership, 64*, 74-77.
- Mechling, L. (2005). The effect of instructor-created video programs to teach students with disabilities: A literature review. *Journal of Special Education Technology, 20*(2), 25-36.
- Mechling, L. C. (2007). Assistive technology as a self-management tool for prompting students with intellectual disabilities to initiate and complete daily tasks: A literature review. *Education and Training in Developmental Disabilities, 42*, 252-269.
- Mechling, L. (2011). Review of twenty-first century portable electronic devices for persons with moderate intellectual disabilities and autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities, 46*, 479-498.
- Miller, B., & Taber-Doughty, T. (2014). Self-monitoring checklists for inquiry problem-solving functional problem-solving methods for students with intellectual disability. *Education and Training in Autism and Developmental Disabilities, 49*, 555-567.
- Mithaug, D. E. (1993). *Self-regulation theory*. Westport, CT: Praeger.
- Neitzel J., & Busick M. (2009). *Overview of self-management*. National Professional Development Center on Autism Spectrum Disorders, Frank Porter Graham Child Development Institute, The University of North Carolina. Retrieved from <http://autismpdc.fpg.unc.edu/sites/autismpdc.fpg.unc.edu/files/imce/documents/Self-management-Complete-10-2010.pdf>
- Newman, L., Wagner, M., Knokey, A. M., Marder, C., Nagel, K., Shaver, D., & Xin, W. (2011). The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2 (NLTS2). (NCSE 2011-3005). Menlo Park, CA: SRI International.
- Park, J., & Kang, Y. (2015). The effects of video self-modeling on the use of subway skills for students with intellectual disabilities. *Korean Journal of Special Education, 50*(3), 1-21.
- Ramdoss, S., Lang, R., Fragale, C., Britt, C., O'Reilly, M., Sigafoos, J. ... Lancioni, G. E. (2012). Using of computer-based interventions to promote daily living skills in individual with intellectual disabilities: A systematic review. *Journal of Developmental and Physical Disabilities, 24*, 197-215.
- Sitlington, P. L., Neubert, D. A., & Clark, G. M. (2010). *Transition education and services for students with disabilities* (5th ed.). Boston, MA: Allyn & Bacon.
- Smith, K. A., Shepley, S. B., Alexander, J. L., & Ayres, K. M. (2015). The independent use of self-instructions for the acquisition of untrained multi-step tasks for individuals with an intellectual disability: A review of the literature. *Research in Developmental Disabilities, 40*, 19-30.

- Smith, K. A., Shepley, S. B., Alexander, J. L., Davis, A., & Ayres, K. M. (2015). Self-instruction using mobile technology to learn functional skills. *Research in Autism Spectrum Disorders, 11*, 93-100.
- Sparrow, S. S., Cicchetti, D. V., & Balla, D. A. (2005). *Vineland adaptive behavior scales* (2nd ed.). Circle Pines, MN: American Guidance Service.
- Traxler, J. (2007). Defining, discussing and evaluating mobile learning: The moving finger write and having writ... *The International Review of Research in Open and Distributed Learning, 8*(2). Retrieved from: <http://www.irrodl.org/index.php/irrodl/article/view/346>
- Unger, D., & Simmons, T. (2005). Transition to employment. In R. Flexer, T. Simmons, R., Luft, & R. Baer (Eds.), *Transition planning for secondary students with disabilities* (2nd ed., pp. 360-387). Upper Saddle River, NJ: Prentice Hall.
- U.S. Department of Labor. (2014). Persons with a disability: Labor force characteristics. Retrieved from: <http://www.bls.gov/news.release/disabl.nr0.htm>.
- Wechsler, D. (2003). *Wechsler Intelligence Scale for Children-WISC- IV*. San Antonio, TX: The Psychological Corporation.
- Wehman, P., Schall, C., McDonough, J., Kregel, J., Brooke, V., Molinelli, A. . . . Thiss, W. (2014). Competitive employment for youth with autism spectrum disorders: Early results from a randomized clinical trial. *Journal of Autism and Developmental Disorders, 44*, 487-500.
- Westling, D.L., Fox, L., & Carter, E. (2015). *Teaching students with severe disabilities* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Yi, S. Y., & Oh, J. Y. (2012). The effects of video modeling on using the electric home appliances of students with intellectual disabilities. *Korean Journal of Special Education, 47*, 121-139.
- YouTube (2016, April 19). Statistics. Retrieved from <http://youtube.com/yt/press/statistics.html>

Correspondence concerning this article should be addressed to David F. Cihak, University of Tennessee, 1122 Volunteer Blvd., Bailey Ed. Complex #412, Knoxville, TN 37996-3442. E-mail: dcihak@utk.edu

What's BEFORE the iPad®? Teaching Basic Prerequisite Skills for iPad® Use

Kimberly Maich
Memorial University

Steve Sider
Wilfrid Laurier University

Carmen Hall
Fanshawe College

Megan Henning
Brock University

Assistive technology, such as that available in an iPad®, have increasingly been used to support learning for all students and particularly for those with special education needs. The purpose of this article is to consider the prerequisite skills required for effective iPad® use. The effective integration of assistive technologies, from technology, pedagogy, and content knowledge perspectives is an important theoretical framework. From a Universal Design for Learning perspective, we consider how new skills can be taught and how task analysis is a critical part of the process. A review of suggested apps for prerequisite skills, such as cause and effect, tap, drag, and swipe, is included as are considerations for Individual Education Plans. An authentic case anecdote is provided to illustrate the ways in which prerequisite skills can be addressed. The conclusion integrates the scholarly literature on teaching and assistive technology.

The integration of multiple technologies into twenty-first century teaching is an essential feature in today's diverse, complex, and inclusive classrooms (Draper Rodriguez, Strnadova, & Cumming, 2014). Teachers are expected to contend with technological advancements and incorporate technology into their daily teaching practises as students have been transformed into digital learners (Draper Rodriguez et al., 2014; Fleury et al., 2014). The theoretical framework that appears to have the significant relevance in the integration of technology and teaching is known as TPACK (technology, pedagogy, and content knowledge) (Koehler & Mishra, 2009). Technology, pedagogy, and content knowledge cannot be seen as separate entities in today's classroom; rather technology, pedagogy, and content knowledge need to be integrated for effective teaching and learning. To successfully integrate these three foundations, teachers must be willing to engage in a process of learning how to most

effectively do so (Candace, Kamini, & Mueller, 2011).

There is a significant body of scholarly literature that considers how technology is used in schools. This literature includes examinations of teacher attitudes (Aldunate & Nussbaum, 2013; Kopcha, 2012), types of technology being utilized (Al Musawi, 2011; Clarke & Zagarell, 2012), how students use technology (Gasparini & Cullen, 2012; Geist, 2011), and the impact of various technology tools and environments on student achievement and attitudes (e.g., Shapley, 2011; Wood et al., 2012). Of most relevance to the focus of this article is literature that considers how technology can support students with exceptionalities and other special education needs.

Students with cognitive, communication and/or motor exceptionalities can benefit significantly from the implementation of

technology (Fleury et al., 2014; Powell, 2014). There are numerous ways in which technology supports students with diverse needs. For example, students with exceptionalities are often able to have increased engagement with learning tasks because of technology integration (Israel, Maynard, & Williamson, 2013). As well, students who use assistive technologies often feel more empowered in accessing and accomplishing learning tasks (McNaughton & Light, 2013). One of the most significant benefits of technology is the opportunity it provides for supporting differentiation for diverse student needs (Fernández-López, Rodríguez-Fórtiz, Rodríguez-Almendros, & Martínez-Segura, 2013). For example, the algorithms in computer applications can recognize progress and gaps in specific learning areas thus facilitating student focus in areas of need. Although technology can support the specific needs of students with exceptionalities, the general principles of Universal Design for Learning suggest that accessing technology can be beneficial for all students (Sider & Maich, 2014).

Tablets, such as iPads®, are an example of a technological tool that is becoming increasingly popular in the classroom due to the flexible ways in which they can be used, ease of use, and low cost (Aronin & Floyd, 2013). However, despite their rapidly increasing integration, there are many challenges to successfully incorporating the iPad® into the classroom including educator training and student readiness to begin using the technology (Mautone, 2013; Powell, 2014). Ultimately, much iPad® use is preceding related research and many students are not successfully prepared to use this technology in educational settings (Mango, 2015). Ibharm, Borhan, and Yatim (2013) therefore raise the argument that not all students possess the same baseline knowledge and skills regarding touch

technology. Clearly, there is a gap in the literature that examines the types of prerequisite skills that children require to engage with technology. This article addresses the gap by considering the prerequisite skills required to successfully operate an iPad®.

Universal Design

Before we teach new skills to any child, student, adult learner, or learner with or without a disability, ensuring that the environment is set up for success is a key factor in making that environment accessible for the needs of that individual learner. In the case of the iPad®, making it an accessible microcosm of teaching and learning translates to learning, managing, and tweaking its built-in accessibility features to meet the needs of its user. The iPad® has many examples of features that help to individualize it as an effective, efficient accessible assistive technology tool, including a screen reader (voiceover) feature, the ability to set large text and icons, speech-to-text options (Siri®), text-to-speech options, predictive text, guided access, assistive touch, switch control, braille compatibility, hearing aid compatibility, and AssistiveTouch®—supporting diversity in gesture use and individual abilities (Apple Inc., 2017). These are some examples of settings that can be accessed and manipulated to meet the needs of learners with visual, hearing, fine motor, and communication needs. Despite the appeal of iPad® integration in education, various barriers can exist to the success of student iPad® use. Ibharm et al. (2013), for example, discovered in their research that students often adapt their own strategies for use (i.e., one hand vs. two hand use). Furthermore, physical restrictions such as fine motor difficulties may prevent students from accessing the technology adequately as well as lack of prior experience using iPads® even

with its built-in features. An assessment of prerequisite skills, therefore, can aid educators in developing an appropriate plan to teach students necessary iPad® skills.

McDowell (2013) shared a proposed inventory of prerequisite skills which was used when working with students who had vision difficulties focusing on skills in a variety of areas such as gestures, features, and iPad® care. This specific type of inventory allows educators to clearly track the necessary prerequisite skills for using the iPad® successfully, which includes basic skills such as swiping or tapping motions as well as more advanced skills such as operating the camera successfully (McDowell, 2013). However, this inventory is not yet comprehensive.

Teaching New Skills

Even prior to examining a student's readiness for using the iPad®, it may be beneficial—or necessary—to examine that student's individual needs in the area of assistive technology itself. Consider comprehensively assessing that student's needs in assistive technology as the first step to accessing prerequisite skills instruction. The Wisconsin Assistive Technology Initiative (2009) developed a comprehensive, cost-free, open access tool entitled: *Assessing Students' Needs for Assistive Technology Manual* which is now in its fifth edition. Users can access and complete the full assessment or choose specific assessment topics to complete (e.g., communication, computer access, and organization) for completion.

If you are moving forward with the iPad®, teaching skills with or within the iPad®—as with using any structured teaching models—developing clear learning goals and targets is essential (Konrad, Ressa, Alexeef, Chan, & Peters, 2014). Goals should be specific, measureable, attainable, relevant, and timely

or SMART (Jung, 2007) in order to effectively assess growth and change. Instruction and assessment should be collaborative, using Applied Behavior Analysis-based instructional strategies such as task analysis, modelling, direct trial training, and positive reinforcement (Gongola & Sweeney, 2012; Lovitt, 2012).

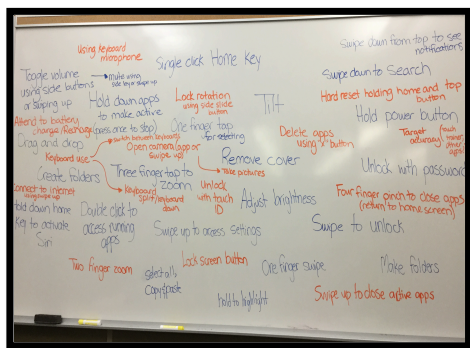
Task Analysis

A task analysis is an effective teaching strategy that involves the process of breaking skills down into their component parts to teach students who struggle to learn all the steps at once (Szidon & Franzone, 2009). The three ways to create an effective task analysis, foundational to teaching skills in a step by step manner, are by watching an expert, reading about it, or doing it yourself (Cooper, Heron, & Heward, 2007). Figure 1 was created with the observation of expert users—college-age native users of technology, developing task analyses of exemplar of basic, intermediate, and advanced skills for iPad® use. Table 1 is a fairly comprehensive list of single skills and task analyses of the current beginner, intermediate, and advanced set of prerequisite skills needed to successfully access an iPad® with independence. These are skills that will assist with individuals navigating the basic environment to then use additional programs for augmentative communication, educational software, or entertainment. Please keep in mind the omnipresent caveat the field of technology is rapidly changing; thus, this table, while currently quite comprehensive, should always be considered a foundation to be individualized and personalized according to context (version) and time frame (e.g., iOS).

Suggested Apps for Prerequisite Skills

The below suggested apps for the development of prerequisite skills are free or low-cost, simple suggestions to match the

Figure 1. Prerequisite skills and task analyses brainstorming.



iPad® learner’s needs with various areas of basic prerequisite skill development. They are listed by the skill of best fit, though other skills may apply. Some of the below are designed specifically for AT purposes and others can be simply *utilized* for developing AT-related skills. Please note that viewing the demonstration videos using a Google Video or YouTube search before trying the apps out yourself may be beneficial.

Cause and effect. Pocket Pond (Trigger Wave, 2012) is one option to support the development of cause-and-effect understanding. Its developers advertise it as “Create relaxing ripples while you enjoy the sounds of nature. Interact with the fish - scare them, feed them, and watch their schooling behavior. It’s your own personal pond to cleanse your worries and free your mind.” Aside from these potential benefits, the use of your finger on the interactive iPad® screen creates movement (e.g., ripples, fish) and sound (e.g., ripples) providing not only cause-and-effect teaching and learning but with the immediate feedback and potential positive reinforcements of the movement and sound accompanying touch.

Tap and more. Tiny Piano (SquarePoet, Inc., 2016) provides tap practice, immediate audio feedback, and the potential joy of

tapping any key to play the next note in a song. Our iPad® learners with any skill level with iPads®—or piano—can play complex songs using even random tap skills (or with closed eyes or vision-related disabilities). Peekaboo Barn Lite (Night & Day Studios, Inc., 2014) with its preschool-like visuals, provides a range of reinforcers for tapping in the right spot—the barn doors. Its developers note that “Inside a little bouncing barn, friendly farm animals are waiting to pop out and surprise your little one. Try and guess who they are; tap the doors to find out!” Its animation rewards play with audio, visual, and even the names of animals. Touch Trainer (Touch Autism, 2014) is an app designed for “single finger fine motor skills” instruction, allowing the adult to adapt the preciseness of the finger tap and the size of tap targets over time as skills develop, rewarding its user with swirling shapes and sounds. It allows the adult to customize the criteria for mastery where the target becomes smaller or the length of the reinforcer that plays with a successful finger touch.

Drag and more. Sea Creatures (Atech, Inc., 2016) (a free app) lists easy to follow directions: “Drag the screen to move. Tap the empty area on the screen to feed the fish. The fish run away when you touch them.” This app adds an extra skill to basic requisite skills—dragging. When users drag the screen, more seascape appears providing

Table 1. *Beginner, Intermediate, & Advanced Skills*

Beginner	<ul style="list-style-type: none"> • Allows basic operation • Requires cause-and-effect knowledge 	<ul style="list-style-type: none"> • Remove cover • Tilt • Tap targets • Swipe (to change screens or unlock device) • Double tap • Pinching (to zoom) • Drag and drop • Flick (scrolling)
Intermediate	<ul style="list-style-type: none"> • May use combinations of beginner skills • Requires procedural knowledge 	<ul style="list-style-type: none"> • Turn the device off / on (using the top button) • Keyboard use (switch; split; minimize the keyboard) • Camera use (switch between front and back camera; use top button and home key to take screen shots) • Double click home key to access running apps • Swipe up (close apps; access settings) • Swipe down (access notifications) • Four finger pinch to close apps (return to home screen) • Select all, copy, paste • Hold to highlight • Lock screen button • Unlock device (using password or touch ID) • Hold power button (restart) •
Advanced	<ul style="list-style-type: none"> • May use complex combinations of skills • Adjustments for personal preferences 	<ul style="list-style-type: none"> • Changing brightness level (using the swipe up function) • Changing the volume • (using swipe up function or side buttons) • Mute using side button • Connect to internet • (using the swipe up function) • Organizing apps • (Create folders, hold down apps to activate, press home key to stop activation of apps, delete apps) • Lock rotation (using side button or swipe up) • Use keyboard microphone • Attend to battery charge • Charging battery • Hold down home key (to activate Siri®)

more opportunities to interact with colourful fish. Endless Alphabet (Originator Inc.,

2016) (\$11.99) is a reading app but its users can also practice dragging letters into place to form words, and are rewarded with colour,

sound, and talking animated animal creatures who walk across the screen when they successfully drag and match the correct letter.

Swipe. Fruit Ninja, a popular mainstream free game (Halfbrick Studios, 2012)

marketed as entertainment (“take a break and experience a new way to slice your favourite fruit”) focuses on swipe skills (from simple to complex) to slice fruit—the main task for game success! Finger Paint with Sounds (Inclusive Technology Ltd., 2013)—another free app—is focused on exploring touch for students with disabilities to “practice their first interactions with a touch screen,” and includes music and color as potential reinforcers when the individual drags their finger across the screen.

Varied touch. Heat pad will work with any type of touch, and has strong potential to use for new learners with little to no touch skills, or to teach complex touch such as the three-fingered swipe, pinch, or more. Padadaz SARL (2016), its developers, explain that “This app simulates various heat-sensitive surfaces reacting to the heat of your fingertips. Simple, yet surprisingly relaxing and entertaining!” In contrast, apps like Bubble Popper (Mob Touch, Inc., 2014) demand a precise or distinct touch to pop one bubble at a time, along with a “realistic bubble appearance and popping sounds.”

Individual Education Plan Integration

Individual Education Plans (IEPs) are detailed documentations that provide strategic ideas and procedures for teachers and other educators to support specific students (e.g., Ontario Ministry of Education, 2004). Depending on the educational jurisdiction, IEPs might be referred to as Special Education Plans or Individual Learning Plans (or similar). Developing prerequisite skills for iPad® usage should be incorporated into IEPs since this provides a coherent and coordinated plan to support students in this process—and to document successes. IEPs should serve as a guide to daily instructional and assessment practices for students with special education needs and are reviewed on a regular basis by educators

and parents, guardians, or caregivers. As a result, IEPs serve as an excellent way to document and communicate a child’s progress.

There is no common template for IEPs; however, IEPs typically include environmental, assessment, and instructional strategies. The instructional strategies and tools that have been identified in the previous sections should be noted in the instructional strategy section of the IEP. As well, educators can identify assessment strategies in the IEP to document a child’s progress with prerequisite skills. The various types of assistive technologies, including iPads® should also be noted on the IEP as well as any specific human resources that are required to ensure the effective integration of the technology. Noting that the IEP is a “living document,” it is important for educators to continually refer to the IEP, and make changes to it, as prerequisite skills are addressed.

As referenced earlier, The Wisconsin Assistive Technology Initiative (WATI) provides a free tool to determine a student’s need for assistive technology (2009; <http://www.wati.org/?pageLoad=content/supports/free/index.php>). The WATI also provides an excellent section (chapter 15) giving detailed instruction on how to use the tool to assess the current level of academic achievement and functional performance as well as to identify goals and specific strategies to address these targeted areas. The development of annual goals, strategies, and reporting mechanisms for IEPs differs from context to context; however, the WATI provides a practical, helpful guide to the process.

Teaching Touch for Future Communication: An Anecdote

For one high school student with global developmental delay, the introduction of an iPad® provided motivation to communicate and engagement to interact with reinforcers in an age-appropriate manner in an inclusive classroom. This student (using a pseudonym of “Ella”) demonstrated little motivation with low-technology communication strategies in the past. The potential of tablet technology was anticipated immediately by the involved educators; however, upon receiving an iPad®, this student had little history with touch technology and could not navigate the device, but was still attracted to her favourite online videos. The prerequisite skills, then, to use her communication software, open the app, and access her reinforcers, were itemized in both individual teaching programs and task analyses. *Guided access*® was used to prevent her leaving any target app. First, Ella was taught how to use distinct touches with *Touch Trainer*, gradually increasing the settings toward the goal of distinct taps on small targets. Then, the *YouTube app* was placed alone on a single screen, and Ella undertook the processes of learning to open this app to her pre-loaded favourite video—an immediate reinforcer. A task analysis was developed requiring Ella to

open the app, choose a video from a selection, and then touch it to begin play. She was taught to swipe using the app *Finger Paint with Sounds*, where music would play only her correct swipes. Next, her YouTube app was then moved a single page with empty pages in-between, motivating her to swipe between pages to access her reinforcer. Placing Ella’s favourite videos lower on the YouTube homepage, next, taught her to scroll. Eventually, numerous apps were added to her home page to encourage discriminate between apps. With these prerequisite skills firmly in place, teaching Ella to utilize a communication app was finally possible. This instruction then began with only two visuals per screen and gradually increased to a range of items to allow Ella to address her wants and need, with the later additional of distracters and eventual requests, greetings, and labels. With her now-expert skills of distinct taps, swiping, and scrolling to navigate the iPad® as prerequisite skills to success, Ella was able to focus on using these skills to access her communication software. See Figure 2 to see Ella one year after beginning to learn her prerequisite skills for the iPad®, now ordering her meal at independently at a community restaurant.

Figure 2. One year after teaching prerequisite skills to the iPad®.



iPad Teaching Decision Tree and Teaching Plans

In developing a teaching program to teach students with exceptionalities how to complete prerequisite skills, it is important to first determine *how* you will teach these skills. If a student requires more repetition and can get confused easily with a sequence of steps, for example, it is often more productive (with a lower likelihood of practicing errors rather than skills) when skills are taught discretely or one at a time. In contrast, other learners can learn better through practicing the sequence that leads to their end goal through chaining and a task analysis. The benefit of using a task analysis is there is less generalization to teach. Use Figure 3—a decision-making tree—to determine the most effective manner to teach an individual student, learner, or adult.

Once an approach is chosen, developing of a specific teaching plan is helpful. For teaching a discrete skill, the target skill is broken down from easier to more difficult components in teaching steps and a prompting hierarchy is followed. Figure 4 provides an example of a teaching program for “Quincey” (a

pseudonym) with teaching steps that get incrementally more difficult with a most-to-least prompt hierarchy. Alternatively, Figure 5 is the task analysis of the skills that were taught to Ella (above) when she was learning to open her communication app. The sample program teaches her the sequence of skills in a backward chaining method, allowing her to access the end of the sequence quickly in order to meet with reinforcers.

Summary

Ibharim et al. (2013) discovered children used a variation of movements when interacting with an iPad® including using one or two hands. They also found that some children had difficulty accurately touching target locations depending on the size of the target area. Likewise, Benton (2012) identified benefits of introducing iPads® with children who have autism spectrum disorder. Benton suggests that the use of picture exchange communication system promotes successful iPad® integration as children are familiar with exchanging pictures for responses or reactions. Benton further suggests that children may need

Figure 3. Decision making tree for choosing approaching to teaching iPad prerequisite skills.

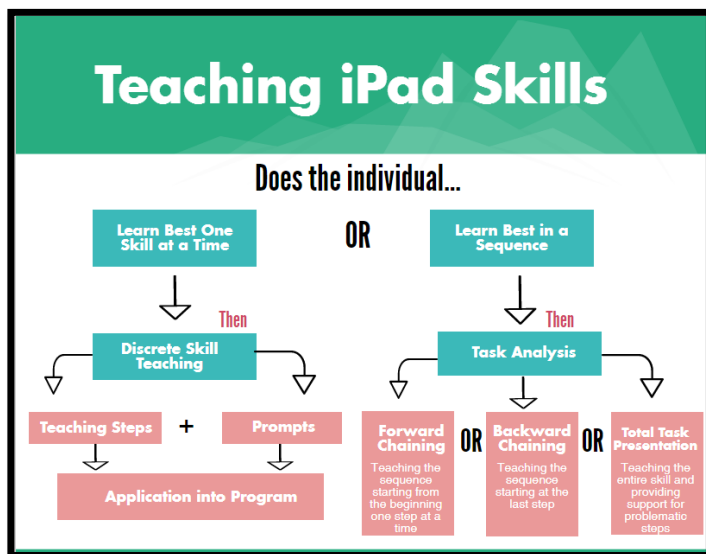


Figure 4. *Quincey's swipe program.*

<p>Error Correction: Single-Response:</p> <ol style="list-style-type: none"> 1. Allow the student to err 2. Present the instruction again 3. Immediately add higher level of prompt 4. Provide neutral reinforcement 5. Repeat trial at original level <p>*Discontinue after 3 consecutive errors</p>
<p>Data Collection:</p> <ul style="list-style-type: none"> • Trial-by-trial <i>Indicate a + for correct action & - for incorrect action (at teaching step and prompt level)</i> • Calculate Percent <i>Divide number correct by total opportunities that day</i>
<p>Generalization:</p> <p>P- people – new school staff, various family members L- location – different rooms, away from table, on floor O- object – with novel apps (drag & drop), with new screens, etc. P – placement of object – have apps in different locations S – S^d – “Go to,” “Place here”</p>
<p>Maintenance: Once mastery is attained at independence for each teaching step, check:</p> <ul style="list-style-type: none"> • Weekly to ensure maintenance • Bi-Weekly to ensure maintenance • Monthly to ensure maintenance

the pictures on the tablets represent objects (i.e., applications). Ultimately, she cautions that training is required to ensure appropriate behavior and successful usage of the technology. Further, McNaughton and Light (2013) contend that it is important to keep the focus not on the technology but on the skills that any given child needs to develop.

As illustrated in the work of Ibharim et al. (2013), Benton (2012), and McNaughton and Light (2013) clearly there are benefits to the use of tablets such as iPad® in settings involving young children and those with exceptionalities. One of the key ways in which tablets can support students with exceptionalities is the ability to differentiate the types of tasks that a student completes based on their specific needs (Fernández-

López et al., 2013). However, for teachers to successfully integrate tablets into the classroom context, they must help children develop prerequisite skills. This supports the work of Koehler and Mishra (2009) who contend that technology must be integrated with pedagogy and content knowledge to be effective. As has been highlighted in this article, these include motor skills, processing skills, and developing understanding such as cause and effect. As well, teachers must have a learning stance themselves and be willing to integrate technology with their teaching practices for the benefit of their students (Mueller & Wood, 2012). The provided resources will facilitate the effectiveness of teacher and student interactions involving tablets such as iPads®.

Figure 5. Ella’s task analysis for opening a communication app.

Task Analysis for Opening a Communication App	
Upon presentation of the iPad Ella will turn it on, open the app, and choose her communication request with 100% accuracy over 2 consecutive days.	
Opportunities: 5 times per day	
Chaining Method: Backward Chaining Begin by teaching the last step in the task analysis first (#6). Complete all steps for Ella and have her complete step 6 until mastery. Then teach steps 5 & 6 until mastery, and so on, until she can complete the entire task analysis.	
<p>Task Analysis</p> <ol style="list-style-type: none"> 1. Push “home” button on iPad to turn on 2. Swipe right to left to scroll pages 3. Swipe right to left to scroll another page 4. Tap on app to open 5. Tap on one of 2 folders 6. Tap on the requested picture/button, to engage the voice output for that item <p>NOTE: Provide requested item after request</p> <p>Prompting Hierarchy: Least-to-Most</p> <ol style="list-style-type: none"> 1. Independent 2. Gesture prompt 3. Partial prompt 4. Full prompt 	<p>Error Correction:</p> <p>Chained behavior: Incorrect start to chain</p> <ol style="list-style-type: none"> 1. Allow error to occur; mark as incorrect (-) 2. Readminister trial with increased prompt level; provide differential reinforcement 3. Intersperse a distractor trial 4. Readminister initial trial <p>Error within chain</p> <ol style="list-style-type: none"> 1. Allow error to occur; mark as incorrect (-) 2. Readminister trial from step at which error occurred to end with increased prompt level; provide differential reinforcement 3. Intersperse a distractor trial 4. Readminister initial trial at start of chain
Mastery Criteria: 90% across 2 consecutive sessions	Revision Criteria: 3 consecutive data points below 30%
Data Collection Procedure:	
<ul style="list-style-type: none"> • Total Task Presentation: complete each step of the chain in order and record a (+) for steps completed independently and a (-) for steps requiring a prompt. • Calculate percentage by the number of independent accurate responses divided by the total number of steps in the task analysis 	
Generalization:	
<p>P (people) – other school employees, family members, friends, support workers</p> <p>L (location) – different rooms, in the community, etc.</p> <p>O (object) – various targets requiring different objects</p> <p>P (placement of object) – various placements depending on chained behavior</p> <p>S (S^d)– vary depending on chained behavior</p>	
Maintenance:	
Once mastery is attained at independence for each teaching step, check:	
<ul style="list-style-type: none"> • Weekly to ensure maintenance • Biweekly to ensure maintenance • Monthly to ensure maintenance 	

References

- Aldunate, R., & Nussbaum, M. (2013). Teacher adoption of technology. *Computers in Human Behavior*, 29, 519-524. doi:10.1016/j.chb.2012.10.017
- Apple Inc. (2017). Use accessibility features on your iPhone, iPad, and iPod touch. Retrieved from <https://support.apple.com/en-ca/HT204390>.

- Aronin, S., & Floyd, K. (2013). Using an iPad in inclusive preschool classrooms to introduce STEM concepts. *TEACHING Exceptional Children*, 45(4), 34-39.
- Atech Inc. (2016). Touch and Find! Sea creatures (Version 1.5.1) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Benton, B. K. (2012, January 1). The iPad as an Instructional Tool: An Examination of Teacher Implementation Experiences. *ProQuest LLC. Theses and Dissertations*. 462. <http://scholarworks.uark.edu/etd/462>
- Candace, F., Kamini, J., & Mueller, J. (2011, March). Three perspectives on Technological Pedagogical and Content Knowledge: Framing technology education using TPACK. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2011, No. 1, pp. 4297-4299).
- Clarke, G. S., & Zagarell, J. (2012). Teachers and technology: A technological divide. *Childhood Education*, (2), 136,
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed). Upper Saddle River, NJ: Pearson.
- Draper Rodríguez, C., Strnadová, I., & Cumming, T. (2014). Using iPads with students with disabilities: Lessons learned from students, teachers, and parents. *Intervention in School & Clinic*, 49, 244-250. doi:10.1177/1053451213509488
- Fernández-López, Á., Rodríguez-Fórtiz, M. J., Rodríguez-Almendros, M. L., & Martínez-Segura, M. J. (2013). Mobile learning technology based on iOS devices to support students with special education needs. *Computers & Education*, 61, 77-90.
- Fleury, V. P., Hedges, S., Hume, K., Browder, D. M., Thompson, J. L., Fallin, K., ... Vaughn, S. (2014). Addressing the academic needs of adolescents with autism spectrum disorder in secondary education. *Remedial and Special Education*, 35, 68-79.
- Gasparini, A., & Culen, A. (2012). Acceptance factors: An iPad in classroom ecology. *2012 International Conference On E-Learning & E-Technologies in Education (ICEEE)*, 140. doi:10.1109/ICeLeTE.2012.6333415
- Geist, E. (2011). The game changer: Using iPads in college teacher education classes. *College Student Journal*, 45, 758-768.
- Gongola, L., & Sweeney, J. (2012). Discrete trial teaching: Getting started. *Intervention in School and Clinic*, 47, 183-190.
- Halfbrick Studios. (2016). Fruit Ninja (Version 2.3.8.) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Ibharim, L., Borhan, N., & Yatim, M. (2013). A field study of understanding child's knowledge, skills, and interaction towards capacitive touch technology (iPad). *International Conference on Information Technology in Asia*, pp. 9-53.
- Israel, M., Maynard, K., & Williamson, P. (2013). Promoting literacy-embedded, authentic STEM instruction for students with disabilities and other struggling learners. *TEACHING Exceptional Children*, 45(4), 18-25.
- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1). Retrieved from <http://www.citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogicalcontent-knowledge>
- Konrad, M., Keesey, S., Ressa, V. A., Alexeeff, M., Chan, P. E., & Peters, M. T. (2014). Setting clear learning targets to guide instruction for all students. *Intervention in School & Clinic*, 50, 76-85. Doi:10.1177/1053451214536042

- Kopcha, T. J. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, 59, 1109-1121. doi:10.1016/j.compedu.2012.05.014
- Jung, L. A. (2007). Writing SMART objectives and strategies that fit the routine. *TEACHING Exceptional Children*, 39, 54-58.
- Lovitt, T. C. (2012). Applied Behaviour analysis: A method that languished but should be restored. *Intervention in School & Clinic*, 47, 252-256. doi:10.1177/1053451211424598
- Mango, O. (2015). iPad use and student engagement in the classroom. *The Turkish Online Journal of Educational Technology*, 14(1), 53-57.
- Mautone, M. (2013, December). Integrating the iPad into the ASD classroom. *Educational Digest*, 79(4), 25-28. Ann Arbor: MI.
- McDowell, J. (2013). iPad skills: A quick inventory of some beginning skills for a young student with low vision. California Transcribers and Educators for the Blind and Visually Impaired, Inc., Annual Conference.
- McNaughton, D., & Light, J. (2013). The iPad and mobile technology revolution: Benefits and challenges for individuals who require augmentative and alternative communication. *Augmentative and Alternative Communication*, 29, 107-116.
- MobTouch Inc. (2014). Bubble Popper + (Version 3.0) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Mueller, J., & Wood, E. (2012). Patterns of beliefs, attitudes, and characteristics of teachers that influence computer integration. *Education Research International*, 2012. Doi: 10.1155/2012/697357
- Musawi, A. A. (2011). Redefining technology role in education. *Creative Education*, (2), 130.
- Night & Day Studios, Inc. (2014). Peekaboo Barn Lite (Version 5.1.0) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Ontario Ministry of Education (2004). The Individual Education Plan: A Resource Guide. Retrieved from <http://www.edu.gov.on.ca/eng/general/elemsec/spaced/guide/resource/iepresguid.pdf>
- Originator Inc. (2016). Endless Alphabet (Version 3.1) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Padadaz. (2016). Heat Pad- Relaxing Heat Sensitive Surfaces (Version 4.1) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Powell, S. (2014). Choosing iPad apps with a purpose: Aligning skills and standards. *TEACHING Exceptional Children*, 47(1), 20-26.
- Shapley, K., Sheehan, D., Maloney, C., & Caranikas-Walker, F. (2011). Effects of Technology Immersion on Middle School Students' Learning Opportunities and Achievement. *Journal of Educational Research*, 104, 299-315. doi:10.1080/00220671003767615
- Sider, S. & Maich, K. (2014). Assistive technology tools to support literacy learning for all learners in the inclusive classroom. *Research into Practice*, 50(1). Access at: www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_TechnologyTools.pdf
- SquarePoet, Inc. (2016). Tiny piano – Free Songs to Play and Learn! (Version 2.2.) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Szidon, K., & Franzone, E. (2009). *Task analysis*. Madison, WI: National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.

- Touch Autism. (2015). Touch Trainer (Version 4.0) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- TriggerWave LLC. (2012). Pocket Pond. (Version 3.3) [Mobile application software]. Retrieved from <http://itunes.apple.com>
- Wisconsin Assistive Technology Initiative. (2009). Assessing students' needs for assistive technology. Retrieved from <http://www.wati.org/?pageLoad=content/supports/free/index.php>
- Wood, E., Zivcakova, L., Gentile, P., Archer, K., De Pasquale, D., & Nosko, A. (2012). Examining the impact of off-task multi-tasking with technology on real-time classroom learning. *Computers & Education*, 58, 365-374.

Correspondence concerning this article should be addressed to Kimberly Maich, Memorial University, Faculty of Education, St. John's, Newfoundland & Labrador, A1C 5S7, CANADA. E-mail: kmaich@mun.ca

The Brain and Autism: What Does Brain Research Tell Teachers?

Victoria Fricke
Saint Louis University

Tanyathorn Hauwadhanasuk
Saint Louis University

Nikki Murdick
Saint Louis University

Amrita Chaturvedi
Saint Louis University

Advances in non-invasive neuroimaging techniques have provided cognitive neuroscientists with an increasing understanding of the neural correlates supporting how individuals acquire, process, and remember information and life experiences. This article provides a brief overview of four important areas of brain research and how the findings may be translated into effective practices for educators. Research is reviewed in these essential areas for student learning: sensory integration, executive function, psychological awareness and memory, and social competence. Methods developed based on the latest research may assist teachers in preparing appropriate activities and interventions for children and adolescents with autism or autism spectrum disorders (ASD).

Research within cognitive neuroscience has advanced substantially during the past few decades as a result of neuroimaging. This has created a heightened interest among educators and those interested in understanding how individuals acquire, process, and remember information (Ansari, 2015). Translation of this expanding body of research for educator usage has not occurred as quickly as the research itself and requires individuals who are knowledgeable in both cognitive neuroscience and education (Ansari, 2015). Premature translation may result in strategies and interventions that may prove to be ineffective in the classroom (Horvath & Lodge, 2016). Everyday learning environments are complex with multiple variables that impact learning, and outcomes vary within the nuances of each situation. Most learning tasks involve multiple cognitive processes that are measured with a performance or behavioral outcome, and the individuality of each learner must be taken into consideration when implementing any

learning strategy (De Smedt, 2014; Horvath & Lodge, 2016).

Neuroscientific data collected within laboratory settings involve basic tasks and specific cognitive processes that are measured with a physiological outcome. Successful translation of these data into an instructional strategy for use in learning environments must take into consideration the level of complexity within those environments (Ansari, 2015; De Smedt, 2014). Any proposed instructional program or strategy that is based on neurological studies must first go through rigorous empirical testing within educational settings before it can be considered an evidence-based practice (Cook et al., 2014). Even then, those findings often have external validity issues and cannot be generalized to different settings or groups of students (Horvath & Lodge, 2016; Odom et al., 2005).

This paper will provide a brief overview of

four important areas of brain research: sensory processing (Wigham, Rodgers, South, McConachie, & Freeston, 2015), executive function (Wertz, 2012), psychological awareness and memory (Lind, 2010), and social competence (Carter et al., 2014). Based on current research in these areas, this paper will also translate the research and identify suggested methods that may assist teachers in preparing appropriate activities and interventions for children and adolescents with autism or autism spectrum disorders (ASD). Autism spectrum disorder (ASD) is an early-onset neurodevelopmental disorder characterized by impairments in social communication, interaction, and stereotyped or repetitive behaviors and interests (APA, 2013).

Sensory Processing

Sensory processing, which was originally called sensory integration dysfunction (SID) (Ayres, 1972), refers to the way the nervous system receives messages from the senses and turns them into appropriate motor and behavioral responses. The primary function of the human brain is to receive, process, organize, interpret and respond to sensory stimuli received through various senses (e.g., visual, tactile, auditory, olfactory and vestibular) (Chang et al., 2014). The *DSM-5* (APA, 2013) includes “hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment” as a diagnostic criterion for ASD (p. 50). Research suggests individuals with ASD process sensory information differently than individuals without ASD (Kern et al., 2006). It is estimated that between 45 - 95% of individuals with ASD have sensory processing difficulties (Ben-Sasson et al., 2009; Lane, Young, Baker & Angley, 2010). Challenges with sensory processing can cause children with ASD to be hypersensitive and/or hyposensitive in one or multiple domains. Similar to ASD, sensory

processing difficulties also fall on a spectrum. Individuals with autism may face sensory challenges in classroom settings (Marco, Hinkley, Hill, & Nagarajan, 2011). See Table 1 for examples of responses to sensory stimuli.

Implications

Sensory issues can affect all areas of an individual’s life (e.g., memory, language development, communication and social skills, along with the ability to stay focused and emotionally stable). According to Marco, Hinkley, Hill and Nagarajan (2011), sensory processing difficulties “may actually cause core features of autism” (p. 9) such as language deficits stemming from difficulties in processing auditory stimuli and inability to recognize facial emotions due to difficulties in processing visual stimuli. Another core characteristic of ASD, repetitive and rigid behaviors, may also be related to sensory processing difficulty. In a study by Wigham, Rodgers, South, McConachie and Freeston (2015), sensory under responsiveness and sensory over-responsiveness were positively and significantly associated with repetitive and rigid behaviors among 53 children with autism between the ages of 8 and 16 years.

There is high co-morbidity between ASD and anxiety disorders (Vasa et al., 2014). Research suggests there may be a positive association between this co-morbidity and sensory processing difficulties. Green, Ben-Sasson, Soto, and Carter (2012) conducted a study with 149 toddlers with ASD and found an uni-directional relationship between sensory over-responsiveness and anxiety. Specifically, Green and colleagues found sensory overload and overstimulation was an adequate predictor of anxiety in toddlers. Self-care and social skills are other areas that may be impacted by sensory processing difficulties in individuals with ASD. Although there is limited research showing

Table 1. *Response to Sensory Stimuli*

Hyper-Sensitivity	Sensory Avoidance Behavior
Auditory	Attempts to leave environments that are loud: (e.g., vacuum cleaner, fire alarms)
Visual	Covering eyes: (e.g., bright lights)
Vestibular	Anxiety: (e.g., travel sickness)
Tactile	Pushing others away when being touched
Olfactory	Attempts to leave environments when certain smells are present
Hypo-Sensitivity	Sensory Seeking Behavior
Auditory	Listening to loud music
Visual	Twisting fingers in front of eyes
Vestibular	Rocking, swirling
Tactile	Touching others, scratching oneself
Olfactory	Sniffing others' hair and skin

the effectiveness of occupational therapy using sensory integration, a randomized clinical trial conducted by Schaaf et al. (2014) suggested a positive relationship between the ability to modulate sensation and behavioral regulation, which could lead to greater participation in self-care and social behaviors. Taken together, these studies suggest a positive association between brain-related sensory issues and challenges faced by children with ASD.

Implications for the Classroom

It is imperative for teachers to understand the impact sensory processing issues can have on the social, emotional and physical behaviors of students with ASD. Research proposes the need for sameness, thus rigid and repetitive behaviors may function as coping mechanisms to address sensory over- and understimulation present in the environment (Ashburner, Ziviani, & Rodger, 2008). To

successfully address sensory needs of students with ASD in their classrooms, teachers must collaborate with occupational therapists so they understand the sensory profile of these students. Knowledge of students' sensory profiles and identification of the functions of their behavior(s) will enable teachers to differentiate between over- or under-reaction to sensory stimuli stemming from sensory processing issues.

Table 1 illustrates some examples of how children with ASD may respond to sensory stimuli and engage in behaviors that may be misconstrued as inappropriate. For example, a student who has difficulty regulating auditory sensory stimuli may become uncomfortable and restless in the presence of loud noises like fire alarms and vacuum cleaners and attempt to leave the environment. In this instance, the attempt to leave the environment is a coping behavior and must not be labeled an inappropriate behavior. Another important characteristic of a sensory processing issue with which teachers must be familiar is the variation present within and across sensory domains (Marco, Hinkley, Hill, & Nagarajan, 2011). For example, the same student who is hypersensitive and attempts to leave an environment and avoid loud noises, may listen to loud music in another environment due to his/her hyposensitivity to auditory stimuli.

Researchers suggest teachers must be mindful of how they arrange classroom spaces and seating assignments, the pace and mode of delivering their instruction, and the importance of providing predictable activities and environments (Ashburner, Ziviani, & Rodger, 2008). Setting up classroom spaces that are clutter free and allow for free and ample movement will cater to the needs of students with vestibular sensory challenges. For a student who is

hypersensitive to auditory stimuli, it will behoove the teacher to provide instruction using visual aids and materials. Similarly, for a student who is hypersensitive to touch, the teacher may consider not assigning group work as classmates may inadvertently touch each other. Finally, classrooms with students who have sensory issues must have a place that is a safe and secure retreat when overwhelmed and anxious.

Executive Function

A second area researched over the past 20 years that may impact the behavior of children with ASD is that of Executive Function (Banich, 2009; Best & Miller, 2011; Blakemore & Choudhury, 2006; Zelazo, 2010). A current definition of executive function is “a set of processes that all have to do with managing oneself and one’s resources in order to achieve a goal” (Cooper-Kahn & Dietzel, 2017, “A Formal Definition of Executive Functioning”, para 1). In other words, it can be considered an umbrella term for those brain based skills that involve mental control and self-regulation. Other researchers define it similarly although they often include essential components for academic success (Bozeday, n.d.) and also processes and skills that address behavior control and supportive activities for planning and focused attention (Knapp & Morton, 2013; Meuwissen, 2015).

Components of Executive Function

Blakemore and Choudhury (2006) named the skills of selective attention, decision making, voluntary response inhibition and working memory as components of executive function. They believed each of the parts of executive function has a role in the development of cognitive control, thus allowing us to filter out what is unimportant and focus on what is important. Zelazo, Blair, and Willoughby (2016) agreed and stated the main focuses of executive function are the

attention regulation skills that assist the individual in focusing and sustaining attention in order to keep goals and information in mind, resisting distracting events, tolerating frustrations that may occur and considering past, present, and future actions when presented with a novel situation. Meuwissen (2015) agreed with this general concept of what is included in the overarching term “executive function” but combined all the skills into three components: Working Memory, that is, the capacity to hold and work with more than one piece of information at a time; Cognitive Flexibility, that is, the capacity to change behavior(s) to fit the situation or to see a situation from another person’s perspective or viewpoint; and Inhibitory Control, that is, the ability to control one’s own body and resist impulsive responses to distraction.

Areas of the Brain Involved in the Development and Organization of Executive Function

Early research focused on the pre-frontal cortex of the brain as the site of executive function (e.g., Alvarez & Emory, 2006; Best & Miller, 2011). According to Meuwissen (2015) the prefrontal cortex is the main focus of executive function although it is now recognized that other parts of the brain are also involved. According to Alvarez and Emory (2006) the areas of the pre-frontal cortex that are now being considered as important in the development of executive function include three specific areas. The first is the dorsolateral prefrontal cortex (DLPFC), which is involved with processing information and with the ability to maintain and shift one’s thinking along with problem solving, working memory, organizational skills, and abstract thinking (Alvarez & Emory, 2006; Clark et al., 2008). The area that is now believed to be involved is the anterior cingulate cortex (ACC), which focuses on emotional drives and may be

implicated in the inhibition of inappropriate responses, decision making behaviors and motivation (Lezak, Howieson, & Loring, 2004). The final area that is being studied is the orbitofrontal cortex (OFC), which has a role in impulse control, self-monitoring of behavior, and evaluating emotional experiences (Ross & Grabenhorst, 2008).

Implications for the Classroom

Researchers indicate executive function skills are essential for students to be successful in schools (Greenstone, 2011) and teachers must design their classroom goals to address all areas of executive function needs (Unknown, 2012). According to Bozeday (n.d.), teachers should teach executive function skills. Although early education has been the focus of the early research, there has also been a move to address the needs of elementary age and middle-school age children who are having difficulties with the skills involved in executive function, especially with self-regulation of behavior. Research according to Zelazo et al. (2016) emphasizes the need to focus on teaching students the specific executive function skills of cognitive flexibility, working memory, and inhibitory control. In addition, common accommodations may need to be used by teachers such as providing step-by-step instructions, posting schedules of directions, preparing a daily to do list, and providing test formats ahead of time (Morin, 2017).

There are both direct and indirect activities/strategies that teachers can institute in the classroom. Greenstone (2011) provided a list of direct activities that teachers can use in the classroom. These include time and work organizers, color-coded and/or sectioned notebooks, calendars to keep track of deadlines and monitor progress, task analysis checklists, memory aids such as mnemonics, an understanding of whether they are strong auditory or visual

learners and techniques adapted to those styles (audio recording of classes, detailed written instructions of assignments, etcetera), and opportunities to develop important work habits, such as breaking down problems or projects into manageable “chunks,” realistically estimating time demands, generating alternative solutions and selecting the best one, and taking time to pause, reflect, and consider options before impulsively acting upon a first thought (Greenstone, 2011, pp. 108-109).

Wilkins and Burmeister (2015 a, b) suggested an acronym in order for teachers to prepare strategies to address the executive function needs of those children in their classroom who have this disability. The acronym is FLIPP which stands for Flexibility, Leveled emotionality, Impulse control, Planning/organizing, and Problem solving. To address each of these concerns teachers can provide visual scales to address flexibility, choice cards for those students who have issues with emotionality, cognitive scripts for those students who have difficulty with impulse control, project mapping for students who have difficulties with planning/organizing, and teach metacognitive problem solving for those students who have difficulty with understanding problems and how to identify solutions.

Additional research is being completed in the areas of executive control development through indirect activities such as aerobic exercises, contemplative practices such as mindfulness and yoga, and even video game playing. Mindfulness is also being considered as a possible strategy to assist students with problems in the areas of executive control. Mindfulness research (Teper & Inzlicht, 2013) indicates that it addresses a number of the cognitive processes that are an involved for students

with issues in executive function. These include planning, understanding behavioral rules, attention to the stimuli that is relevant to the activity in the class environment, and inhibition of inappropriate behavior. This early research base indicates that these indirect approaches may also be effective and that teachers might consider their usage in the classroom.

Long-term Memory and Psychological Self-Awareness

There is a bi-directional relationship between memory and the self. When examining long-term memory systems, individuals with autism/ASD show decreased ability in declarative memory, specifically within the episodic memory system (Brezis, 2015; Crane, Pring, Jukes, & Goddard, 2012; Lind, Williams, Bowler, & Peel, 2014; Wojcik, Moulin, & Souchay, 2013). The focus of this section will be on long-term memory, as it relates to episodic autobiographical memory. First, distinctions within declarative memory will be outlined. Next, research explaining the relationship between encoding of autobiographical memories, theory of mind (ToM), and self-concept will be discussed. Finally, instructional strategies, which will provide intentional practices that may strengthen the episodic memory system and reading comprehension for learners with ASD, will be suggested.

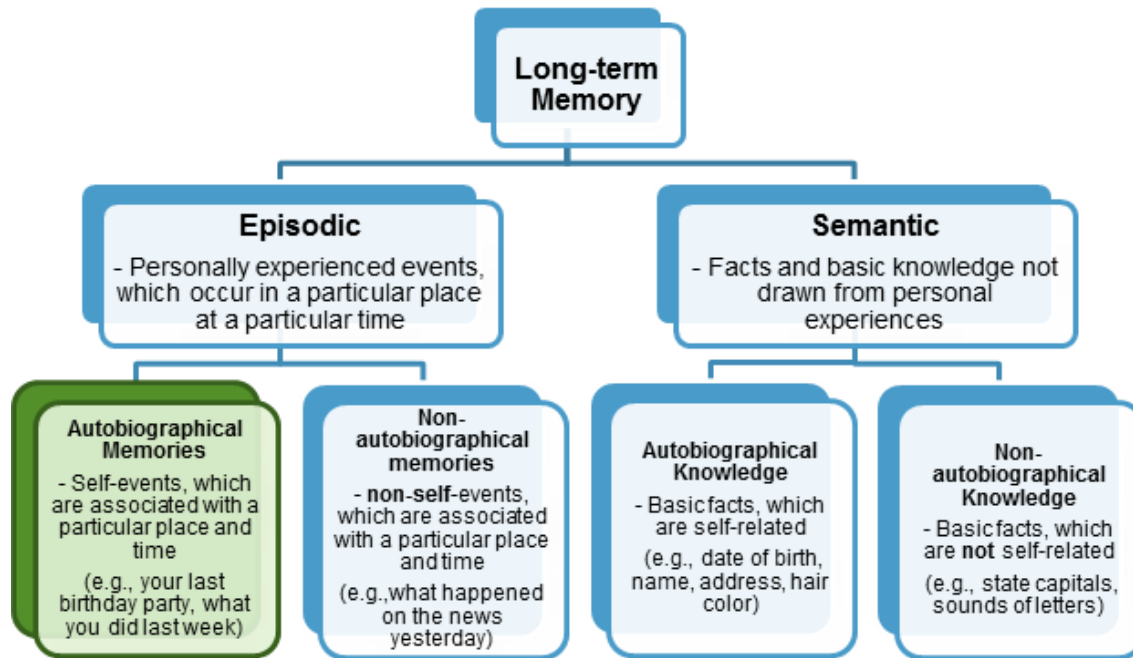
Long-term Memory

The three-store memory model divides memory into sensory, short-term (working memory), and long-term (Atkinson & Shiffrin, 1968). Long-term memory can then be divided into non-declarative memory, which is responsible for skills, emotions, and functions that do not require conscious thought; and declarative memory, which is responsible for semantic knowledge as well as episodic knowledge. Declarative memory consists of both semantic and episodic

memory (see Figure 1). Semantic memory consists of the learning and memory of general facts, while episodic memory consists of personally remembered events that are specific to a particular place and time. Semantic and episodic are two distinct declarative memory systems, but they still interact with one another (Tulving, 1972, 2002). Both semantic and episodic memory can be further broken down into autobiographical and non-autobiographical distinctions (Lind, 2010). Autobiographical memories and knowledge relate directly to the self; non-autobiographical memories and knowledge are non-self-related.

Semantic memory involves the storage of facts and bits of knowledge, which may be connected to oneself (semantic autobiographical knowledge) or non-self-related information (semantic non-autobiographical knowledge). An example of semantic autobiographical knowledge would include facts about the color of your own hair and eyes or your own home address. Semantic non-autobiographical knowledge would include all of the other non-self-related facts (e.g., state capitals, the specific names and facts about dinosaurs). Within these two areas of semantic memory, individuals with and without autism show nearly the same ability (Brezis, 2015; Lind, 2010, Wojcik, Moulin, & Souchay, 2013). Episodic memory is a powerful long-term memory system in which memories are associated with a particular time and place. An example of an episodic autobiographical memory would be remembering your own birthday party; whereas, a non-autobiographical memory would be remembering what happened in the news yesterday (Lind, 2010). There is still a particular time and place attached for both of these examples, but remembering what was on the news yesterday is non-self-related.

Figure 1. Long-term Memory



Note. Adapted from Lind, 2010

Implications

In most ASD studies, children with autism show no impairment in their semantic knowledge, but show deficits within the episodic memory system, specifically with the processes of encoding, consolidation, and retrieval of autobiographical memories (Brezis, 2015; Crane et al., 2012; Goddard et al., 2007; Lind et al., 2014; Wojcik, Moulin, & Souchay, 2013). The reasons for this impairment within individuals with autism are an on-going debate with several theories. One theory explores memory binding issues within the episodic memory buffer (Lind et al., 2014); some researchers attribute the deficit to visual processing/visual memory (Goddard et al., 2007); while another theory asserts that a diminished self-concept inhibits autobiographical encoding (Goddard et al., 2007; Toichi, et al., 2002). How these mechanisms interact with one another and exactly what role they play in autobiographical memory is still being explored.

Self-concept refers to our understanding of ourselves, including attitudes, beliefs, and ideas. A person's level of self-concept is directly associated with his or her ability to encode events about oneself (Goddard et al., 2007; Lind, 2010; Rogers, Kuiper, & Kirker, 1977; Toichi, et al., 2002). Children with ASD often show diminished psychological self-knowledge. Even though physical self-knowledge is typical to their peers (knowledge of their own name, date of birth, hair color, etc.), many individuals have shown an under-developed self-concept. Self-concept relies more on beliefs about oneself. For example, "I am a good friend" or "I am a kind person", which includes a mental picture of whom we are as a person (Lind, 2010).

Individuals with ASD also often show impaired abilities when performing ToM tasks (Baron-Cohen, Leslie, & Frith, 1985; Perner, Frith, Leslie, & Leekam, 1989; Ullman & Pullman, 2015) as well as Self-

reference tasks (Henderson et al., 2009; Lombardo, Barnes, Wheelwright, & Baron-Cohen, 2007; Toichi et al., 2002). Theory of mind involves the capacity to understand the mental states, emotions, beliefs and perspectives of someone different from ourselves (Premack, & Woodruff, 1978). Self-reference effect refers to the phenomenon that encoding for memory is enhanced when information is self-relevant or related to the self (Rogers, Kuiper, & Kirker, 1977). Theory of mind, self-reference effect, and autobiographical memory, all hinge on one's self-concept (Kimhe, 2014; Henderson et al., 2009; Lind, 2010; Lombardo, Barnes, Wheelwright, & Baron-Cohen, 2007; Toichi et al., 2002), and all three of these processes show similar brain activation patterns within the default network (Buckner, Andrews-Hanna, & Schacter, 2008).

Implications for the Classroom

Instructional strategies that utilize ToM are frequently implemented within classrooms. These activities can include role play or symbolic play (Lam, & Yeung, 2012), reading comprehension strategies, and perspective writing (Kimhe, 2014). Autobiographical memory, ToM, and reading comprehension have all been correlated with one another. In learners with ASD, a deficit in one area, usually means a deficit in the other two (Adler, Nadler, Eviatar, & Shamay-Tsoory, 2010; Kimhe, 2014).

Extra support during reading activities (summarization or retelling a story, characterization, and predicting) is essential even when reading fluency is strong. Learners with autism can show high reading fluency, but still have difficulty with reading comprehension and vocabulary (Kimhi, 2014; O'Connor, & Klein, 2004), especially around grades three and four and then again

around grades seven and eight. In grades three and four, typical reading curricula shifts its emphasis away from decoding words and more toward reading for comprehension (Williamson, Carnahan, & Jacobs, 2012). Within grades seven and eight, the level of text complexity shifts toward stories that use more indirect characterization versus direct characterization. In stories with mostly direct characterization, the author states what the characters are thinking and feeling, but indirect characterization requires the reader to create inferences about the characters' thoughts and emotions based on what they do and say along with how the other characters are reacting to them. Also at this level, the use of figurative language within the selected stories becomes more prevalent. Inferring the meanings of metaphors and similes within the context of the story is also an area in which learners with ASD will require extra supports (Happe, 1995; Kalandadze, Norbury, Nærland, & Næss, 2016).

Prompting students to actively make and revise predictions throughout the reading process and utilizing simple graphic organizers, such as a character organizer, are important tools (Kimhi, 2014). Through prompting and guiding students through in-depth discussions about the characters within a story and by identifying specific attributes of the characters, students can begin to identify which characteristics also apply to themselves, thus strengthening self-concept as well as reading comprehension. Many of us have read a good novel or story in which there was a character through which we identified. Essentially, by getting to know that character, we can also better understand ourselves, which relates directly to improved idea of self (Williamson, Carnahan, & Jacobs, 2012).

Perspective taking along with point of view visualization and writing are extremely

valuable activities for practicing both ToM (Tsunemi, Tamura, Ogawa, Isomura, & Masataka, 2014) and empathy building (Gaesser & Schacter, 2014). Essentially, while reading a story, the reader visualizes himself as part of the storyline. This is a common reading comprehension strategy that requires active practice through prompts and discussions. Older learners with ASD can be prompted to take this strategy to the next level through creating a new character for himself who travels alongside the protagonist. This character/persona can possess similar or different traits when compared to their own self. Learners then journal from a first-person point of view as that character. Through this vicarious process, learners think prospectively about not only how they would react, but how someone unlike themselves might react to various events within the storyline. You can see the implications for how this very introspective process can improve knowledge of self. Point of view visualization and writing show nearly the same brain activation patterns on fMRI scans as autobiographical memory retrieval (Buckner & Carroll, 2007; Hassabis & Maguire, 2007; Schacter, Addis, & Buckner, 2008; Schacter et al., 2012). It is also no surprise that there is an association between viewpoint visualization and writing with increased empathy (Gaesser & Schacter, 2014).

In summary, self-concept is directly linked to our ability to encode autobiographical episodic memories. Self-concept can potentially be improved through ToM activities along with increased focus on reading comprehension strategies, which involve close study of the characters within a story. Teachers can use intentional prompts, which walk students through visualizing themselves as part of the story, and then pose questions, which ask students how they

would react and feel as a result of the events unfolding throughout the story, to build both ToM and reading comprehension skills. And finally, students with autism can create a character through which they journal in the first-person perspective, their reactions, thoughts, and emotions in response to various events within the storyline.

Social Competence

This section provides a brief overview of an important area of brain research associated with social competence of students with autism and how the information can be translated into effective practices for educators. Social impairment is a core diagnostic feature of autism spectrum disorder (ASD), and context appropriate differentiation of self and others is considered as the core of many social cognition deficits present (Hoffmann, Koehne, Steinbeis, Dziobek, & Singer, 2016). Structural and functional abnormalities of the right temporo-parietal junction (rTPJ) have been linked to social cognition deficits (Castelli, Frith, Happe', & Frith, 2002; David et al. 2014). Recent research suggests that self-other distinction in the emotional domain may be sub-served by brain regions that are part of the temporo-parietal cortex, but slightly more anterior to TPJ, namely the right supramarginal gyrus (rSMG) (Hoffmann et al., 2016).

Researchers implicate the posterior superior temporal sulcus (STS) as a key factor in behaviors often associated with students with ASD (Pelphrey, Shultz, Hudac, & Vander Wyk, 2011). This region, particularly the posterior STS in the right hemisphere, analyzes biological motion cues, including eye, hand, and other body movements, to interpret and predict the actions and intentions of others (Bonda, Petrides, Ostry, & Evans, 1996; Pelphrey, Morris, Michelich, Allison, & McCarthy, 2005). Failing to read

intentions may play a role in STS dysfunction. These findings indicate that the posterior STS is the component of the neural system supporting social perception (Pelphrey et al., 2011). Research demonstrates that individuals with ASD exhibit deficits in understanding the intentions and mental states of others.

Social difficulties appear to be associated with deficits in three social cognition processes: theory of mind (ToM), emotion recognition, and executive functioning (EF). Two of the three processes, ToM and executive function, have been addressed in previous sections. Deficits in emotion recognition involve an inability to recognize facial expressions of emotion and voice (Happé & Frith, 2014; Ryan & Charragáin, 2010). Individuals with autism have difficulties in recognizing their emotions and others' (Lacava, Golan, Baron-Cohen, & Myles, 2007).

Implications for the classroom

There are a variety of approaches that focus on social skills behaviors and technology that research indicates may be effective in a classroom setting to address social difficulty issues. Within this section, several of these examples will be discussed.

Social Skills Interventions

Most studies have focused on capturing improvements in discrete skills (e.g., initiations, eye gaze) and interaction patterns (social interactions, reciprocity). Transformation of students' self-perceptions, social status, peer affiliations, friendship quality, and quality of life have been conducted through perspective studies (Carter et al., 2014). Researchers implemented didactic social skill-based and social activity-based interventions in school environments and reported that social skills groups conducted in school settings can

affect both peer engagement during recess as well as peer acceptability. Their social networks were also improved (Kasari et al., 2016).

One well known intervention is Social Stories, which are used to help individuals with ASD understand complex social situations (Gray, 2017; Styles, 2011). The expectations for the student as well as the appropriate behaviors in a certain social situation are described in the stories. The stories are either directly read by the child or someone reads them to the child; then the child is expected to perform the behavior in a related social context. The study showed mother-delivered social stories were effective in teaching social skills to children with ASD and could maintain and generalize their acquired skills (Acar, Tekin-Iftar & Yikmis, 2017).

Behavioral Interventions

Behavior-based interventions have been identified as effective strategies in teaching social interaction skills for children with autism in general education and in inclusive settings. Early interventions in inclusive classroom settings may provide more opportunities for children with ASD to be socially accepted and successfully participate in the general education. The studies have implemented peer or adult modeling, instructional strategies of prompting hierarchies (most-to-least or least-to-most prompting) and/or positive reinforcement (Camargo et al., 2016).

One behavioral intervention supported by research is peer-mediated interventions (PMI). This intervention may increase social interaction in children and young adults with ASD in inclusive settings, with positive generalization, maintenance, and social validity outcomes (Watkins et al., 2015). The study showed that the intervention was more

effective in enhancing social response with the involvement of peers; siblings; family members; school staff; when taking place at home; as well as when taking place in integrated or segregated classrooms (Zhang & Wheeler, 2011).

Technological Interventions

The emergence of new technologies is continuously changing how and where adolescents stay connected to one another. Moreover, the increasing accessibility of technology is providing more students with expressive language difficulties a reliable means of communication. These new technologies introduce compelling new vehicles for teaching social-related skills (e.g. video modeling, interactive applications), expanding available communication modes (e.g., speech-generating software), and facilitating social connections (e.g., texting, email, social networking; Carter et al., 2014).

Several studies indicate video self-modeling (VSM) and peer training interventions are evidence-based practices with effective strategies in teaching social skills for children across the autism spectrum. These strategies make expeditious improvements in the social behaviors of children regardless of verbal or cognitive ability (Bellini & Akullian, 2007). The VSM strategy requires recording the child's behavior and editing the footage into 1-2 minute video clips that display positive and efficacious behavior several times a week for 2-8 consecutive weeks (Bellini, Gardner, Hudock, & Kashima-Ellingson, 2016). VSM has been used across multiple disciplines and populations to teach a wide variety of skills including motor behaviors, social skills, communication, self-monitoring, functional living skills, perspective-taking skills, vocational skills, and athletic performance (Bellini & Akullian,

2007; Delano, 2007; Hitchcock, Dowrick, & Prater, 2003).

The iSocial approach as distance education can be used to support schools and youth with high functioning autism to gain social competence through knowledge and social practice in context. The iSocial approach integrated the social competence curriculum into fidelity through 3D virtual learning environments (VLEs) for teaching social skills. Learning outcomes suggested the iSocial approach showed great promise in enhancing social skills that required cognitive and behavioral practices for youth (Stichter et al., 2010; Stichter, Laffey, Galyen, & Herzog, 2014).

Lastly, Rice, Wall, Fogel, and Shic (2015) implemented the FaceSay™ software program as a computer-based social skills intervention to improve the ability of youth with ASD to recognize emotions and understand perspectives of others. FaceSay™ provides students with simulated practices with eye gaze, joint attention, and facial recognition skills. The study showed that the FaceSay™ intervention created positive changes in cognitive and social-skills areas with cost-and time-efficiency.

Individuals with complex emotional, social and behavioral needs necessitate evidence-based interventions that are individualized yet sufficiently broad (Sugai & Horner 2008). Considering the complexity of deficits for individuals with autism, interventions that specifically target social deficits and use cognitive strengths are needed (Stichter et al., 2010). Each intervention must be differentiated in order to meet the multifaceted needs of each individual student (Carter et al., 2014). Generalization for research studies requires that students learn and practice social-related skills in context (Bellini, Peters, Brianner, & Hopf, 2007).

Intervention approaches that engage peers and families may be impactful in providing students with ASD the skill opportunities to be socially valid and meaningful. School teams (including paraprofessionals, related service providers, general educators, and special educators) play important roles in delivering the interventions (Carter et al., 2014).

Conclusion

Although the research related to the brain and individuals with autism is ongoing, it is imperative that teachers be aware of how this information can provide insight into the needs of students within their classrooms while also remaining cautious of educational programs and strategies that have not yet been rigorously researched within classroom settings and with a variety of learners. In this

paper, the authors discussed four areas of recent research that may have implications for classroom settings (i.e., sensory processing, executive function, psychological awareness and memory, and social competence) and provided suggestions for a variety of instructional strategies and resources. Table 2 outlines additional resources that may be useful for teachers, students, and parents. Teachers are under considerable pressure to show student growth and achievement while also being inundated by new research, instructional programs, and strategies. The authors hope that this summary of research and suggested strategies can provide teachers added resources when supporting their students with autism spectrum disorder.

Table 2. *Resources for Classroom Teachers*

Essential Area	Approaches
Sensory Processing	<ul style="list-style-type: none"> • 101Games and Activities for Children with Autism, Asperger’s and Sensory Processing Disorders (Deleany, 2009) • Documentary: “Spectrum: A Story of the Mind” (PBS, 2017)
Executive Function	<ul style="list-style-type: none"> • Classroom accommodations for executive functioning issues (Morin, 2017) • Enhancing and practicing executive function skills with children from infancy to adolescence (Zelazo et al., 2016) • FLIPP the switch: Strengthen executive function skills (Wilkins & Burmeister, 2015 a, b) • Lazy kid or executive function? (Landon & Oggel, 2002)
Long-term Memory and Psychological Awareness	<ul style="list-style-type: none"> • Classroom Activities on Perspective-taking (Conflict Resolution Education, n.d.) • Drawing a Blank: Improving Comprehension for Readers on the Autism Spectrum (Iland & Iland, 2011) • How to Teach Perspective-taking to Children (Speech and Language Kids, 2016)
Social Competence	<ul style="list-style-type: none"> • Community-Based LEGO® Social-Skills Program (Jeffrey, Matheson, & Hutchinson, 2015) • Computer-Assisted Face Processing Instruction Improves Emotion Recognition, Mentalizing, and Social Skills (Rice et al., 2014) • Training Facial Expression Production (Gordon, Pierce, Bartlett & Tanaka, 2014) • Training Paraprofessionals (Koegel, Kim, & Koegel, 2014)

References

- Acar, C., Tekin-Iftar, E. E., & Yikmis, A. (2017). Effects of mother-delivered social stories and video modeling in teaching social skills to children with autism spectrum disorders. *Journal of Special Education, 50*, 215-226. doi:10.1177/0022466916649164
- Adler, N., Nadler, B., Eviatar, Z., & Shamay-Tsoory, S. G. (2010). The relationship between theory of mind and autobiographical memory in high-functioning autism and Asperger syndrome. *Psychiatry Research, 178*, 214-216. doi:10.1016/j.psychres.2009.11.015
- Alvarez, J. A., & Emory, E. (2006). Executive function and the prefrontal lobes: A meta-analytic review. *Neuropsychology Review, 16*, 17-42. doi: 10.1007/s11065-006-9002-x
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Association.
- Ansari, D. (2015). Mind, brain, and education: A discussion of practical, conceptual, and ethical issues. In J. Clausen & N. Levy, (Eds.), *Handbook of Neuroethics* (pp. 1703-1719). Netherlands: Springer. doi: 10.1007/978-94-007-4707-4_146
- Ashburner, J., Ziviani, J., & Rodger, S. (2008) Sensory processing and classroom emotional, behavioral, and educational outcomes in children with autism spectrum disorder. *Australian Journal for Occupational Therapy, 62*, 564-573. doi: 10.5014/ajot.62.5.564.
- Asperger, H. (1944). Die “Autistischen Psychopathen” im Kindesalter. *European Archives of Psychiatry and Clinical Neuroscience, 117*, 76–136. doi: 10.1007/BF01837709
- Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. *Psychology of Learning and Motivation, 2*, 89-195.
- Ayres, A. J. (1972). *Sensory integration and learning disorders*. Los Angeles: Western Psychological Services.
- Banich, M. T. (2009). Executive function: The search for an integrated account. *Current Directions in Psychological Science, 18*, 89-94.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a ‘theory of mind’? *Cognition, 21*, 37–46.
- Baron-Cohen, S., Golan, O., Chapman, E., & Granader, Y. (2007). Transported to a world of emotion. *The Psychologist, 20*, 76–77.
- Baron-Cohen, S., Ring, H. A., Wheelwright, S., Bullmore, E. T., Brammer, M. J., Simmons, A., & Williams, S. (1999). Social intelligence in the normal and autistic brain: An fMRI study. *European Journal of Neuroscience, 11*, 1891–1898. doi: 10.1046/j.1460-9568.1999.00621.x
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The reading the mind in the eyes test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42*, 241–251. doi: 10.1111/1469-7610.00715
- Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. *Exceptional Children, 73*, 264-287.
- Bellini, S., Gardner, L., Hudock, R., & Kashima-Ellingson, Y. (2016). The use of video self-modeling and peer training to increase social engagement in preschool children on the autism spectrum. *School Psychology Forum, 10*, 207-219.
- Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special*

- Education*, 28, 153-162.
- Ben-Sasson, A., Hen, L., Fluss, R., Cermak, S. A., Engel-Yeger, B., & Gal, E. (2009). A meta-analysis of sensory modulation symptoms in individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 39, 1-11.
- Best, J. R., & Miller, P. H. (2011). A developmental perspective on executive function. *Child Development*, 81, 1641-1660.
- Blakemore, S.-J., & Choudhury, S. (2006). Development of the adolescent brain: Implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry*, 47, 296-312. doi: 10.1111/j.1469-7610.2006.01611.x
- Bonda, E., Petrides, M., Ostry, D., & Evans, A. (1996). Specific involvement of human parietal systems and the amygdala in the perception of biological motion. *Journal of Neuroscience*, 16, 3737-3744.
- Bozeday, G. (n.d.). *Executive function skills*. Retrieved from <http://www.store.schoolspecialty.com>
- Brezis, R. S. (2015). Memory integration in the autobiographical narratives of individuals with autism. *Frontiers in Human Neuroscience*, 9. doi: 10.3389/fnhum.2015.00076
- Buckner, R. L., Andrews-Hanna, J. R., & Schacter, D. L. (2008). The brain's default network. *Annals of the New York Academy of Sciences*, 1124, 1-38. doi: 10.1196/annals.1440.011
- Buckner, R., & Carroll, D. (2007). Self-projection and the brain. *Trends in Cognitive Sciences*, 11, 49-57. doi:10.1016/j.tics.2006.11.004
- Camargo, S., Rispoli, M., Ganz, J., Hong, E., Davis, H., & Mason, R. (2016). Behaviorally based interventions for teaching social interaction skills to children with ASD in inclusive settings: A meta-analysis. *Journal of Behavioral Education*, 25, 223-248. doi:10.1007/s10864-015-9240-1
- Carter, E. W., Common, E. A., Sreckovic, M. A., Huber, H. B., Bottema-Beutel, K., Gustafson, J. R., & Hume, K. (2014). Promoting social competence and peer relationships for adolescents with autism spectrum disorders. *Remedial and Special Education*, 35, 91-101. doi: 10.1177/0741932513514618
- Castelli, F., Frith, C., Happé, F., & Frith, U. (2002). Autism, Asperger syndrome and brain mechanisms or the attribution of mental states to animated shapes. *Brain*, 125, 1839-1849. doi: 10.1093/brain/awf189
- Cook, B., Buysse, V., Klingner, J., Landrum, T., McWilliam, R., Tankersley, M., & Test, D. (2014). Council for Exceptional Children: Standards for evidence-based practices in special education. *Teaching Exceptional Children*, 46, 206.
- Chang, S.-Y., Owen, J. P., Desai, S. S., Hill, S. S., Arnett, A. B., Harris, J., & Mukherjee, P. (2014). Autism and sensory processing disorders: Shared white matter disruption in sensory pathways but divergent connectivity in social-emotional pathways. *PLOS ONE*, 9 (7): e103038. doi:10.1371/journal.pone.0103038
- Clark, L., Bechara, A., Damasio, H., Aitken, M. R. F., Sahakian, B. J. & Robbins, T. W. (2008). Differential effects of insular and ventromedial prefrontal cortex lesions on risky decision making. *Brain*, 131, 1311-1322. doi: 10.1093/brain/awn066
- Conflict Resolution Education. (n.d.). Perspective checking: Classroom activities on perspective taking. Retrieved from http://www.creducation.org/resources/perception_checking/classroom_activities_on_perspective_taking.html

- Cooper-Kahn, J. & Dietzel, J. (2008). *What is executive functioning?* Reprint (2017) at www.ldonline.org from Cooper-Kahn, J. & Dietzel, J. (2008). *Late, lost, and unprepared* (pp. 9-14). Bethesda, MD: Woodbine House.
- Crane, L., Pring, L., Jukes, K., & Goddard, L. (2012). Patterns of autobiographical memory in adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *42*, 2100-2112. doi: 10.1007/s10803-012-1459-2
- David, N., Schultz, J., Milne, E., Schunke, O., Schöttle, D., Münchau, A., ... Engel, A. (2014). Right temporoparietal gray matter predicts accuracy of social perception in the autism spectrum. *Journal of Autism and Developmental Disorders*, *44*, 1433–1446. doi: 10.1007/s10803-013-2008-3
- Delano, M. E. (2007). Video modeling interventions for individuals with autism. *Remedial and Special Education*, *28*, 33-42.
- De Smedt, B. (2014). Advances in the use of neuroscience methods in research on learning and instruction. *Frontline Learning Research*, *2*, 7-14. doi: 10.14786/flr.v2i4.115
- Frith, U. (Ed.). (1991). *Autism and Asperger Syndrome*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511526770
- Frith, C. D., & Frith, U. (2012). Mechanisms of social cognition. *Annual Review of Psychology*, *63*, 287–313. doi: 10.1146/annurev-psych-120710-100449
- Gaesser, B., & Schacter, D. L. (2014). Episodic simulation and episodic memory can increase intentions to help others. *Proceedings of the National Academy of Sciences*, *111*, 4415-4420. doi: 10.3389/fpsyg.2012.00576
- Goddard, L., Howlin, P., Dritschel, B., & Patel, T. (2007). Autobiographical memory and social problem-solving in Asperger syndrome. *Journal of Autism and Developmental Disorders*, *37*, 291-300. doi: 10.1007/s10803-006-0168-0
- Gray, C. (2017). Social Stories. Retrieved from <http://carolgraysocialstories.com/social-stories/>
- Green, S. A., Ben-Sasson, A., Soto, T. W., & Carter, A. S. (2012). Anxiety and sensory over-responsivity in toddlers with autism spectrum disorder: Bidirectional effects across time. *Journal of Autism and Developmental Disorder*, *42*, 1112 -1119. doi: 10.1007/s10803-011-1361-3
- Gordon, I., Pierce, M., Bartlett, M., & Tanaka, J. (2014). Training facial expression production in children on the autism spectrum. *Journal of Autism & Developmental Disorders*, *44*, 2486-2498. doi:10.1007/s10803-014-2118-6
- Greenstone, H. (2011). Executive function in the classroom: Neurological implications for classroom intervention. *Learning Landscapes*, *5*, 101-114.
- Happé, F. G. (1995). Understanding minds and metaphors: Insights from the study of figurative language in autism. *Metaphor and Symbol*, *10*, 275-295.
- Happé, F., & Frith, U. (2014). Annual research review: Towards a developmental neuroscience of atypical social cognition. *Journal of Child Psychology and Psychiatry*, *55*, 553-577.
- Hassabis, D., & Maguire, E. (2007). Deconstructing episodic memory with construction. *Trends in Cognitive Sciences*, *11*, 299-306. doi:10.1016/j.tics.2007.05.001
- Henderson, H. A., Zahka, N. E., Kojkowski, N. M., Inge, A. P., Schwartz, C. B., Hileman, C. M., & Mundy, P. C. (2009). Self-referenced memory, social cognition, and symptom presentation in autism. *Journal of Child Psychology and Psychiatry*, *50*, 853-861. doi: 10.1111/j.1469-7610.2008.02059.x
- Hitchcock, C. H., Dowrick, P. W., & Prater, M. A. (2003). Video self-modeling intervention in school-based settings: A review. *Remedial and Special Education*, *24*, 36-45.

- Hoffmann, F. H., Koehne, S., Steinbeis, N., Dziobek, I., & Singer, T. (2016). Preserved self-other distinction during empathy in autism is linked to network integrity of right supramarginal gyrus. *Journal of Autism & Developmental Disorders*, *46*, 637-648. doi: 10.1007/s10803-015-2609-0
- Horvath, J. C., & Lodge, J. M. (2016). A framework for organizing and translating science of learning research. In J. C. Horvath., J. M. Lodge, & J. Hattie. (Eds.), *From the laboratory to the classroom: Translating science of learning for teachers*, (pp. 7-20). London: Routledge.
- Iland, E. D., & Iland, M. E. (2011). *Drawing a blank: Improving comprehension for readers on the autism spectrum*. Shawnee Mission, KS: AAPC Publishing.
- Jeffrey, W. H., Matheson, I. A., & Hutchinson, N. L. (2015). An exploration of a community-based LEGO® social-skills program for youth with autism spectrum disorder. *Exceptionality Education International*, *25*, 13-32.
- Kalandadze, T., Norbury, C., Nærland, T., & Næss, K. A. B. (2016). Figurative language comprehension in individuals with autism spectrum disorder: A meta-analytic review. *Autism*. doi: 10.1177/1362361316668652
- Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., ... King, B. (2016). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology & Psychiatry*, *57*, 171-179. doi:10.1111/jcpp.12460
- Kern, J. K., Trivedi., M. H., Garver, C. R., Grannemann, B. D., Andrew, A. A., Salva, J. S., & Schroeder, J. L. (2006). The pattern of sensory processing abnormalities in autism. *Autism*, *10*, 480-494. doi: 10.1177/1362361306066564
- Kimhi, Y. (2014). Theory of mind abilities and deficits in autism spectrum disorders. *Topics in Language Disorders*, *34*, 329-343. doi: 10.1097/TLD.0000000000000033
- Knapp, K., & Morton, B. (2013). Brain development and executive functioning. In B. Morton, Executive functions, *Encyclopedia on Early Childhood Development* (pp. 6-11). Retrieved from <http://www.child-encyclopedia.com/executive-functions/>
- Koegel, R. K., Kim, S., & Koegel, L. (2014). Training paraprofessionals to improve socialization in students with ASD. *Journal of Autism & Developmental Disorders*, *44*, 2197-2208. doi:10.1007/s10803-014-2094-x
- Kretzmann, M. (2008). *ENGAGE social skills groups*. Unpublished manual, UCLA.
- Lacava, P. G., Golan, O., Baron-Cohen, S., & Myles, B. S. (2007). Using assistive technology to teach emotion recognition to students with Asperger syndrome: A pilot study. *Remedial and Special Education*, *28*, 174-181.
- Lam, Y. G., & Yeung, S. S. S. (2012). Cognitive deficits and symbolic play in preschoolers with autism. *Research in Autism Spectrum Disorders*, *6*, 560-564. doi: 10.1016/j.rasd.2011.07.017
- Landon, T., & Oggel, L. (2002). Lazy kid or executive dysfunction? *CCC-SLP Innovations & Perspectives*, *5*, 1-2. Retrieved from <http://ldonline.org>
- Lane, A. E., Young, R. L., Baker, A. E., & Angley, M. T. (2010). Sensory processing subtypes in autism: Association with adaptive behavior. *Journal of Autism and Developmental Disorders*, *40*, 112-122. doi: 10.1007/s10803-009-0840-2
- Lezak, M. D., Howieson, D. B., & Loring, D. W. (2004). *Neuropsychological assessment* (4th ed.). New York: Oxford University Press.

- Lind, S. E. (2010). Memory and the self in autism: A review and theoretical framework. *Autism, 14*(5), 430-456. doi: 10.1177/1362361309358700
- Lind, S. E., Williams, D. M., Bowler, D. M., & Peel, A. (2014). Episodic memory and episodic future thinking impairments in high-functioning autism spectrum disorder: An underlying difficulty with scene construction or self-projection? *Neuropsychology, 28*, 55. doi: 10.1037/neu0000005
- Lombardo, M. V., Barnes, J. L., Wheelwright, S. J., & Baron-Cohen, S. (2007). Self-referential cognition and empathy in autism. *PLoS One, 2*, e883. doi: 10.1371/journal.pone.0000883
- Marco, J. E., Hinkley, L. B. N., Hill, S. S., & Nagarajan, S. S. (2011). Sensory processing in autism: A review of neurophysiologic findings. *Pediatric Research, 69*, 1-13. doi: 10.1203/PDR.0b013e3182130c54
- Meuwissen, A. (2015). Strengthening executive function in children: Tips for parents and practitioners. *Parent further: A search institute resource for parents*. Retrieved from <http://www.search-institute.org>
- Morin, A. (2017). *At a glance: Classroom accommodations for executive functioning issues*. Retrieved from <https://understood.org>
- O'Connor, I. M., & Klein, P. D. (2004). Exploration of strategies for facilitating the reading comprehension of high-functioning students with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 34*, 115-127. doi:10.1023/B:JADD.0000022603.44077.6b
- Odom, S. L., Brantlinger, E., Gersten, R., Horner, R. H., Thompson, B., & Harris, K. R. (2005). Research in special education: Scientific methods and evidence-based practices. *Exceptional Children, 71*, 137-148.
- Pelphrey, K. A., Morris, J. P., Michelich, C. R., Allison, T., & McCarthy, G. (2005). Functional anatomy of biological motion perception in posterior temporal cortex: An fMRI study of eye, mouth and hand movements. *Cerebral Cortex, 15*, 1866-1876. doi: 10.1093/cercor/bhi064
- Pelphrey, K. A., Shultz, S., Hudac, C. M., & Vander Wyk, B. C. (2011). Research review: Constraining heterogeneity: The social brain and its development in autism spectrum disorder. *Journal of Child Psychology and Psychiatry, 52*, 631-644. doi: 10.1111/j.1469-7610.2010.02349.x
- Perner, J., Frith, U., Leslie, A. M., & Leekam, S. R. (1989). Exploration of the autistic child's theory of mind: Knowledge, belief, and communication. *Child Development, 689-700*. doi: 10.2307/1130734
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 1*, 515-526.
- Public Broadcasting System. (2017). *Spectrum: A story of the mind* [DVD]. Available from <http://www.pbs.org/program/spectrum-story-mind/>
- Rice, L. L., Wall, C., Fogel, A., & Shic, F. (2015). Computer-assisted face processing instruction improves emotion recognition, mentalizing, and social skills in students with ASD. *Journal of Autism & Developmental Disorders, 45*, 2176-2186. doi:10.1007/s10803-015-2380-2
- Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personality and Social Psychology, 35*, 677.

- Ross, E. T., & Grabenhorst, F. (2008). The orbitofrontal cortex and beyond: From affect to decision-making. *Progress in Neurobiology*, *86*, 216-244.
doi:10.1016/j.pneurobio.2008.09.001
- Ryan, C., & Charragáin, C. N. (2010). Teaching emotion recognition skills to children with autism. *Journal of Autism & Developmental Disorders*, *40*, 1505-1511.
doi:10.1007/s10803-010-1009-8
- Schaaf, R. C., Benevides, T., Mailloux, Z., Faller, P., Hunt, J., van Hooydonk, E., ... & Kelly, D. (2014). An intervention for sensory difficulties in children with autism: A randomized trial. *Journal of Autism and Developmental Disorders*, *44*, 1493-1506.
- Schacter, D., Addis, D., Hassabis, D., Martin, V., Spreng, R., & Szpunar, K. (2012). The future of memory: Remembering, imagining, and the brain. *Neuron*, *76*, 677-694.
doi:10.1016/j.neuron.2012.11.001
- Schacter, D., Addis, D., & Buckner, R. (2008). Episodic simulation of future events. *Annals of the New York Academy of Sciences*, *1124*, 39-60. doi: 10.1196/annals.1440.001
- Stichter, J. P., Herzog, M. J., Visovsky, K., Schmidt, C., Randolph, J., Schultz, T., & Gage, N. (2010). Social competence intervention for youth with Asperger Syndrome and high-functioning autism: An initial investigation. *Journal of Autism & Developmental Disorders*, *40*, 1067-1079. doi:10.1007/s10803-010-0959-1.
- Stichter, J. P., Laffey, J., Galyen, K., & Herzog, M. (2014). iSocial: Delivering the social competence intervention for adolescents (SCI-A) in a 3D virtual learning environment for youth with high functioning autism. *Journal of Autism and Developmental Disorders*, *44*, 417-430.
- Styles, A. (2011). Social Stories™: Does the research evidence support the popularity?. *Educational Psychology in Practice*, *27*, 415-436.
- Sugai, G., & Horner, R. H. (2008). What we know and need to know about preventing problem behavior in schools. *Exceptionality*, *16*, 67-77. doi: 10.1080/09362830801981138
- Teper, R. & Inzlicht, T. (2013). Meditation, mindfulness, and executive control: The importance of emotional acceptance and brain-based performance monitoring. *Social Cognitive and Affective Neuroscience*, *8*, 85-92. doi: 10.1093/scan/nss045
- Toichi, M., Kamio, Y., Okada, T., Sakihama, M., Youngstrom, E. A., Findling, R. L., & Yamamoto, K. (2002). A lack of self-consciousness in autism. *American Journal of Psychiatry*, *159*, 1422-1444. doi: 10.1176/appi.ajp.159.8.1422
- Tsunemi, K., Tamura, A., Ogawa, S., Isomura, T., & Masataka, N. (2014). Intensive exposure to narrative in story books as a possibly effective treatment of social perspective-taking in schoolchildren with autism. *Frontiers in Psychology*, *5*, 2. doi: 10.3389/fpsyg.2014.00002
- Tulving, E. (1972). Episodic and semantic memory 1. *Organization of Memory*. London: *Academic*, *381*, 382-404.
- Tulving, E. (2002). Episodic memory: from mind to brain. *Annual Review of Psychology*, *53*, 1-25.
- Ullman, M. T., & Pullman, M. Y. (2015). A compensatory role for declarative memory in neurodevelopmental disorders. *Neuroscience & Biobehavioral Reviews*, *51*, 205-222.
doi: 10.1016/j.neubiorev.2015.01.008
- Unknown. (2012). *Current interventions to improve executive function in students with disabilities*. Retrieved from <https://cte.ku.edu/sites/cte.drupa.ka.edu/>

- Vasa, R. A., Carroll, L. M., Nozzolillo, A. A., Mahajan, R., Mazurek, M. O., Bennett, A. E., ... Bernal, M. P. (2014). A systematic review of treatments for anxiety in youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *44*, 3215-3229.
- Watkins, L. I., O'Reilly, M., Kuhn, M., Gevarter, C., Lancioni, G., Sigafos, J., & Lang, R. (2015). A review of peer-mediated social interaction interventions for students with autism in inclusive settings. *Journal Of Autism & Developmental Disorders*, *45*, 1070-1083. doi:10.1007/s10803-014-2264-x
- Wertz, S. (2012). Improving executive function in children with autism spectrum disorders. Retrieved from www.autism-programs.com
- Wigham, S., Rodgers, J., South, M., McConachie, H., & Freeston, M. (2015). The interplay between sensory processing abnormalities, intolerance of uncertainty, anxiety and restricted and repetitive behaviours in autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*, 943-952. doi: 10.1007/s10803-014-2248-x
- Wilkins, S. & Burmeister, C. (2015a). *Five strategies to strengthen executive function*. Retrieved from <http://aapcpublishing.net>
- Wilkins, S., & Burmeister, C. (2015b). *FLIPP the switch: Strengthen executive function skills*. Shawnee Mission, KS: AAPC.
- Williamson, P., Carnahan, C. R., & Jacobs, J. A. (2012). Reading comprehension profiles of high-functioning students on the autism spectrum: A grounded theory. *Exceptional Children*, *78*, 449-469.
- Wojcik, D. Z., Moulin, C. J., & Souchay, C. (2013). Metamemory in children with autism: Exploring “feeling-of-knowing” in episodic and semantic memory. *Neuropsychology*, *27*, 19-27. doi: 10.1037/a0030526
- Zelazo, P. D. (2010). *Executive function part four: Brain growth and the development of executive function*. Retrieved from <http://www.aboutkidshealth.ca>
- Zelazo, P. D., Blair, C. B., & Willoughby, M. T. (2016). *Executive functions: Implications for education*. Washington, DC: National Centre for Education Research, Institute of Education Sciences, U.S. Department of Education.
- Zhang, J. & Wheeler, J.J. (2011). A meta-analysis of peer-mediated interventions for young children with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities*, *46*, 62–77.

Correspondence regarding this article should be addressed to Nikki Murdick, School of Education, Fitzgerald Hall 216, 3500 Lindell Blvd., Saint Louis, Missouri 63103. Email: nikki.murdick@slu.edu

Practical Application of Applied Behavior Analysis in the School Setting for an African American Female with Autism

L. Lynn Stansberry Brusnahan
University of St. Thomas

Erin Farrell
University of St. Thomas

The purpose of this single-subject case study was to examine the practical application of interventions grounded in the principles of applied behavior analysis (ABA) in the school setting. With the assistance of a school district behavior specialist trained in ABA, educators utilized functional communication training (FCT) and other ABA evidence-based practices (EBP) to increase communication and decrease challenging behaviors in a 6-year-old African American female with autism. The other ABA EBPs included functional behavior assessment, prompting, time delay, modeling, differential reinforcement, and extinction. Methodology included document reviews, interviews, and observations. Results demonstrated an increase in communication using a visual, gestural, or verbal means to request an item and a decrease in the duration, frequency, and intensity of tantrums, physical aggression, and self-injurious behaviors.

The core features of autism spectrum disorder (ASD) include challenges in communication, social interaction, and restricted, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). Not specific to the criteria for a diagnosis but simultaneous with these challenges, some individuals with ASD exhibit destructive or disruptive behaviors like physical aggression or verbal outbursts (Sigafos, 2000). These behaviors can create learning obstacles and challenges for providing an appropriate education for a student in the school setting (Dunlap et al., 2003). Individuals with autism may engage in challenging behaviors for specific communicative functions, such as to gain access to items and/or to escape undesirable or difficult tasks (Carr & Durand, 1985). Given this interrelationship, creating practical interventions to decrease problematic behaviors and increase communication skills is essential (Mohammadzaheri, Koegel, Rezaei, &

Bakhshi, 2015). The Individuals with Disabilities Education Act (IDEA, 2004) and Every Student Succeeds Act (ESSA, 2015) includes references to educators' use of evidence-based practices (EBP) and there is evidence of the efficacy of applied behavior analysis (ABA) practices as educational and behavioral interventions (National Research Council, 2001) in the field of ASD.

As the number of students with autism in school environments has grown, public schools seek educators who have expertise in EBPs such as ABA interventions. The National Research Council (2001) reports, however, that most educators graduate from institutions of higher learning having received minimal training in evidence-based interventions grounded in ABA for students with autism. In addition to a lack of training, teachers and support staff may perceive ABA-based interventions as complex, overwhelming, overly cumbersome, and data-driven (Kamau, 2014).

In our study, we examined educators' perceptions of the practical utilization of functional communication training (FCT) and other ABA EBPs to increase communication in a young student with ASD who engaged in challenging behaviors. FCT is an ABA intervention that has been shown to decrease challenging behaviors and increase communication (Durand & Merges, 2001; Wacker et al., 2005). The other ABA EBPs included functional behavior assessment (FBA), modeling, prompting, time delay, differential reinforcement, and extinction. The student's team included a school district behavior specialist trained in ABA. The goal of intervention was to increase the student's communication using a visual, gestural, or verbal means to request an item and reduce the frequency, duration, and intensity of tantrums, physical aggression, and self-injurious behaviors. In this research, we also asked educators about the ease of data collection to determine the effectiveness of an intervention on a student's behaviors. We start by defining the key terminology utilized in this study, which includes communication, applied behavior analysis, and functional communication training.

Definition of Communication

Communication is more than being able to speak or being able to put words together (Quill & Stansberry Brusnahan, 2017). It is a fundamental social skill that allows an individual to relay intended meaning to another. Communication can be a verbal and/or nonverbal interactive exchange between two or more people. Either written or spoken, communication is how people express needs, feelings, and let someone else know that they want something.

Definition of Applied Behavior Analysis

In 1968, Baer, Wolf, and Risley defined applied behavior analysis as "the process of applying somewhat tentative principles of

behavior to the improvement of specific behaviors and simultaneously evaluating whether or not any changes noted are indeed attributed to the process of application" (p. 91). According to Cooper, Heron, and Heward (2007), ABA is "the science in which tactics derived from the principles of behavior are applied systematically to improve socially significant behavior and experimentation is used to identify the variables responsible for behavior change" (p. 7). ABA has been shown to successfully teach a wide range of skill areas including communication (Steege, Mace, Perry, & Longenecker, 2007). ABA is not one method but rather an umbrella term for a multitude of interventions used to teach, reinforce, and maintain skills; generalize behaviors from one setting to another; decrease challenging behaviors by minimizing their reinforcement; and increase reinforcement of replacement behaviors.

Definition of Functional Communication Training

Functional communication training is a systematic procedure in which an individual is taught an alternative response that results in the same reinforcement as a maintaining challenging behavior (Tiger, Hanley, & Bruzek, 2008). FCT is defined as the replacement of problematic behavior that has a communication function with more appropriate communication function that accomplishes the same goal (Wong et al., 2014). An FBA usually precedes the implementation of FCT to identify the function of a behavior. FCT also typically includes differential reinforcement procedures where the individual is taught a communication skill to gain the same reinforcement identified as maintaining the challenging behavior. FCT also can include extinction where the problematic behavior is typically ignored and no longer receives reinforcement. FCT has an evidence base

with 12 single case design studies demonstrating that this intervention has been effective for preschoolers to high school-age students with ASD to address behavior and communication outcomes (Fettig, 2013; Franzone, 2009; Wong et al., 2014).

Method

Research Questions

There were three research questions in our single-subject case study.

1. What impact will FCT and other ABA EBPs have on the student's use of communication skills to request items during the school day?
2. What impact will FCT and other ABA EBPs have on duration, frequency, and intensity of the student's targeted challenging behaviors during the school day?
3. What is the school personnel's perception of ease of utilization of the ABA strategies and the data collection required to determine effectiveness of the intervention?

Participants

In this case study, the special education teacher of a student with ASD, who was demonstrating challenging behavior in the school setting, asked the school district for assistance. The district provided a behavior specialist and school psychologist. The district behavior specialist had training in ABA and developing and implementing interventions for students with autism. In addition, the team consisted of the student, a parent, a Speech-Language Pathologist, an Occupational Therapist, and an administrator.

The student was a 6-year-old female kindergarten student who met special education eligibility under the category of ASD. The student was not able to sit to complete intellectual testing. Observational

data revealed she was able to complete rote memory academic tasks with one-on-one adult support. Examples include: matching upper- and lower-case letters; counting to 20; typing numbers sequentially from 1 to 12; and stating the days of the week. The student was African American. Her family had been homeless for part of the previous school year and she qualified for free and reduced lunch. English was the student's first language. This student seldom used spontaneous verbal language to communicate her needs and wants and was receiving speech and language therapy as a related service. The student had not received ABA therapy in clinical settings.

Setting

As the student's reevaluation was due, the team decided to conduct a FBA and implement a new behavior support plan. After the plan was created, the team concluded that it would not be possible to implement all the changes since it was the final weeks of the school year. Thus, the plan was implemented in the extended school year (ESY) setting. The setting was an elementary public school in a suburb outside of a major metropolitan mid-western city. The demographics of the students in the school included 76% Caucasian, 7% African American, and 7% Asian. The school included 3.4% English language learners, 9% special education, and 12.5% received free and reduced lunch. The participant in this study received her education in a federal setting III self-contained special education classroom for students with autism both during baseline and intervention. The extended school year (ESY) session lasted 4 weeks.

Procedures

A FBA, which is a systematic set of strategies used to determine the underlying function of a behavior, was conducted to create the behavior support plan (Collet-Klingenberg,

2008). A FBA consists of describing the challenging behavior; identifying antecedents and consequences; and developing a hypothesis about the function of the behavior. The next steps are choosing and teaching an alternative replacement behavior (e.g., communicative response) that serves the same function to replace the challenging behavior and utilizing extinction to not reinforce the problematic behavior (Mancil, Conroy, Nakao, & Alter, 2006).

Conduct a functional behavior assessment.

The team wanted to make each step practical so to begin the process the behavior specialist led the team in a FBA utilizing a DASH framework (Loman, Rodriguez, & Borgmeier, 2014). The team used multiple forms of data collection including document reviews, interviews, and direct observations. Each letter in DASH provides the step in the practical FBA process.

The D stands for “define.” The team reviewed the student’s previous behavior plan. The team operationally defined the targeted behavior in observable and measurable terms. The student engaged in targeted behaviors that included tantrums defined as actions that included crying, screaming, yelling at others, and throwing

herself on floor in a cluster or chain of behaviors. The team defined physical aggression as actions causing harm to others which included hitting, kicking, biting, and head-banging against another person’s body. Self-injurious behaviors were defined as any action that may cause harm to self and included banging head on floor or objects. These targeted behaviors disrupted the learning of the student and her peers within the classroom.

The A stands for “ask” about behavior. Both formal and informal interviews were conducted with team members. Figure 1 includes the basic questions the interviewees were asked. These questions required respondents to describe the student’s challenging behaviors along with what happens before (antecedents) and after (consequences) the behavior to maintain the problem behaviors. The questions were focused on finding out where, when, and why the behaviors occur and the function of the behaviors. Team members were asked questions to determine motivating materials and preferences for the student as individuals with ASD are more likely to respond to an intervention that incorporates his or her preferences (Grandin, 1995).

Figure 1. *Basic interview questions.*

Basic Interview Questions
Behavior: What challenging behaviors have you observed? Describe the behavior’s frequency, duration, and intensity.
Antecedents: What generally happens right before the behavior? Are there events that set up or contribute to triggering the behavior?
Consequences: What generally happens right after the behavior?
Function: What do you think is the function of the behavior?
Reinforcement: What types of things is she/he motivated or reinforced by?

The S stands for the times when the observers “see” the behavior. The team observed the behavior during classroom routines to verify information from the interviews. The team collected baseline data on the frequency of the participant’s use of functional communication (requesting) as well as the duration and frequency of targeted problem behaviors for three sessions.

The H stands for “hypothesize.” The team reviewed the previous behavior plan and analyzed the interviews and observations to determine the function of the behavior. The student was observed engaging most frequently in the behaviors when she was unable to gain access to desired objects such as the iPad. The team hypothesized what the individual was trying to communicate and created a summary statement of when, where, and why the behaviors were occurring. The team hypothesized that when presented with a lack of access to preferred activities/items in the classroom, the student would engage in tantrums, physical aggression, and self-injurious behavior to communicate and gain preferred activities/items. The student experienced deficits in the areas of communication, emotional regulation, and cognitive flexibility skills. The rationale for the team decision to utilize FCT was to replace the challenging behaviors with more socially acceptable forms of communication.

Choose and teach alternative replacement behavior. After completing the FBA and determining the function of the behavior, the team identified a communicative response to teach the individual that would replace the challenging behaviors. The rationale for the selection of the type of communicative responses was based on the student's capability of completing the responses; the ease of teaching and acknowledging the responses; and how efficiently the responses serve the function (Dunlap & Duda, 2005).

The team chose communicative responses that would be as easy for the student to use and that served the same purpose as the challenging behaviors, but in a more appropriate way (Franzone, 2009). Communicative responses can consist of assistive technology devices.

During baseline conditions, no systematic communication supports or prompts were provided. During intervention, the district behavior specialist systematically used direct instruction to teach the student the replacement behaviors of requesting desired items from her environment using a visual (picture representation of requested item), gestural (point), and verbal means of communication. To train staff on the FCT procedures, the behavior specialist provided verbal directions when the student was not present and then modeled the strategies with the student present. The specialist then prompted the teacher and provided coaching with feedback.

The training with the student took place in a separate smaller classroom to limit distractions and provide more 1:1 attention and support. The student’s preferred items were made available for the training on a reinforcement hierarchy. Preference was determined through the interviews and by observing the student’s attempts to gain access to items at school. The item chosen to begin training was the iPad, crayons, puzzles, and books. Due to these items being her most preferred, the student was deprived of access to them before training so she would be highly motivated to gain access to the items.

For the FCT, the team utilized a type of pictures that the student was already familiar with as they were utilized in her schedule throughout the school year. Pictures of the student’s highly desired items were located within a three-ring picture book with Velcro.

The team would take the pictures from inside the book and put them on the front of the book where there were two boxes labeled “first” and “then.” The “first” indicated the current activity and the “next” indicated the next activity. Previously, staff had arranged the visuals for each part of the student’s daily schedule. During the instruction, the team taught the student to manipulate the “first” and “then” format independently.

Pictures of the desirable choices were presented to the student on a Velcro strip on the front of her picture book. The pictures were presented two and then three at a time. At the beginning, the student was verbally cued to select the picture of her desired choice. Later, the staff varied between presenting the strip with the picture choices with and without verbal cues. The verbal cue consisted of asking the student, “What do you want?” Staff would provide a prompt as needed to indicate to the student to make a selection from the choices presented. Staff would use either a gesture (point) prompt or take the desired item off of the Velcro strip and hand it to the student to use to make her choice. Modeling was utilized by pairing a prompt with a one-word verbal labeling the desired item (“iPad”). After a request, the student was given access to the desired item for 3 to 5 minutes. After the student had access to the item for the allotted time, staff would remove the desired item.

During initial training, all of the student’s communication requests were honored immediately using a continuous schedule of reinforcement to acknowledge the use of the replacement behaviors to request her wants and needs. To ensure that the student communicated for multiple items, staff removed the most requested item from the picture choices after she had received that item three times. Because she rarely verbally communicated, the team decided they would

continue to honor her request for the most desired item if a verbal request was made.

After receiving her instruction in the 1:1 setting, the student would return to the classroom setting. In the structured 1:1 sessions and classroom environment, the plan included using time delay (waiting and giving time for student to respond) before prompting and fading to an intermittent schedule (not providing reinforcement for each request) of reinforcement after the student acquired the skills. The team would honor the student’s point or picture exchange communications on a variable ratio (reinforce after an average number of requests) schedule of reinforcement but if she made a verbal request, the instructors would continue with the immediate and continuous schedule of reinforcement.

Utilize differential reinforcement and extinction. The final step, in regards to the FCT, was for the team to differentially reinforce alternative behaviors (DRA) while extinguishing the challenging behaviors (Lalli, Casey, & Kates, 1995). DRA involves reinforcement of a desired response that serves the same purpose as the problematic behaviors while removing reinforcement from the previously reinforced response (Kucharczyk, 2013). Extinction is a strategy based on ABA used to reduce or eliminate behaviors and involves withdrawing or terminating the reinforcement, which in this case was access to a desired item (Fleury, 2013). Giving her access to the item when she was engaged in the targeted behaviors was serving to maintain her challenging behaviors. By differentially reinforcing the desired communicative response and removing reinforcement from the problematic behaviors, the goal was to increase desired responses while the undesired responses decreased. The team wanted to withdraw the maintaining

consequence to stop and extinguish the behaviors. While ignoring the challenging behaviors, the team would not grant access to the desired items and instead would redirect her and provide a prompt.

Data Collection

The behavior specialist collected data during sessions in which she was present and trained the team to do the same when she was not present. There were two different data forms. With the first form, the team collected data during the 1:1 sessions when the student was given structured choices of activities/items to request, as well as spontaneous requests that were made in the classroom environment. With the second form, data was collected on the frequency and duration of the targeted

challenging behaviors in all settings. Additionally, each team member was also asked to rate the intensity of the behavior using a scale before and after intervention.

Communication. Figure 2 provides the form the team used to collect data on the communication skills that were targeted to increase. This form was used to record structured requests during the 1:1 sessions and spontaneous requests in the classroom. The form captured information on the item or activity requested and the means of request used (verbal, gestural, visual, or other). During the structured 1:1 sessions, the observer captured whether or not the selection by the student was a choice presented by an adult.

Figure 2. *Requests made when presented a choice data form.*

Data Form: Requests Made when Presented a Choice								
<p>Directions Provide the date of the observation. Note the requested item/activity = What did she request? <u>1:1 Structured Environment:</u> Note if the requested item was one of the choices presented or not = Did she choose one of the items presented? Yes or No As student makes requests for any item or activity, place a "X" or check mark to record how she made the request. Check any combination of types of requests per item/request (e.g., visual and verbal can be checked for the same request). Verbal = Did she make a verbal request? Gestural = Did she make a point request? Visual = Did she make a request using picture? Other = Did she make a request in another way? Describe how she made the request. Provide relevant comments.</p>								
Date	Requested Item/Activity	Structured Requested item 1 of choices?	Verbal	Gestural	Visual	Other-Describe	Setting	Comments
		Yes or No					1:1 or Classroom	
		Yes or No					1:1 or Classroom	

Behaviors. Figure 3 shows the form utilized to collect data on the challenging behaviors. The team recorded duration, antecedent, frequency, type of behaviors, and consequence for each occurrence. Definitions of key terms and a key was provided for the identification of the targeted behaviors, which included tantrum (T), physical aggression (PA), and self-injurious behavior (SIB).

Data Analysis

For each observation, the behavior specialist summarized and analyzed the following collected data: (a) structured requests in the 1:1 sessions; (b) spontaneous requests in the classroom; and (c) frequency and duration of targeted challenging behaviors in all settings. Additionally, the specialist summarized the pre- and post-intervention data on intensity of problematic behaviors.

Results

Research Question 1

The first research question was “What impact will FCT and other ABA EBPs have on the

student’s use of communication skills to request items during the school day?” The primary dependent measure was requesting an item by using a visual, gestural, or verbal means of communication. Figure 4 includes the frequency of structured requests made by the student in the 1:1 sessions. Figure 5 includes the spontaneous requests data in the classroom environment. These figures include the baseline (B) data and the data collected after the team implemented the intervention (I).

During the baseline period, the student was observed requesting items utilizing tantrums, physical aggression, and self-injurious behaviors. During baseline, the team did not have an explicit plan to reinforce the student when she did request desired items using a more appropriate form of communication. At this point, staff would react and were maintaining the student communicating with the problematic behaviors by delivering the desired item after the display of the challenging behaviors.

Figure 3. *Antecedent behavior consequence data form.*

Data Form: Antecedent Behavior Consequence					
Key Terminology Antecedent = What happened before the behavior? Behavior = What does the behavior look like? Consequence = What happened after the behavior?					
Directions Provide date and time of each occurrence of a target behavior. Provide in minutes the duration of each occurrence of the target behavior. Circle all target behaviors that occurred during the observation using the follow key: Tantrum (T), Physical aggression (PA), Self-injurious behavior (SIB) Provide the antecedents and consequences for each occurrence of the target behavior.					
Date	Time	Duration	Antecedent	Behavior	Consequences
				T PA SIB	
				T PA SIB	

Figure 4. *Total structured requests made.*

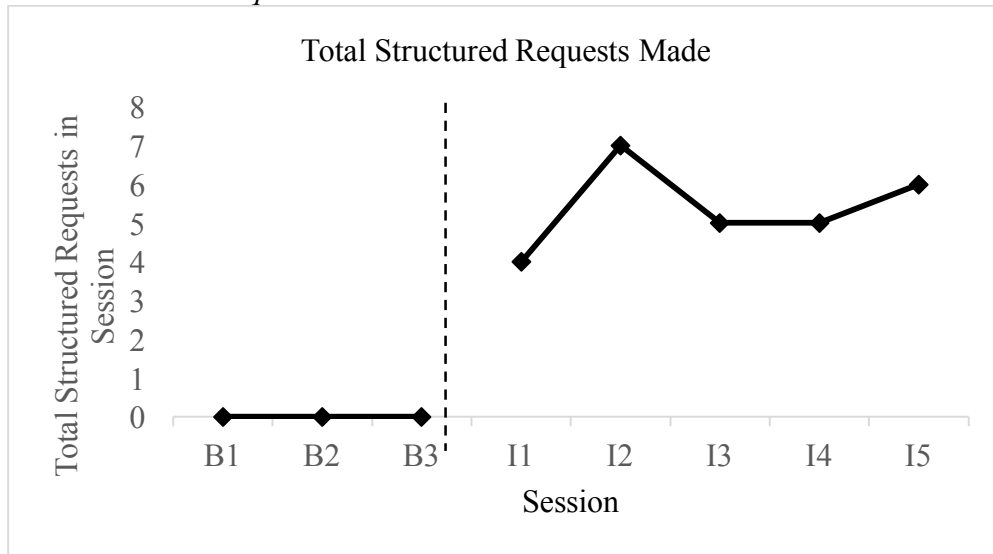
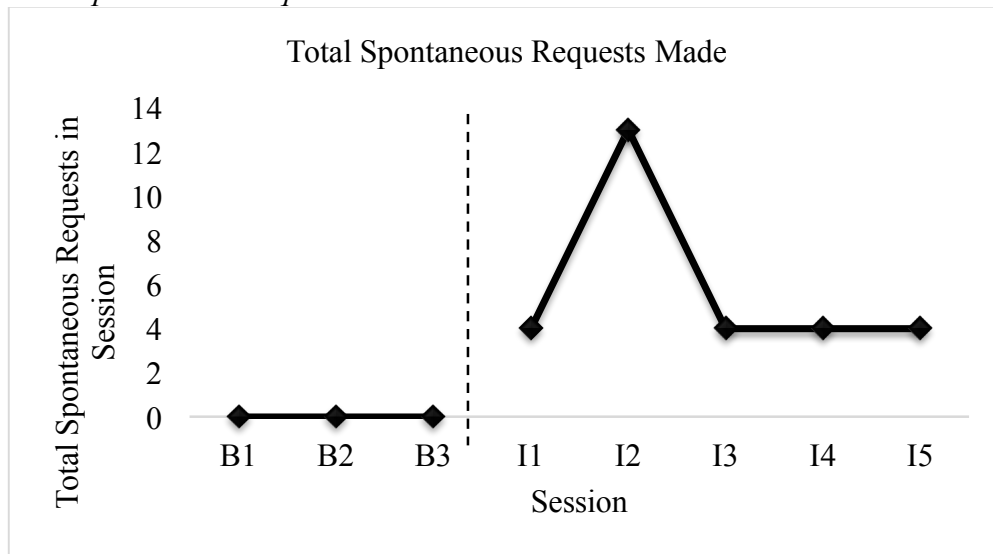


Figure 5. *Total spontaneous requests made.*



After the student was directly taught utilizing the FCT procedures with a continuous and immediate schedule of reinforcement, she began to request the item independently after only three initial prompted trials in the 1:1 setting. During the first observation, the student made four requests using her communication options in the structured 1:1 setting and four spontaneous requests in the

classroom environment. The team would accept as a request for the item any attempt to use the picture to exchange for the item, any gestural pointing to the picture or item, or a verbal request for the item. As the student had very limited verbal communication, the most desired response was a verbal request. The student used all three forms of requests.

After acquiring the skill during the first session, the student entered the classroom on

the second day after intervention and immediately made a picture exchange and a point to request a desired item. On the second observation, the student was observed making 7 requests in the 1:1 session and 13 requests spontaneously in the classroom environment respectively. In the subsequent observation periods, the student made 5, 5, and 6 requests in the 1:1 setting and 4, 4, and 4 spontaneous requests in the classroom environment. Due to the needs of other students in the ESY setting, the frequency of requests in the structured and natural contexts were not able to be recorded with fidelity after five intervention data collection periods.

In addition to observation data, members of the team were interviewed and reported the student utilized multi-modal spontaneous requests that had not been previously observed. The observers noted that generalization was occurring as well, as the student began requesting novel items that were not taught. For example, the student verbally requested different colors of crayons without this skill being specifically taught. The team immediately reinforced these requests with delivery of the requested item.

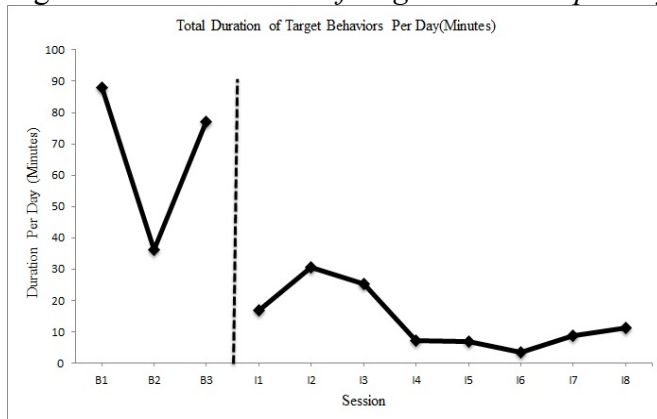
Research Question 2

The second research question was “What impact will FCT and other ABA evidence-based practices have on duration, frequency, and intensity of the student’s targeted challenging behaviors during the school day?” The primary dependent measure was the demonstration of the targeted behaviors, which included tantrums, physical aggression, and self-injurious behaviors.

Duration. Figure 6 shows the total duration or length of time in minutes the student engaged in the challenging behaviors during the observational periods. The observer would note the start time and stop time for the duration for each occurrence of the targeted behaviors in minutes. At the end of each observation, all of the minutes would be added together to determine total duration for the day.

The duration of the student engaging in the targeted challenging behaviors during the baseline conditions ranged from 38 minutes to a total duration of 88 minutes at the peak of baseline. The three baseline data points

Figure 6. Total duration of target behaviors per day (minutes).



were added together and divided by the total number of data collection periods to get a mean or average of the numbers. The mean across the three baseline data collection points was a total duration of 67 minutes. After introducing FCT, the student engaged in the targeted challenging behaviors a duration of 31 minutes at the peak of intervention. The mean across the eight intervention data collection points was a total duration of 14 minutes during the data collection period.

In an interview, the teacher noted the decrease in the amount of time spent engaged in challenging behaviors increased the amount of time in the school day that was available for this student to engage in meaningful learning activities and be a part of her classroom activities with her peers. The teacher noted that there were instances of learning opportunities the student engaged with that were not observed during the regular school year. The teacher reported that the decrease in the duration of time she personally had to spend dealing with problem behaviors increased the opportunities for learning and engagement for all of the students in the classroom.

As the student became consistent with requesting a desired item, with all accepted forms of requesting, the team then faded the schedule of reinforcement so that the student was not receiving the item every time it was requested. After the student had access to the item three times, the instructor would remove the desired item from the available choices. This resulted in problem behavior when the procedure was being initially taught.

Frequency. Figure 7 shows the total frequency or number of instances the student engaged in the challenging behaviors during the observational periods. During baseline,

the frequency of the challenging behaviors ranged from 8 to 12 instances per day at the peak. The three baseline data points were added together and divided by the total number of data collection periods to get a mean of 9 instances of problematic behaviors per day. After introducing the intervention, the student engaged in the challenging behaviors at the peak frequency of 11 instances for the day. The mean across the eight intervention data collection points was 7 instances per session during the data collection period. The overall frequency of the problematic behaviors from baseline to intervention decreased from 9 to 7. As indicated in the graph there was not a consistent decrease across sessions. One explanation for inconsistency in the student's behaviors is when extinction is utilized behavior is likely to increase in frequency before it is extinguished in an attempt to evoke reinforcers previously acquired with the behaviors (Fleury, 2013). This is referred to as an extinction burst and could be an explanation for the spike in the seventh observation.

Intensity. Figure 8 shows the intensity of targeted challenging behaviors during baseline and after intervention as perceived by the team. Team members were asked to rate the intensity of the behavior using a Likert 5-point scale and the perceptions were totaled and divided by the number of respondents. Results revealed there was the perception that the intensity decreased after intervention in each of the targeted problematic behaviors, which included tantrums (4.5 to 2), physical aggression (4 to 1.5), and self-injurious behaviors (4 to 1). An example of the scale is a 1 indicated a low intensity tantrum defined as soft volume crying whereas a 5 indicated a high intensity tantrum defined as high volume crying, screaming, yelling, and throwing self

Figure 7. Total frequency of target behaviors.

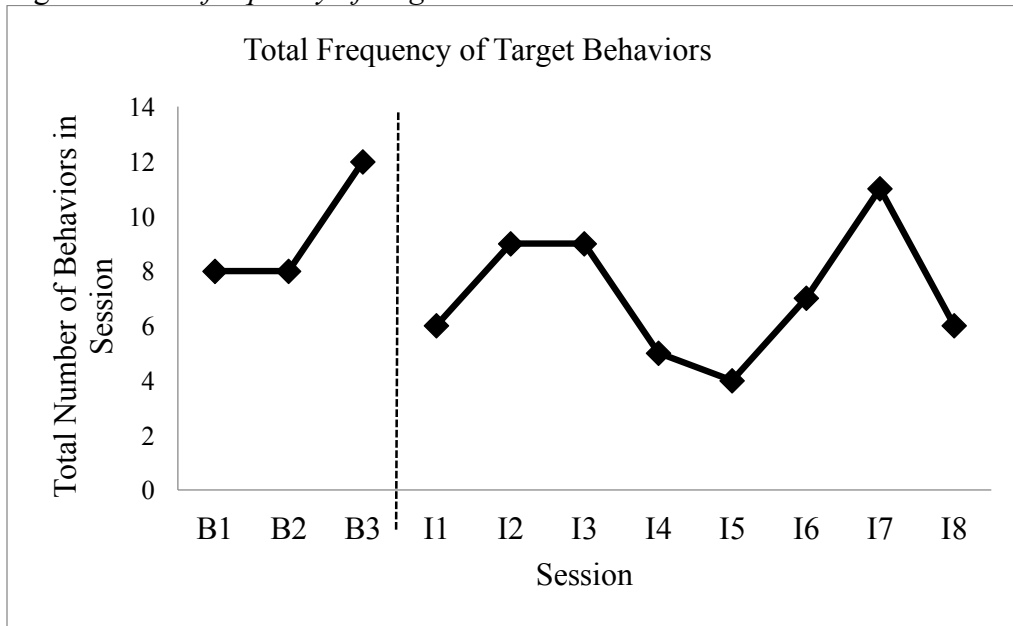
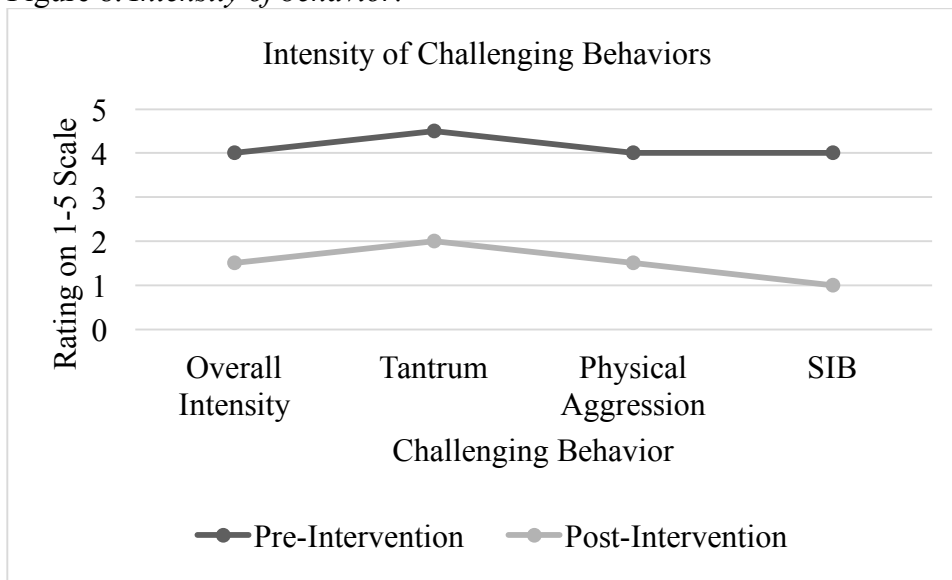


Figure 8. Intensity of behavior.



forcefully to the floor. The combined overall score for all challenging behaviors went from a perceived rating of a baseline score of a 4 on the 5-point scale to an after intervention score of 1.5.

Research Question 3

The third research question was “What is the school personnel’s perception of ease of

utilization of the ABA strategy and the data collection required to determine effectiveness of the intervention?” The researcher asked members of the team qualitative questions to address the previous findings that educators and service providers can perceive ABA-based interventions as complex, overwhelming, overly cumbersome, and “data-driven”.

Utilization. In regards to the ease of utilizing the ABA strategies, responses indicated that the FBA process, put into the context of DASH, provided a framework that was practical, understandable, and easily implemented. The FCT intervention was perceived as smoothly executed in the 1:1 setting. It was noted it was helpful that the direct instruction took place in a setting with few distractions. A member of the team stated that the FCT procedure and the other ABA EBPs was pretty straightforward, structured, and easy to implement. Each team member noted that they were surprised at how fast the student responded to the behavioral interventions. Team members felt it was helpful to have training and support from the district behavior specialist who had a solid understanding of the principles of ABA and demonstrated the ease of use. One team member noted initial resistance to utilizing ABA strategies in the classroom because she thought it would be difficult. The team agreed that the ABA strategies were useful for this student.

Data collection. In regards to ease of data collection during intervention, responses included that the system itself was easy to utilize. It was thought that the forms were designed well. A member of the team stated that it was helpful to have the descriptions on each of the sheets that indicated what data to collect. As data was collected, monitored, and shared, the team and administration noted appreciation for the very clear demonstration of the student's progress. However, it was noted that there was limited time to collect data on behaviors after the intervention. Due to transportation and scheduling variables, the student was not present for all days of ESY, further limiting data collection. There were not enough adults present to implement procedures and collect data each day. As such, staffing was a

challenge for data collection. Due to the needs of the other students in the class and the limited number of personnel in the ESY setting, the team was forced to abandon data collection of requests after five data collection periods.

Discussion

In this case study, utilizing a practical method to conduct a FBA allowed the team to effectively determine a hypothesis about the function of the student's behaviors. Based on the function of the behaviors, the team created an effective behavior support plan. In the plan, the team proactively taught skills based on behavioral principles including FCT and other ABA EBPs such as FBA, modeling, prompting, time delay, differential reinforcement, and extinction. The hypothesis from the FBA was supported by results which showed that the interventions had an impact on increasing the student's communication skills and reducing her challenging behaviors.

Communication. When examining the impact of the intervention on the student's communication to requests items, the team found that using FCT and other ABA EBPs contributed to the student's acquisition of skills that she could utilize across settings. Not only did the student increase her use of requesting during her 1:1 sessions, she began generalizing her skills to the classroom setting by spontaneously requesting items.

Behaviors. Giving the student communication that served the same function as the targeted behaviors decreased the duration, frequency, and intensity of her behaviors from baseline to intervention. At baseline, the targeted challenging behaviors were demonstrated for longer in duration, more frequently, and at higher intensity than after intervention. This meant that more of the team's instructional time was spent

engaged in management of the student's behaviors. While the frequency did decrease, the duration and intensity of behaviors decreased most substantially. After intervention, the interruption to the learning environment was minimal. This provided more available instruction time at school for the educator to teach and the students to learn.

Utilization. When examining the school personnel's perception of ease of utilization of the ABA strategies, support from the behavior specialist trained in ABA in the school setting was perceived as helpful. As the specialist demonstrated the ease of use of ABA interventions, along with data collection practices that were simple to implement, the team agreed that these strategies were practical and effective for this student. The team appreciated the support and the frameworks provided to complete a practical FBA and implement the ABA EBPs. There were noted challenges in the ability to gather data consistently with fidelity due to the nature of the students' needs and staff availability within the classroom. The importance of the data being collected, monitored, and shared to monitor student progress was acknowledged by the team.

Limitations

There were several limitations in this case study. This study included only one student. Another limitation was that the ESY schedule of 1-month long provided less opportunities for data collection. Additionally, the student was not present for all days of ESY, further limiting the data collection period. The behavior specialist and school psychologist were not available every day and thus the data collection rested on the special education staff on these days. Data collection did not occur when other students in the classroom had needs that took precedence over the data

collection.

There were other variables of programming that may have accounted for some of the reduction in challenging behaviors including establishing routines and expectations in a new school environment; different teaching staff; more 1:1 time for the student to work with staff trained in ABA procedures; and a higher degree of control over the environment than is typical during the regular school year. Another limitation was the team did not collect data through a formal system of inter-observer agreement (IOA). The professionals did coach each other during data collection on prompting procedures and independent demonstration and would verbally agree on how to document each trial.

Implications

A study conducted by Mancil, Conroy, Nakao, and Alter (2006) determined that FCT was an effective and efficient intervention for decreasing challenging behaviors and increasing communication in a child with ASD in the home environment. Our case study expands the research by demonstrating the effectiveness of FCT in the school environment. The progress made by the student in this case study in the school setting demonstrates the importance of institutions of higher learning providing training in EBPs grounded in ABA to educators.

Our research demonstrates educators trained in ABA who serve on teams can help develop and support plans that can impact student success in school settings. Enhanced knowledge and support from behavioral specialists within the schools can serve to change the perceptions that ABA interventions are complex. Trained ABA professionals understand the use of positive behavior supports to increase desired behavior as well as decrease undesired behavior in diverse environments. Utilizing

these professionals in the school environment can give teams the support they need to understand student behavior and the integrated relationships between teacher and student behavior. This understanding can lead to optimal learning environments for all students by creating opportunity for success for students through applied practice in EBPs. Continued research is needed related to how to best use the skills of professionals trained in ABA in school settings.

Selection of special education EBPs requires developing an understanding of what interventions work effectively for whom (West et al., 2016). This study extends the research base as it includes a participant from a race, gender, and socioeconomic status not well represented in previous ASD research. Further research is needed to demonstrate the impact of FCT and other ABA procedures on behavior over time and across settings to determine if skills are maintained.

Conclusion

Challenging behaviors can create barriers to learning for students with ASD. This study demonstrated how the practical application of ABA EBPs in a school setting can lead to improvements in behaviors for a student with ASD. The student in this study had not previously received intervention utilizing ABA. She was disruptive in the classroom and her behaviors took time away from her learning. With an investment of 1:1 direct instruction during a pull-out session in a quiet environment utilizing the support of a behavioral specialist, this student quickly mastered a skill using FCT and other ABA EBPs.

In a limited amount of time, the team was able to implement practical interventions and collect data that demonstrated that FCT and other ABA strategies benefited the student in a school setting to increase her communication skills. After intervention, the student was able to point, use a picture exchange, and verbally request a desired item both in structured and spontaneous situations. Through the data collected, the practical application of FCT, as an alternative response to targeted challenging behaviors, was demonstrated to decrease the duration, frequency, and intensity of the student's tantrums, physical aggression, and self-injurious behaviors. In this case study over the course of the data collection, the problematic behaviors decreased and no longer allowed the student to gain access to desired items. This decrease contributed to the educator having more time to educate and attend to the needs of the student and her peers in the classroom. When implementing ABA EBPs, educators are encouraged to use data collection to determine whether or not the interventions are effective for a student's targeted behaviors.

The results of this study highlight the benefits and practicality of utilizing ABA based interventions in the school setting for a student with ASD. The findings of this investigation, along with other research conducted to date, paints a vivid picture of why schools should consider adoption of practical interventions grounded in ABA and consider utilizing personnel with knowledge in behavioral principles.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Baer, D., Wolf, M. & Risley, T. (1968). Some still-current dimensions of applied behavior

- analysis. *Journal of Applied Behavior Analysis*, 20, 313-327.
- Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18, 111-126.
- Collet-Klingenberg, L. (2008). *Overview of functional behavior assessment*. Madison: University of Wisconsin, Waisman Center, The National Professional Development Center on Autism Spectrum Disorders.
- Cooper J. O, Heron T .E, & Heward W. L. (2007). *Applied behavior analysis* (2nd ed.). Saddle River, NJ: Pearson.
- Dunlap, G., Conroy, M., Kern, L., DuPaul, G., VanBrakle, J., Strain, P. & Joseph, G. (2003). *Research synthesis on effective intervention procedures: Executive summary*. Tampa, FL: University of South Florida Center for Evidence-based Practice: Young Children with Challenging Behavior.
- Dunlap, G., & Duda, M. (2005). Using functional communication training to replace challenging behavior. *What Works Brief*. Retrieved from <http://csefel.vanderbilt.edu/briefs/wwb11.html>
- Durand, V. M., & Merges, H. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities*, 16, 110-119.
- Every Student Succeeds Act. S. 1177 – 114th Congress (2015).
- Fettig, A. (2013). *Functional communication training (FCT) fact sheet*. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, The National Professional Development Center on Autism Spectrum Disorders.
- Fleury, V. P. (2013). *Extinction (EXT) fact sheet*. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, The National Professional Development Center on Autism Spectrum Disorders.
- Franzone, E. (2009). *Overview of functional communication training (FCT)*. Madison, WI: National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.
- Grandin, T. (1995). *Thinking in pictures: And other reports from my life with autism*. New York, NY: Vintage Books.
- Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- Kamau, L. Z. (2014). *Applied behavior analysis based interventions in public schools: Understanding factors that hinder adoption, implementation and maintenance*. (Doctoral Dissertation) College of Professional Studies Northeastern University, Boston, MA.
- Kucharczyk, S. (2013). *Differential reinforcement of alternative, incompatible, or other behavior (DRA/I/O) fact sheet*. Chapel Hill, NC: The University of North Carolina, Frank Porter Graham Child Development Institute, The National Professional Development Center on Autism Spectrum Disorders.
- Lalli, J. S., Casey, S., & Kates, K. (1995). Reducing escape behavior and increasing task completion with functional communication training, extinction, and response chaining. *Journal of Applied Behavior Analysis*, 28, 261-268.
- Loman, S. L., Rodriguez, B .J. & Borgmeier, C. (2014). Critical features of training practitioners to conduct function based interventions: From theory to professional development to practice. *Research and Practice in the Schools*.
- Mancil, G.R., Conroy, M.A., Nakao, T., & Alter, P. J. (2006). Functional communication training in the natural environment: A pilot investigation with a young child with autism

- spectrum disorder. *Education and Treatment of Children*, 29, 615-633.
- Mohammadzaheri, F., Koegel, L., Rezaei, M., & Bakhshi, E. (2015). A randomized clinical trial comparison between pivotal response treatment (PRT) and adult-driven applied behavior analysis (ABA) intervention on disruptive behaviors in public school children with autism. *Journal of Autism and Developmental Disorders* 45, 2899–2907.
- National Research Council. (2001). Educating children with autism. In C. Lord & J. P. McGee (Eds.), *Committee on education interventions for children with autism*. Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.
- Quill, K. & Stansberry Brusnahan, L. L. (2017). *Do-Watch-Listen-Say: Social and communication intervention for autism spectrum disorder* (2nd ed.). Baltimore, MD: Paul H. Brookes Publishing Company.
- Sigafoos, J. (2000). Communication development and aberrant behavior in children with developmental disabilities. *Education and Training in Mental Retardation and Developmental Disabilities*, 35, 168-176.
- Steege, M. W., Mace, F. C., Perry, L., & Longenecker, H. (2007). Applied behavior analysis: Beyond discrete trial teaching. *Psychology in the Schools*, 44, 91-99.
- Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice*, 1, 16–23.
- Wacker, D. P., Berg, W. K., Harding, J. W., Barretto, A., Rankin, B., & Ganzer, J. (2005). Treatment effectiveness, stimulus generalization, and acceptability to parents of functional communication training. *Educational Psychology*, 25, 233-256.
- West, E. A., Travers, J. C., Kemper, T. D., Liberty, L. M., Cote, D. L., McCollow, M. M. & Stansberry Brusnahan, L. L. (2016). Racial and ethnic diversity of participants in research supporting evidence-based practices for learners with autism spectrum disorder. *The Journal of Special Education*, 50, 151-163.
- Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kurcharczyk, S.,...Schultz, T. R. (2014). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, 45, 1951-1966.

Correspondence concerning this article should be addressed to L. Lynn Stansberry Brusnahan, University of St. Thomas, 1000 LaSalle Ave., MOH 217, Minneapolis, MN 55403. E-mail: llstansberry@stthomas.edu

A University Based Model for Changing Outcomes for Individuals with Intellectual and Developmental Disabilities

Christina R. Carnahan
University of Cincinnati

Carla Schmidt
University of Cincinnati

Kathryn Doyle
University of Cincinnati

Diane Clouse
University of Cincinnati

Catherine Dart
University of Cincinnati

The outcomes for individuals with intellectual and developmental disabilities (ID/DD) after graduating from high school remain poor, with limited opportunities for employment, independent living, and often few meaningful relationships. Universities are uniquely positioned to provide high quality supports and services for these individuals in inclusive settings, which could promote higher rates of employment and healthy, independent living. This article describes a model for creating programs for individuals with ID/DD with a continuum of support needs from mild to complex, including a discussion of specific programs, and barriers and facilitators to success.

High school graduation represents a time of transition and change for all students, but for individuals with intellectual and developmental disabilities it can be especially stressful (Biggs & Carter, 2015; Gauthier-Boudreault, Gallagher, & Couture, 2017; McKenzie, Ouellette-Kuntz, Blinkhorn, & Demore, 2017). The opportunities for employment and social relationships are often limited (Chezan, Petcu, & VanHorn, 2017). For example, while many individuals may work a few hours per week in the community (Burgess & Cimera, 2014; Chen, Leader, Sung, & Leahy, 2015; Wehman et al., 2017), they frequently find themselves spending the day at home with limited access to employment or post-secondary education. Approximately 65-70% of the adults with ID/DD are unemployed or underemployed, with jobs making minimum wage or less (Erickson,

Lee, & von Schrader, 2010; Siperstein, Heyman, & Stokes, 2014; Test, Smith, & Carter, 2014). Similarly, enrollment in postsecondary education is low, with only 30-40% of individuals attending any kind of educational experience. These statistics are especially true for individuals who have significant communication, sensory, and behavioral challenges (Carter, Austin, & Trainor, 2013; Gerhardt & Lanier, 2011).

These employment, educational, and social relationship challenges can negatively influence the quality of life for individuals with ID/DD and their families (McKenzie et al., 2017; Shogren, Shaw, & Little, 2016). Close social relationships and involvement in community activities are essential aspects of quality of life (Biggs & Carter, 2016). Other factors such as employment and financial well-being also influence quality of

life for individuals with ID/DD and their families (Chiang & Wineman, 2014; Kober & Eggleton, 2005; Shogren et al., 2016). Stated another way, what individuals do during the day and the quality of their relationships with others matters (Simoes & Santos, 2017; Shalock, Verdugo, Gomez, & Reinders, 2016). It remains unclear which factors most substantially influence overall quality of life for individuals with ID/DD. However, while some characteristics such as disability label or demographics are fixed, many other characteristics such as community connections through socialization and employment, financial security, and access to transportation are not fixed (Biggs & Carter, 2016), and can be influenced through high quality supports and opportunities after high school (Beadle-Brown, Whelton, Richardson, Beecham, Baukmer, & Bradshaw, 2016; DeWaele, van Loon, Van Hove, & Shalock, 2005; Shalock et al., 2016).

The limited access to employment, education, and other meaningful social opportunities after high school combined with an increasing focus on quality of life has led to a growing demand for quality opportunities (Gerhardt & Lanier, 2011). To this end, several legislative efforts supporting both increasing access to integrated employment (Wehmeyer et al., 2017) and post-secondary education (Grigal, Paiewonsky, & Hart, 2016) have occurred. Two important examples include the Higher Education Opportunities Act (HEOA, 2008) and Employment First.

HEOA

The HEOA revisions in 2008 provided individuals with ID increased access to postsecondary education through access to financial aid, increased financial support opportunities to Institutes of Higher Education serving these individuals, and the

development of a national coordinating center for individuals with ID seeking a college experience. HEOA provides eligible students with ID the opportunity to access Pell Grants, Supplemental Educational Opportunity Grants, and the Federal Work Study Program. These students would have previously been denied access to financial aid because they were non-matriculating. In order to access benefits, students must have a documented diagnosis of ID, be enrolled in a Comprehensive Transition Program (CTP), and maintain satisfactory academic progress, as defined by the CTP.

Funding provided also expanded the development of Transition Postsecondary Education programs for Students with Intellectual Disabilities (TPSID). Two sequences of funds were provided, the first in 2010-2015, and the second began in 2015 and will continue until 2020. The goal is to expand the number of TPSIDs and create statewide consortiums to increase the PSE options available while supporting the development of best practices.

Finally, the law established a national coordinating center, Think College, which supports data collection and program evaluation for TPSIDs, as well as providing resources non TPSID PSE programs and individuals with ID and their families interested in finding a PSE option. These resources include current research and training related to PSE programs and access to information describing the over 260 programs available nationwide.

Employment First

Employment First is a framework for systems change that is centered on the premise that all citizens, including individuals with significant disabilities, are capable of full participation in integrated employment and community life (U.S.

Department of Labor (DOL); 2014). The DOL and the Office of Disability Employment Policy (ODEP) are working collaboratively to promote alignment of publicly financed systems, service delivery practices, and reimbursement structures that will prioritize *community integrated* services for youth and adults with the most significant disabilities. The Employment First framework extends the work of previous policies to fundamentally change the way schools, employers, and social service agencies think about employment for individuals with significant disabilities.

At least 34 of the 50 states have Employment First initiatives targeting employment in typical work settings as the funding priority and primary outcome for individuals with significant disabilities (Butterworth, Smith, Hall, Migliore, Winsor, & Domin, 2014). In 2013, Ohio developed specific guidelines related to Employment First. This shift required community integrated, paid employment be the primary goal for all individuals with disabilities, regardless of perceived ability.

For individuals with disabilities, the shift in focus to community employment and opportunities for post-secondary education represent possibilities and challenges (Kramer, 2016; Thoma et al., 2012; Plotner & Marshall, 2015). Examples of challenges include access to appropriate supports and financial resources (e.g., the funds for tuition). However, both post secondary education and community integrated employment have been shown to support quality life experiences for individuals with ID/DD (Carter et al., 2011; Carter, Blustein, Bumble, Harvey, Henderson, McMillan, 2016; Shogren et al., 2016; Thomas, Lakin, Carlson, Domzal, Austin, & Boyd, 2011; Zafft, Hart, & Zimbrich, 2004).

Advancement and Transition Services

In response to the policy initiatives and the need for ongoing support for individuals with ID/DD, Advancement and Transition Services (ATS) was developed in the College of Education, Criminal Justice, and Human Services at the University of Cincinnati. The purpose of this conceptual paper is to describe ATS, which is a continuum of services for individuals with ID/DD on an urban university campus. While options for individuals with mild to moderate ID are expanding, few universities also support individuals who have complex communication, sensory, or behavioral challenges. ATS, however, serves adolescents with ID/DD through adulthood with a wide range of physical, intellectual and social abilities, including those with significant communication, sensory, and behavioral challenges. Throughout the paper we will highlight the experiences of individuals in our different programs, describe specific supports, and discuss administrative considerations including program planning, funding models, and staffing.

The roots of ATS trace back to 2007 when a local school district partnered with our university to provide transition services and inclusive on-campus experiences for high school students with ID/DD. Around the same time, the national push for inclusive, university based postsecondary programs for individuals with ID occurred (Thoma et al., 2012). Thus, the Transition and Access Program (TAP) developed out of and in response to our initial high school efforts. TAP, described in greater detail below, offers an inclusive college experience for students with intellectual disabilities.

While postsecondary programs such as TAP are fairly new, emerging data suggests positive employment outcomes (Izzo,

Heider, Green, Cleary, & Brown, 2017; Ross, Marcell, Williams, & Carlson, 2013). In a recent study, for example, Moore & Shelling (2015) suggested employment rates between approximately 70 and 90% for individuals with ID who completed two specific postsecondary programs. Additionally, initial data from some states such as Ohio have demonstrated employment rates of approximately 80% for individuals completing postsecondary programs (Izzo et al., 2017). While these data must be interpreted cautiously, we can hypothesize that postsecondary programs such as TAP provide valuable experiences to individuals with mild to moderate levels of support need.

Given the successes of postsecondary programs for individuals with ID/DD who have moderate support needs (Hart, Grigal, & Weir, 2010) and Employment First mandates in Ohio, we sought to create opportunities for individuals with a wider level of support need. We envisioned a continuum of services through which we could ultimately model what Gerhardt and Lanier described as, “...the strengths and competencies of individuals” and “the benefits of their active inclusion in adult life in the community” (2011, p. 44). Thus, we expanded services to individuals with autism spectrum disorder (ASD) and other DD who experienced significantly more complex communication, sensory, and behavioral challenges. Today, ATS offers a university-based continuum of programs and services for adolescents and adults with ID/DD with mild to complex support needs.

A Continuum of Services and Supports

Within ATS, we provide services for adolescents and adults with ID/DD with varying levels of support needs. The specific programs include TAP, IMPACT Innovation, and the Collaboration for

Employment and Education Synergy (CEES). Table 1 provides a brief description of each of these programs. While these operate separately in terms of budgets, admittance criteria, and directorship, once enrolled, individuals can access services or support across programs. For example, a student enrolled in TAP might participate in an executive functioning group run through IMPACT. Similarly, individuals primarily served in IMPACT can register for courses (e.g., specific social curricula course) designed through TAP.

High school programs. In 2016, we developed CEES. With support from their local school districts (i.e., funding and transportation), approximately 50 individuals with ID/DD between 14 and 18 years of age attend CEES one time per week each semester. Sessions focus on individualized transition curriculum designed to encourage students to explore how their interests and abilities can be applied in the workplace, and promote the development of self-management and social skills, which are critical to paid employment (Noel, Oulvey, Drake, & Bond, 2017; Simonsen & Neubert, 2013). The primary goal of CEES is to build relationships between schools, home, and community partners that cultivate natural community supports, the importance of which have been described by Carter et al. (2011), Carter et al. (2016), and Test et al. (2014). The relationships students develop with company employees, while simultaneously experiencing increasing levels of independence sets the stage for next steps to employment in their communities.

In addition to supporting adolescents with ID/DD, CEES provides a valuable learning experience for between four and six student teachers and approximately six paid student staff each academic year. With support from

Table 1. *ATS Programs*

Description	Residential	Staffing Ratio	Campus Wide Access	Collegiate Course Access	Director	Assistant	Student Teachers	Adjunct use	Hourly Student Staff
CEES (2016, January) Semester long institute for adolescents (15-22) with ID/DD focused on employment and social communication	No	1:2		No	1	1	2-3	No	Yes
TAP (2012, August) Four-year, non degree college experience for high school graduates with ID/DD	Yes	Variable	Yes	Yes	2	0	0	Yes	Yes
IMPACT (2016, October) Ongoing day services for adults with DD who have complex communication, behavior, and sensory differences	No	1:1 or 2:1	Yes	Variable	1	1	0	No	Yes

the professional staff, the student teachers and paid staff gain critical experiences implementing transition related assessments, working across organizations and systems of support to create comprehensive plans for individual learners, and building community networks outside of schools for adolescents with ID/DD.

Postsecondary programs. TAP is part of the Think College network (<http://www.thinkcollege.net/>) and the Ohio Statewide Consortium (<https://u.osu.edu/otccc/>) for post secondary programs. TAP provides a four-year, residential college experience for individuals with intellectual and developmental disabilities for up to 40 students (10 students per collegiate year). Admission criteria include high levels of independence (the ability to spend long periods of time alone, including entire weekends), well-developed communication systems, and the ability to organize and manage a highly individualized course load. At the end of the four years, students exit the program with a certificate of completion and a digital portfolio highlighting their employment skills, strengths, and interests.

While primary outcomes or measures of TAP include independent living and employment after graduation similar to other post-secondary programs for individuals with ID (Thoma et al., 2012), another critical aspect are the inclusive, independent collegiate experiences that support students in developing social competence and self-determination (Grigal, Hart, & Weir, 2013). Hart and her colleagues (2010) identified several promising practices that play a critical role in the TAP organization. These include person centered planning, social mentoring, academic coaching, universal design for learning (UDL), competitive employment, social communication, self-

determination, and evaluation. Some of the supports for these practices, including person centered planning, mentoring and coaching, and developing social communication and self-determination skills, are housed within TAP. Others, however, such as UDL, are driven by the university. Still others, such employment and evaluation require supports from across ATS, our university, and the community.

Using a person centered approach, students, families, and staff identify individual outcomes related to employment, social competence and self-determination, and independence and community living. Specific goals are set each semester, including action steps, and experiences that will support goal related skills. While the actual experiences vary depending on student interests, most individuals register for at least one university course (audit or traditional credit) and at least one course offered by TAP related to the outcome areas (e.g., personal finance, healthy relationships, employment support). Students receive academic coaching focused on developing important executive functioning skills to complete coursework. Additionally, students engage in employment (e.g., internships) or employment related (e.g., vocational exploration for younger students) activities each semester. Students are paired with a social mentor who supports connections to the larger university community through access to evening or weekend activities. These social mentors also support students in practicing existing or newly acquired social communication and self-advocacy skills across campus.

The TAP staffing model includes a combination of fulltime, part time, and student staff. Two directors oversee TAP with support from three area coordinators (i.e., vocational, academic, and campus

living) as well as several part time adjunct instructors. Approximately 30 student workers also provide support across the program domains. For example, student workers provide coaching in academic, vocational, and independent living.

In addition to TAP, IMPACT Innovation serves approximately 20 adults with developmental disabilities who have significant or complex communication, sensory, and behavioral challenges. Unlike TAP, IMPACT operates for six hours per day, five days per week. Associates (individuals who participate in IMPACT) receive high levels of support as they move around campus each day. Associates engage in internships and paid employment, according to their level of independence and support needs. Additionally, daily opportunities for physical fitness, which is considered an evidence based practice for younger individuals with DD (Wong et al., 2014) and been shown to improve overall wellbeing for adults with ID (Rowland, 2013), occur at the campus recreation center. In addition, instruction using research-based health curricula for individuals with developmental disabilities is provided that focuses on personal care, healthy eating, and friendship/relationships (e.g., *Health Matters*, Marks, Sisirak & Heller, 2010; *Intimate Relationships and Sexual Health*, Davies & Dubie, 2011; and the *PEERS* curriculum, Laugeson & Frankel, 2010). Finally, to encourage life-long learning, IMPACT incorporates ongoing opportunities to build social skills and communication, expand leisure through activities such as art, music, and technology course, and, if applicable, course work in special interest areas.

The IMPACT staffing model includes a director and assistant, and one graduate assistant to support the leadership team.

Additionally, IMPACT employs approximately 25 part-time student workers each week. Due to the level of community integration, the staffing ratio does not exceed two associates per staff member.

Programmatic Domains

ATS programs address three broad domains including employment, personal growth and lifelong learning, and healthy and independent living. The concepts of self-determination (Wehmeyer & Shogren, 2016) and executive functioning (Craig, Margari, Legrottaglie, Palumbi, Giambattista, & Margari, 2016) weave across each area. Stated another way, individuals have opportunities to build specific self-determination, executive function, and social communication skills while also making gains across domains.

Employment. Both employment and financial security are critical factors that influence the quality of a person's life (Biggs & Carter, 2016; Ellenkamp, Brouwers, Embregts, Joosen, & Weeghel, 2016). Driven by Employment First, flexible employment opportunities and supports are embedded in ATS to support individuals in accessing community-integrated work that aligns to unique interests, skills, and personal desires (Wehman, Brooke, Lau, Targettm, 2013). This model is designed to provide employment to all individuals, no matter their level of support need. Several factors are critical to the model. First, as described by Carter et al. (2016) as an essential aspect of successful community integrated employment, long-term partnerships serve as the foundation for creating quality employment experiences. The ATS team has built relationships with several private businesses within or on close proximity to UC to avoid transportation challenges, which are often a barrier to employment for individuals with disabilities

(Noel, Oulvey, Drake, & Bond, 2017). Through collaboration with these employers, our team is able to offer a variety of experiences from job exploration to paid employment.

In addition to developing collaborative relationships, embedding evidence based practice (EBPSs) (Gilson, Carter, & Biggs, 2017) and providing employers with support and training to use these practices (Carter et al., 2016) is also essential for creating sustainable employment opportunities for individuals with ID/DD. Whether an individual is engaged in career exploration or beginning a paid job, we incorporate a variety of EBPs such as visual schedules and video models (Gilson et al., 2017). These EBPs become the foundation for training, supporting, and problem solving with employers.

A final critical factor is the focus on natural supports rather than traditional job coaches (Cimera, 2007). Natural supports are existing employees within a company. Because these individuals already know the work and company culture, they are often better suited to support individuals with disabilities. These natural supports are not job coaches (Wehman et al., 2013). Rather, they provide instruction and direction using the EBPs at the start of employment, and are available to coach and help problem solve when the employee faces a challenge. Perhaps even more importantly, natural supports help an individual become part of the work community by building relationships.

Personal growth and life-long learning. Ongoing access to academics is an essential aspect of all services in a university (Grigal et al., 2013; Hart et al., 2010). Within ATS, academic access is divided into several categories. This includes traditional

coursework for credit, auditing courses, courses developed specifically for individuals participating in ATS, and small group or one on one instruction. These flexible options provide individuals with the opportunities that most closely meet their needs, and are critical to individual success (Thoma et al., 2012). Individuals in TAP, for example, often take courses for credit or audit. Individuals participating in IMPACT, on the other hand, often begin with one on one or small group instruction, with the opportunity to access other courses when ready. While the courses someone participates in are highly individualized, we strive to address areas that are often barriers for individuals with disabilities during work, academically, or in the community. For example, social communication (Chen et al., 2015; Noel et al., 2017) and executive functioning (e.g., organizing information, following and carrying out a plan, flexible problem solving) are often challenges for youth and young adults in ATS (Hart et al., 2011). Developing skills in these areas can be essential for independence and ongoing success (Simonsen & Neubert, 2014). Thus, targeted instruction using social communication and problem solving curricula often occurs in small groups, with opportunities to use practice throughout the rest of the day.

Healthy and independent living. Historically, many postsecondary programs have focused on independent living as a primary outcome (Grigal et al., 2013), and learning to live independently is certainly one aspect of life for many individuals attending college, regardless of disability label. However, independent living goes beyond learning to cook basic meals, complete laundry, and solving basic household problems. Healthy and independent living also incorporates managing mental and physical well-being

(Rowland, 2013), building meaningful personal relationships (Wehman et al., 2013), and accessing the community in an individualized way (Simoes & Santos, 2017). Our goal is to move beyond basic independent living to focus on these many aspects of what it means to live a healthy, fulfilled adult life. Individuals accessing services through ATS exercise at our rec center independently, with a mentor or with an individual fitness trainer, depending on their level of need and interest. Some individuals also participate in university courses teaching health and wellness (e.g., human sexuality), and others participate in small groups or one on one supports related to managing health care needs such as making health appointments, organizing medicine independently, and advocating for their own medical needs.

In the next section, we offer three case examples highlighting the varied experiences of individuals accessing services and supports through ATS. These examples highlight how employment, personal growth and lifelong learning, and healthy and independent living are integrated across programs.

Example One: Jeff

Jeff is a 17-year-old, Caucasian male who has been identified as having intellectual disability. He lives with his parents at home in Southwest Ohio. During the school year, Jeff attended the CEES program once per week, paid for through school district funding. Before beginning the program, the CEES director and one student teacher met Jeff, talked with his teachers and family, and conducted several assessments to identify his preferences, strengths, needs, and interests.

Jeff's interests include playing sports such as football and weight lifting, as well as

spending time with friends. Based on the assessments and interviews, the CEES team developed targeted goals for Jeff related to specific employment skills necessary for integrated community work, social communication skills necessary for workplace social interactions, and increasing independence in the community. During CEES, he engaged in activities related to these goals each week. For example, each week he explored vocational experiences to determine what type of job would best fit his skill set. Jeff also spent time with staff and the natural supports (i.e., individuals employed in the setting who support an individual with a disability) in the workplace learning work habits and attitudes, and the expectations of an employment setting. Additionally, he developed habits related to workplace responsibility and collaborating with others.

A sample of Jeff's day at CEES highlights how the three areas were woven into his experience and how his goals supported community access. Upon arrival, Jeff joined his peers in a small group where they discussed and role-played workplace and campus expectations. Next, Jeff transitioned to his internship with a student teacher from CEES. Jeff started the semester working at the Center Court bakery in one of our campus food courts. He prepared cookie trays and other baked goods. During the internship, Jeff developed the skills such as following directions from a supervisor, being courteous to co-workers, and initiating new tasks. Jeff also completed an internship in ATS Delivers, a delivery service on campus. Jeff's targets included initiating conversations, responding appropriately to requests, and traveling independently.

After work, Jeff met several friends in a gathering space for students on campus for lunch and socializing. After lunch, he

participated in a structured social skills class. The lesson topics varied each week, but centered around job preparation. Through these lessons, Jeff explored career options that aligned with his personal interests, developed his resume, and investigated the steps he needed to take to successfully continue his career pathway.

At the end each day, Jeff left campus and returned to his school. At least one of the student teachers visited Jeff several times throughout the semester, sharing materials and resources with his teachers and families, and providing progress updates. As Jeff progressed through CEES, applied for a job on campus in Center Court. The summer following CEES completion, he worked ten hours per week. His mother drove him to campus each day, where someone he met during his internship served as his natural support.

Example Two: Marco

Marco is a 23-year-old male with Down Syndrome enrolled as a sophomore in TAP, funded by the tuition his family pays to the university. He grew up in a small community, and participated in mostly inclusive high school classes. Before entering the program, TAP staff conducted a series of assessments to support Marco in identifying his preferences, interests, strengths, and needs in areas such as social-communication, executive function, and community independence.

Marco is very social, and enjoys skiing, exercising and sports. Since entering the program, his goals have included a combination of academic, social, employment, and independence. Marco and his family identified social relationships, self-determination, and self-management as three critical areas to address. Self-management seemed to rise to the top of

Marco's list of goals. For example, at times Marco would become very overwhelmed in academic and employment settings. He wanted to develop a strategy for calming and then interacting with others. Additionally, Marco consistently described social competence as important. He clearly wanted to develop technology skills to interact with peers he met in class. Other targets have included managing the personal aspects of day-to-day college life. For him, skills such as finding activities of interest, dressing appropriate for collegiate life, being on time, and asking for help were all important steps for increasing independence.

Like any college student, Marco's schedule varied daily. On Monday, Wednesday and Friday he worked in the morning at an internship secured by the program's job developer. He then met a few friends for lunch at the campus-dining hall. After lunch, Marco attended an inclusive university course he audited. At the end of the day, he participated in a TAP class he learned organization and self-management skills.

When his academic courses were finished, Marco often headed back to his dorm to hang with friends or do homework. On a typical evening, he went to dinner before going to a basketball game on campus. Other evenings, Marco attended study tables facilitated by a residential assistant in his dorm. Marco's schedule also included meetings with his advisor, peer mentor and life coach.

Marco made substantial progress in self-management and communication by the end of his sophomore year. For example, upon initially entering the program, Marco's reactions to stress included skipping classes, and often sending emails or texts that were difficult to decipher. However, overtime, Marco developed several coping skills. It is

worth noting that perhaps most important, he was developed the skills to engage in community activities including his classes, internships, and social activities without becoming overwhelmed. Now, when he becomes upset, he is able to consistently recognize his stress, use a calming strategy, and then communicate his needs verbally or in writing. This spring, using data from his course instructors and program staff, Marco met with his TAP team and family to discuss new goals. Examples included obtaining summer employment, expanding his social circle, and connecting to community organization to explore employment and living options after graduation.

Example Three: Jill

Jill is an 18-year-old, African American female with a diagnosis of autism spectrum disorder and attention-deficit/hyperactivity disorder (ADHD). She lives with her mother, two brothers, and two sisters. Jill attends IMPACT Innovation five days a week through funding from her Medicaid level one waiver. Jill's interests include videos, being in the community, surfing the Internet, being at the library, music, and swimming. Due to the unique design and location of IMPACT Innovation, Jill gets to explore each of these interests and more each day within the context of her individualized programming.

Jill receives intensive services in three areas each day including a) academic/life-long learning supports, b) employment supports/activities, and c) healthy and independent living activities/supports. Within these domains, Jill has specific goals. She is exploring employment experiences to determine what type of job would best fit her skill set. Jill is working on social pragmatic skills and conversational skills such as modulating her volume and rate of speech, and differentiating communication

based upon relationships with the listener. Finally, Jill would also like to increase her overall physical health.

A sample of Jill's day at IMPACT highlights how the three domains are woven into her day and how she is working on current goals. Jill's day begins when she independently navigates transportation to IMPACT using a shared-ride public transportation service for individuals with disabilities. Jill arrives at IMPACT at 9am. She starts her day in her office where she completes her arrival routine and previews her daily schedule. After the arrival routine, Jill is off to the student recreational center where she will meet a personal trainer, Peter. Peter and Jill first do one-on-one weight training followed by a dip in the pool. Next, Jill meets some friends at the Student Center for lunch. After lunch, Jill reports to her internship in an office on campus. During her internship, Jill completes filing and organizational tasks.

Once work is complete, Jill attends a music class offered by the UC College-Conservatory of Music. The last thing on Jill's schedule for the day is communication instruction with Robin, a graduate student in the department of Communication Sciences and Disorders. During this session, Jill works on conversational skills as well as social boundaries. Jill then returns to her office to review and reflect on her day, looks ahead to what is on the schedule for tomorrow, takes a break, and prepares for the transition home. At 3:00 pm Jill's day is complete when public transportation arrives.

Since joining IMPACT, Jill has determined that she prefers to work in a quiet space with highly organized tasks. She is currently able to work for approximately 20 minutes and then takes a break. Jill also enjoys being around people during social activities such

as when she is exercising and eating lunch. Jill would like to continue to explore employment opportunities and meet new friends. She would also like to explore science related topics such as the solar system for leisure.

Mark, Marco, and Jill participate in three different programs within ATS. The differences include funding source, staffing models, and levels and types of supports. Despite these differences, commonalities exist including the focus on employment supports, personal growth and life long learning, and healthy and independent living. By having flexible opportunities and supports, we can serve individuals with varying level of needs, share resources such as curriculum between programs, and provide flexible options to individuals and their families in an inclusive community setting. Below we will discuss some of the facilitators and barriers to creating the continuum.

Discussion

Legislative and advocacy efforts have led to increasing access to postsecondary and community integrated employment as avenues for improving quality life experiences for individuals with ID/DD (Grigal, Migliore, & Hart, 2014; Martinez, 2013; Rogan & Rinne, 2011; Thoma et al., 2012), and universities offer a unique environment in which these experiences can occur for individuals who have a continuum of strengths and needs (Hendrickson, Carson, Woods-Grove, Mendenhall, & Scheidecker, 2013). The physical environment offers a range of activities, resources, and experiences, often all within a small area. The academic environment provides access to coursework not otherwise available. Perhaps more importantly, the academic environment offers a context for building meaningful relationships between

individuals with ID/DD (Hart et al., 2010), including those with significant support needs, and faculty, staff, and students. Developing these systems of support, however, is and will continue to be challenging (Wehman, Chan, Ditchman, Kang, 2014; Plotner & Marshall, 2014; Thoma et al., 2012).

Facilitators, Challenges, and Future Directions

In the short history of ATS, we experienced barriers and facilitators to success that have been described by others in relation to both employment and post-secondary education (Grigal & et al., 2013; Plotner & Marshall, 2015; Rogan & Rinne, 2011; Thoma et al., 2012). Frequently, a specific factor proves to be both a support and challenge. This is especially true for funding, staffing, and implementing evidence-based practices to support the individuals we serve.

Funding. Funding has been described as a considerable challenge for both post-secondary programs and innovative employment configurations (Plotner & Marshall, 2015; Rogan & Rinne, 2011). Creating a financially sustainable model rises to the top of our list of facilitators and barriers to success. All ATS services started with small planning grants from either our college or local foundations, and now operate with braided funding models. Similar to other post-secondary models, our funding includes a combination of state or federal funds (e.g., grants, waiver, school tuition), private pay, and fundraising. However, financial sustainability continues to be a concern (Grigal et al., 2013). It is essential for legislation, funding, and programs to evolve in tandem (Shogren, Luckasson, & Shalock, 2015; Wehman et al., 2014).

Many legislative efforts have paved the way for individuals to attend IHEs and participate more fully in paid employment in their communities (Shogren et al., 2014). There are pockets of excellence across states where agencies collaborate successfully for positive individual outcomes (Grigal et al., 2014; Plotner & Marshall, 2014; Plotner & Marshall, 2015). However, many individuals still face a system in which services exist in siloes and funding streams do not work together efficiently and effectively (Thoma et al., 2012).

Staff development. The individuals who support post-secondary education and integrated employment for people with ID/DD play a critical role as they have the capacity to influence outcomes (De Waele et al., 2005; Gerhardt, Cicero, & Mayville, 2014; Wehman et al., 2013). Within ATS, we employ approximately 70 students each week from programs such as special education, speech language, psychology, health promotions, and even aerospace engineering. Additionally, approximately 40 students serve as volunteers and mentors each semester. These students certainly develop skills and strategies for supporting individuals with ID/DD in inclusive settings. More importantly, they develop dispositions toward inclusion that change who they are as people (Cullen, Gregory, & Noto, 2010). One graduate assistant stated, “I’m not the same person I was a year ago. I have a completely different perspective and understanding of behavior and who these people are.” However, staff development is an ongoing, persistent issue, and there are few resources for demonstrating evidence based practice implementation with adults in community settings.

Creating a thorough staff development model is important for moving community based services for adults forward (Hewitt &

Larson, 2007), no matter where they occur. Quality training and development are essential for improving outcomes for individuals with ID/DD we serve (Gerhardt et al., 2014). More importantly, a quality development model is critical for both our student workers and organizations doing similar work. A well-developed model could prove to be a valuable source of supplemental instruction for the future professionals such as educators, doctors, and health promotion majors we employ. Such a model could also be used across organizations both regionally and nationally to increase both retention rates of direct support staff and improve intervention effectiveness (Gerhardt and Lanier, 2011).

Evidence based practices for adults. There has been an increasing focus on evidence-based practices for school aged individuals with ID/DD (Spooner, McKissick, & Knight, 2017; Wong et al., 2015). However, while best practices in transition and supported employment exist (Hendricks & Wehman, 2009; Simonsen & Neubert, 2012), little is known about the utility of these specific EBPs for building explicit skills in employment and other community settings (Gerhardt & Lanier, 2011). Thus, investigating existing EBPs for building skills and supporting individuals into adulthood is a critical area for research (Bishop-Fitzpatrick, Minshew, & Eack, 2014; Hendricks & Wehman, 2009; Turygin & Matson, 2014).

Strategies such as video modeling, systematic prompting, and reinforcement are likely to be effective for a variety of skills (Gilson et al., 2017). However, the research must reflect the nature of the adult world and the communities in which we live and work. Community environments are dynamic, requiring flexibility and critical thinking by individuals with disabilities and

the people providing support (Hendricks & Wehman, 2009). Thus, research must address strategies for efficiently and effectively implementing EBPs across community settings (e.g., recreation, health, employment) (Gerhardt & Lainer, 2011). Similarly, research highlighting how these strategies promote quality of life is essential. We must ask complex question such as, which strategies are the easiest to implement by individuals with limited training or resource, and how will these increase access to the areas frequently addressed in discussion of quality of life – independence, employment, and relationships.

Concluding Comments

For at least the past decade, national trends have pushed IHEs to expand inclusivity efforts to include individuals with ID/DD who have moderate support needs. A model such as ATS pushes the faculty and staff in these institutions, especially those with schools of education and/or existing postsecondary programs for individuals with ID, to expand our thinking and vision to individuals who have extensive support needs. The relationships that develop when we offer a continuum of programs on university campuses have the power to change how we include individuals with varying levels of support need in our communities now and in the future.

References

- Beadle-Brown, J., Leigh, J., Whelton, B., Richardson, L., Beecham, J., Baumker, T., & Bradshaw, J. (2016). Quality of life and quality of support for people with severe intellectual disability and complex needs. *Journal of Applied Research in Intellectual Disabilities, 29*, 409-421. doi: 10.1111/jar.12200.
- Biggs, E. E., & Carter, E. W. (2016). Quality of life for transition-age youth with autism or intellectual disability. *Journal of Autism and Developmental Disorders, 46*, 190-204.
- Bishop-Fitzpatrick, L., Minshew, N. J., & Eack, S. M. (2014). A systematic review of psychosocial interventions for adults with autism spectrum disorders. In F. Volkmar, B. Reichow, & McPartland (Eds.), *Adolescents and adults with autism spectrum disorders* (pp. 315-327). New York: Springer.
- Burgess, S., & Cimera, R. E. (2014). Employment outcomes of transition-aged adults with autism spectrum disorders: A state of the states report. *American Journal on Intellectual and Developmental Disabilities, 119*, 64-83. doi: 10.1352/1944-7558-119.1.64.
- Butterworth, J. Smith, F. A., Hall, A. C., Migliore, A., Winsor, J., & Domin, D. (2014). StateData: The national report on employment services and outcomes, 2013 edition. Boston, MA: University of Massachusetts, Institute for Community Inclusion. Retrieved from <http://book.statedata.info/13/>.
- Carter, E., Austin, D., & Trainor, A. (2011). Factors associated with the early work experiences of adolescents with severe disabilities. *Intellectual and Developmental Disabilities, 49*, 233-247. doi: 10.1352/1934-9556-49.4.233.
- Carter, E. W., Blustein, C. L., Bumble, J. L., Harvey, S., Henderson, L. M., & McMillan, E. D. (2016). Engaging communities in identifying local strategies for expanding integrated employment during and after high school. *American Journal on Intellectual and Developmental Disabilities, 121*, 398-418. doi: 10.1352/1944-7558-121.5.398.

- Chiang, H. M., & Wineman, I. (2014). Factors associated with quality of life in individuals with autism spectrum disorders: A review of literature. *Research in Autism Spectrum Disorders*, 8, 974-986. Doi. 10.1007/s1080301112971.
- Chen, J. L., Leader, G., Sung, C., & Leahy, M. (2015). Trends in employment for individuals with autism spectrum disorder: a review of the research literature. *Review Journal of Autism and Developmental Disorders*, 2, 115-127. Doi. 10.1007/s40489-014-0041-6.
- Chezan, L. C., Petcu, S. D., & Van Horn, M. L. (2017). A preliminary investigation of employment data collection in postsecondary education for students with intellectual and developmental disability. *Journal of Intellectual & Developmental Disability*, 1-12. doi:10.1352/19447558121.1.1.
- Cimera, R. E. (2007). The cost-effectiveness of supported employment and sheltered workshops in Wisconsin (FY 2002–FY 2005). *Journal of Vocational Rehabilitation*, 26, 153-158.
- Craig, F., Margari, F., Legrottaglie, A. R., Palumbi, R., de Giambattista, C., & Margari, L. (2016). A review of executive function deficits in autism spectrum disorder and attention-deficit/hyperactivity disorder. *Neuropsychiatric Disease and Treatment*, 12, 1191-1212.
- Cullen, J. P., Gregory, J. L., & Noto, L. A. (2010). The Teacher Attitudes toward Inclusion Scale (TATIS) Technical Report. *Online Submission*.
- Davies, C., & Dubie, M. (2011). *Intimate relationships and sexual health: a curriculum for teaching adolescents/adults with high-functioning autism spectrum disorders and other social challenges*. Shawnee Mission, Kansas: AAPC Publishing.
- De Waele, I., Van Loon, J., Van Hove, G., & Schalock, R. L. (2005). Quality of life versus quality of care: implications for people and programs. *Journal of Policy and Practice in Intellectual Disabilities*, 2, 229-239. doi. 10.1111/j.1741-1130.2005.00035.x.
- Ellenkamp, J. J., Brouwers, E. P., Embregts, P. J., Joosen, M. C., & van Weeghel, J. (2016). Work environment-related factors in obtaining and maintaining work in a competitive employment setting for employees with intellectual disabilities: A systematic review. *Journal of Occupational Rehabilitation*, 26, 56-69.
- Erickson, W. Lee, C., & Von Schrader, S. (2010). 2008 Disability Status Report: The United States. Ithaca, NY: Cornell University Rehabilitation Research and Training Center on Disability Demographics and Statistics.
- Gauthier-Boudreault, C., Gallagher, F., & Couture, M. (2017). Specific needs of families of young adults with profound intellectual disability during and after transition to adulthood: What are we missing? *Research in Developmental Disabilities*, 66, 16-26.
- Gerhardt, P. F., Cicero, F., & Mayville, E. (2014). Employment and related services for adults with autism spectrum disorders. In F. Volkmar, B. Reichow, & McPartland (Eds.), *Adolescents and adults with autism spectrum disorders* (pp. 105-119). New York: Springer New York.
- Gerhardt, P., & Lanier, I. (2011). Addressing the needs of adolescents and adults with autism: A crisis on the horizon. *Journal of Contemporary Psychotherapy*, 41, 37-45. doi:10.1007/s10879-010-9160-2.
- Gilson, C. B., Carter, E. W., & Biggs, E. E. (2017). Systematic review of instructional methods to teach employment skills to secondary students with intellectual and developmental disabilities. *Research and Practice for Persons with Severe Disabilities*, 42, 89-107. doi. 10.1177/1540796917698831.
- Grigal, M., Paiewonsky, M., & Hart, D. (2016). Postsecondary education for students with intellectual disability. In M. Wehmeyer & K. Shogren (Eds.), *Handbook of research-*

- based practices for educating students with intellectual disability* (pp. 471 -492). New York: Routledge.
- Grigal, M., Hart, D., & Weir, C. (2013). Postsecondary education for people with intellectual disability: Current issues and critical challenges. *Inclusion, 1*, 50-63. Doi. 10.1352/2326-6988-1.1.050.
- Grigal, M., Migliore, A., & Hart, D. (2014). A state comparison of Vocational Rehabilitation support of youth with intellectual disabilities' participation in postsecondary education. *Journal of Vocational Rehabilitation, 40*, 185-194. doi. 10.3233/JVR-140683.
- Hart, D., Grigal, M., & Weir, C. (2010). Expanding the paradigm: Postsecondary education options for individuals with autism spectrum disorder and intellectual disabilities. *Focus on Autism and Other Developmental Disabilities, 25*, 134-150.
- Hendricks, D. R., & Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders: Review and recommendations. *Focus on Autism and Other Developmental Disabilities, 24*(2), 77-88. doi. 10.1177/1088357608329827.
- Hendrickson, J. M., Carson, R., Woods-Groves, S., Mendenhall, J., & Scheidecker, B. (2013). UI REACH: A postsecondary program serving students with autism and intellectual disabilities. *Education and Treatment of Children, 36*, 169-194.
- Hewitt, A., & Larson, S. (2007). The direct support workforce in community supports to individuals with developmental disabilities: Issues, implications, and promising practices. *Developmental Disabilities Research Reviews, 13*, 178-187. doi. 10.1002/mrdd.20151.
- Higher Education Opportunity Act of 2008, Pub.L. No. 110–315 § 122 STAT. 3078 (2008).
- Izzo, M. V., Heider, A., Green, J. C., Cleary, D., & Brown, C. (2017). *Ohio's statewide consortium: Enhancing employment outcomes for students with intellectual and developmental disabilities through inclusion in postsecondary programs*. Columbus, OH: Ohio State University Nisonger Center.
- Kober, R., & Eggleton, I. R. (2005). The effect of different types of employment on quality of life. *Journal of Intellectual Disability Research, 49*, 756-760. Doi. 10.1111/j.1365-2788.2005.00746.x.
- Kramer, J. (2016). *Bringing Employment First to scale: Knowledge translation and support for individuals and families*. Available at: <http://works.bepress.com/john-kramer/1/>.
- Laugeson, E., & Frankel, F. (2010). *Social skills for adolescents and teenagers with developmental and autism spectrum disorders*. New York: Routledge.
- Marks, B., Sisirak, J., & Heller, T. (2010). *Health Matters: The exercise and nutrition health education curriculum for people with developmental disabilities*. Baltimore, MD: Brookes Publishing Company.
- Martinez, K. (2013). Integrated employment, Employment First, and US federal policy. *Journal of Vocational Rehabilitation, 38*, 165-168.
- McKenzie, K., Ouellette-Kuntz, H., Blinkhorn, A., & Démoré, A. (2017). Out of school and into distress: families of young adults with intellectual and developmental disabilities in transition. *Journal of Applied Research in Intellectual Disabilities, 30*, 774-781. doi:10.1111/jar.12264
- Moore, E., & Schelling, A. (2015). Postsecondary inclusion for individuals with intellectual disability and its effects on employment. *Journal of Intellectual Disabilities, 19*, 130-148. doi.10.1177/1744629514564448.

- Noel, V. A., Oulvey, E., Drake, R. E., & Bond, G. R. (2017). Barriers to employment for transition-age youth with developmental and psychiatric disabilities. *Administration and Policy in Mental Health and Mental Health Services Research, 44*, 354-358.
- Plotner, A. J., & Marshall, K. J. (2014). Navigating university policies to support postsecondary education programs for students with intellectual disabilities. *Journal of Disability Policy Studies, 25*, 48-58. doi. 10.1177/1044207313514609.
- Plotner, A. J., & Marshall, K. J. (2015). Postsecondary education programs for students with an intellectual disability: Facilitators and barriers to implementation. *Intellectual and Developmental Disabilities, 53*, 58-69. doi. 10.1352/19349556.53.1.58.
- Rogan, P., & Rinne, S. (2011). National call for organizational change from sheltered to integrated employment. *Intellectual and Developmental Disabilities, 49*, 248-260.
- Ross, J., Marcell, J., Williams, P., & Carlson, D. (2013). Postsecondary Education Employment and Independent Living Outcomes of Persons with Autism and Intellectual Disability. *Journal of Postsecondary Education and Disability, 26*, 337-351.
- Rowland, J. L. (2013). Exercise, Leisure, and Well-Being for People with Disabilities. In M. Wehmeyer (Ed.), *The Oxford handbook of positive psychology and disability* (pp. 82-90). New York: Oxford University Press.
- Schalock, R. L., Verdugo, M. A., Gomez, L. E., & Reinders, H. S. (2016). Moving us toward a theory of individual quality of life. *American Journal on Intellectual and Developmental Disabilities, 121*, 1-12. doi. 10.1352/1944-7558-121.1.1.
- Shogren, K. A., Luckasson, R., & Schalock, R. L. (2015). Using context as an integrative framework to align policy goals, supports, and outcomes in intellectual disability. *Intellectual and Developmental Disabilities, 53*, 367-376. Doi. 10.1352/1934-9556-53.5.367.
- Shogren, K. A., Shaw, L. A., & Little, T. D. (2016). Measuring the early adulthood outcomes of young adults with disabilities: Developing constructs using NLTS2 data. *Exceptionality, 24*, 45-61. doi:10.1080/09362835.2015.106464416.
- Simonsen, M. L., & Neubert, D. A. (2013). Transitioning youth with intellectual and other developmental disabilities: Predicting community employment outcomes. *Career Development and Transition for Exceptional Individuals, 36*, 188-198.
- Siperstein, G., Heyman, M., & Stokes, J. (2014). Pathways to employment: A national survey of adults with intellectual disabilities. *Journal of Vocational Rehabilitation, 41*, 165-178. doi. 10.3233/jvr-140711.
- Simões, C., & Santos, S. (2017). The Impact of Personal and Environmental Characteristics on Quality of Life of People with Intellectual Disability. *Applied Research in Quality of Life, 12*, 389-408. doi. 10.1007/s11482-016-9466-7.
- Spooner, F., McKissick, B. R., & Knight, V. F. (2017). Establishing the state of affairs for evidence-based practices in students with severe disabilities. *Research and Practice for Persons with Severe Disabilities, 42*, 8-18. Doi. 10.1177/1540796916684896.
- Test, D., Smith, L., & Carter, E. (2014). Equipping youth with autism spectrum disorders for adulthood: Promoting rigor, relevance, and relationships. *Remedial and Special Education, 35*, 80-90. doi. 10.1177/0741932514857.
- Thoma, C., Austin, K., Achola, E., Batalo, C., Carlson, D., Boyd, K., ... & Wolfe, D. (2012). The state of postsecondary education for persons with intellectual disabilities: What are the perceptions of key stakeholders? *Creative Education, 3*, 1122-1129.

- Thoma, C. A., Lakin, K. C., Carlson, D., Domzal, C., Austin, K., & Boyd, K. (2011). Participation in Postsecondary Education for Students with Intellectual Disabilities: A Review of the Literature 2001-2010. *Journal of Postsecondary Education & Disability*, 24, 175–191.
- Turygin, N. & Matson, J. (2014). Adaptive behavior, life skills, and leisure skills training for adolescents and adults with autism spectrum disorder. In F. Volkmar, B. Reichow, & McPartland (Eds.), *Adolescents and Adults with Autism Spectrum Disorders*, (pp. 131-160). New York: Springer.
- U.S. Department of Labor. (2014). Employment First. Retrieved from <https://www.dol.gov/odep/topics/EmploymentFirst.htm>.
- Wehman, P., Brooke, V., Lau, S., & Targett, P. (2013). Supported Employment. In M. Wehmeyer (Ed.), *The Oxford handbook of positive psychology and disability* (pp. 338-364). New York: Oxford University Press.
- Wehman, P., Chan, F., Ditchman, N., & Kang, H. J. (2014). Effect of supported employment on vocational rehabilitation outcomes of transition-age youth with intellectual and developmental disabilities: A case control study. *Intellectual and Developmental Disabilities*, 52, 296-310. doi. 10.1352/1934-9556-52.4.296.
- Wehman, P., Schall, C. M., McDonough, J., Graham, C., Brooke, V., Riehle, J. E., ... & Avellone, L. (2017). Effects of an employer-based intervention on employment outcomes for youth with significant support needs due to autism. *Autism*, 21, 276-290. doi: 10.1177/13623613166358.
- Wehmeyer, M. L., & Shogren, K. A. (2016). Self-determination and choice. In N. Singh (Ed.) *Handbook of evidence-based practices in intellectual and developmental disabilities* (pp. 561-584). New York: Springer International Publishing.
- Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., ... Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, 45, 1951-1966. doi. 10.1007/s10803-014-2351-z.
- Zafft, C., Hart, D., & Zimbrich, K. (2004). College Career Connection: A Study of Youth with Intellectual Disabilities and the Impact of Postsecondary Education. *Education & Training in Developmental Disabilities*, 39, 45–53.

Correspondence concerning this article should be addressed to Christina R. Carnahan, University of Cincinnati, 2610 McMicken Circle, Cincinnati, OH 45221. E-mail: carnahc@ucmail.uc.edu

Gender Identity and Sexual Diversity: Supporting Individuals with an Intellectual or Developmental Disability

Gloria Y. Niles
University of Hawaii - West Oahu

Elizabeth A. Harkins Monaco
University of Pittsburg - Johnstown

The diversity of individual identities is multi-faceted and unique to human existence. Inherent within the process of human development is the developmental process of forming a healthy concept of self. Gender and sexuality are essential components of an individual's unique sense of self. An individual's identity development is influenced by both intrinsic and extrinsic factors; a melding of both nature and nurture (Diamond, 2006). Heteronormative assumptions influence social expectations, which presume that gender and sexuality conform to a cisgender binary, with a corresponding heterosexual orientation. When gender and sexuality diversity are viewed as a non-binary continuum, individuals develop the self-determination to explore and define their gender and sexuality identity, inclusive of a diverse array of unique possibilities. Individuals with intellectual or developmental disabilities have gender identities and sexuality. When supported in their self-defined identity development and are affirmed in the process of self-determination, individuals with intellectual or developmental disabilities are given agency to self-identify to express their gender identity and explore their unique sexual orientation. In order to promote gender and sexual identity, parents and educators of individuals with intellectual or developmental disabilities must be prepared to support and explain the complexities of gender and sexuality diversity.

The satisfaction of defining one's personal identity promotes optimal functioning, daily wellbeing, and the realization of one's potential (Deci & Ryan, 2000). Identity formation, a critical element in healthy psychosocial functioning, directly impacts value systems, self-concept, and self-worth. Self-identity formation is developmental, individualized, and evolving; a process that involves simultaneous and sequential interconnections of biological, psychological, and environmental factors. Gender and sexuality are universal components of all humans, and are essential components of an individual's identity (Diamond, 2009).

Identity and Self Determination

Self-determination theory is a "broad-based

motivation theory that endorses the role of a set of psychological needs in determining human behavior and decision making" (Deci & Ryan, 2000; Vansteenkiste et al., 2008). In other words, this refers to the amount of daily experiences that reinforces basic satisfaction and psychological needs: *autonomy* or the innate desire to control personal decision-making and the initiation, maintenance, and regulation of behavior; *competence* or the need to experience success at setting goals and accomplishing challenging tasks; and *relatedness* or a sense of regard and connectedness in relationships (Deci & Ryan, 2000). When these needs are satisfied, a person achieves ultimate psychological freedom to make logical decisions. Feelings of accomplishment, control, and senses of belonging are

reinforced.

Ultimately self-determination's role in defining human behavior across different situations and settings is critical when developing personal value systems (Deci & Ryan, 2000). If one does not attain full autonomy, individuals could revert to states of indifference and experience unhappiness, poor health, or isolation. For those who experience innate struggles with decision-making and self-awareness, specifically with sexual and gender maturity, there is increased risk for limited exploration and awareness, never developing a full identity (Deci & Ryan, 2000; S. J. Schwartz, Co^{te}, & Arnett, 2005). This has direct impact on populations that are easily overwhelmed, such as people with intellectual or developmental disabilities. Luyckx, Vansteenkiste, Goossens, & Duriez, (2009) suggests that in these cases, "freedom can be tyrannizing rather than liberating (e.g., B. Schwartz, 2000)." People with intellectual or developmental disabilities have historically struggled attaining full competence and often are not able to accomplish challenging tasks, set goals, or regulate their behavior. In addition, they generally participate in fewer social activities and have less intimate relationships as compared with typically developing peers. Less socialization results in less exposure, ultimately contributing to reduced perspective taking and a lack of relatedness.

Gender Identity and Expression

Genetic factors determine the biological sex of a human from the moment of conception. However, the prenatal development of the reproductive system is only a starting point for gender and sexuality identity. Gender and sexuality are not directly correlated to a person's assigned biological sex; they are also tied to cultural acceptance and values,

and cannot occur in isolation. Intrinsically, identity is linked to various behaviors, thoughts, and feelings that are learned at early ages and from a variety of sources, such as parents, family, friends, religion, the media, or overall societal experiences. Societal impact is critical – individuals who develop an overall sense of self, contribute to overall societal acceptance of diverse cultural factors (Arnett, 2000). It expedites tendencies to move toward greater self-awareness and integrated identity development (Luyckx, et al., 2009).

Gender, male or female, differs from assigned biological sex, and is a biased interaction between neurological functions and social influences and perceived self-perception. Cultural norms are heavily influenced by society's expectations about how one should think and act. Gender constructs refer to a complex mix of beliefs, behaviors, and characteristics, specifically including actions, communication styles, and behaviors (Planned Parenthood, 2017). Gender identity, how one personally feels and expresses gender, is typically expressed through clothing, behavior, and personal appearance. Feminine traits are typically associated with being a girl or woman, whereas masculine traits are usually associated with being a boy or man; when a person's gender identity matches their assigned biological sex, the person is referred to as cisgender (Bryan, 2012). Other times, people find that their gender identity opposes their biological sex and identify as transgender. People who identify as transgender may prefer to express their true identity by shifting their clothing, behavior, and personal appearance to represent their identified gender.

Biological Sex

Humans are genetically predisposed and are born with constitutional, genetic, and

hormonally mediated innate patterning related to all aspects of sexuality. Biological sex is assigned as soon as an individual's external genitalia are observed, whether prenatally or at birth. Biological sex is determined by anatomy of the reproductive organs, endocrinology and based on the chromosomal pairing, typically XX for female and XY for male. For individuals with an intellectual or developmental disabilities, the biological process of gender and sexual development typically progress through the same development prenatally, from birth to puberty, and throughout adulthood. However, from the moment a biological sex is assigned, males and females may be treated differently, either consciously or unconsciously (Diamond, 2009). Sex assignment biases the way society will interact with the individual, and will anticipate the individual's reactions.

Gender Variations

Historically, gender identity was considered a binary of male or female. However, contemporary constructs of gender recognize that gender identity is a variation on a continuum with male/masculine or female/feminine representing the opposing endpoints of the continuum. Commonly, when asked to identify one's gender, binary selections of either male or female are provided, forcing an individual to select one or the other. In a study of college undergraduates, when asked to identify their gender using 3 choices of man, woman or non-binary, 98% chose man or woman. However, when given a 9-point scale with a varied gender identity distribution, the range on the 7 points in between the ends, which represented "identify as man" or "identify as woman" increased from 2% to 20% (Bryan, 2015). In reality, the majority of men have feminine traits, and many women have some masculine traits, and both may show different traits at different times (Bryan,

2015). Bryan's findings suggest that when given a continuum of gender variation, significantly more individuals identify as a gender variation that does not conform to the traditional gender binary. While understanding the complexities of gender variation is confusing, individuals must explore their own perceptions, and be provided with support and flexibility to explore gender roles in childhood. This exploration provides the opportunity to discover and self-identify one's own gender identity.

The Report of the 2015 U.S. Transgender Survey (USTS) conducted by the National Center for Transgender Equality demonstrates that individuals with intellectual or developmental disabilities are represented among individuals who identify as transgender. Survey respondents were asked about their disability status based on questions from the American Community Survey (ACS), in order to compare those in the USTS sample to those with disabilities in the U.S. general population. Overall, 39% of respondents indicated they had one or more disability as described in the ACS, compared to 15% of the general population. Using the ACS disability questions, 30% of USTS indicated having serious difficulty with making decisions because of a physical, mental or emotional condition, compared to 5% of the U.S. general population. Additionally, respondents were nearly four times as likely to report difficulty doing errands alone, such as visiting a doctor's office or shopping because of a physical, mental or emotional conditions, at 22% compared to 6% in the U.S. general population. The USTS findings related to disability suggest that individuals with intellectual or developmental disabilities are represented among the 27,715 respondents (James, Herman, Rankin, Keisling, Mottet, & Anafi, 2016).

Social Influences on Gender Identity Formation

Children begin to observe and explore socially constructed gender roles at a very young age (Bryan, 2012). By the age of 2 year's old, toddlers can self-identify as either boy or girl. At this age, children begin to show preferences for toys, colors, and mannerisms that represent their gender. However, young children also continue to explore gender roles through imaginative play, clothing selection, peer and family relationships. Parents and educators significantly influence children's gender identity and expression through comments, gifts, and presumed interests. For children with intellectual or developmental disabilities, oftentimes there are few options for gender exploration, as clothing choices are made for them, and developmentally delayed play skills may limit the degree of exploration of gender roles experienced through the typical developmental sequence of imaginative play.

Cultural influences shape various subgroups early on. Children for example, adopt behaviors that are rewarded or seen positively, and stop or hide behaviors that are criticized or punished. By age 3, a child has learned to prefer toys and clothes that are "appropriate" to what rules society has determined, whether with sexuality, gender, or other elements of identity (Planned Parenthood, 2017). These predetermined stereotypes require certain attributes that are beyond anyone's control, and cause unequal and biased treatment, while promoting unfair expectations. Women for example, are often expected to be passive and submissive, or assumed to be the best providers for children or housework; men are expected to be self-confident and aggressive, and to make more money through professional occupations. This has particular impact on people with intellectual

or developmental disabilities, who struggle meeting basic cultural expectations and are often assumed to be inept and incapable, particularly around areas of sexuality and gender. Society's strong views beyond these basic stereotypes increasingly impact people with intellectual or developmental disabilities. Skill development that manages conflict, improves basic communication, and generalizes strategies, is especially more complicated for students with intellectual or developmental disabilities (FoSE, 2017). They struggle relating to other people, further inhibiting how they understand themselves. This gets particularly complicated when facing challenges in the development and acceptance of sexual and gender identity, or sexual orientation. Understanding the responsibilities and consequences of sexuality and gender ultimately defines one's abilities to make safe and healthy decisions as adults by exhibiting less risky behavior.

Gender stereotypes of an individual's gender expression often lead to assumptions about a person's sexual orientation. Men who express feminine characteristics are often assumed to be gay, while women who express masculine characteristics through their gender expression are stereotyped as having a sexual orientation as lesbian. Although some gay men and lesbians could fit the stereotypes, many don't fit at all. Gender identity and gender expression are not always accurate predictors of an individual's sexuality or sexual orientation.

Sexual Diversity

Children with intellectual or developmental disabilities are often not given opportunities for personal sexual growth and development. Given delayed intellectual development, expression of sexuality is often sequestered as parents; support providers and educators have often excluded

individuals with intellectual or developmental disabilities from sexuality education. However, biological development of the reproductive system, including physiological secondary sex characteristics are being guided through endocrine and neurological aspects of puberty similarly in individuals with IDD as with neurotypical individuals. Health consequences can be catastrophic for this population; innate struggles with communication and advocacy limit access to emotional assistance or medical care, ultimately increasing risks for sexual abuse (Smith & Harrell, 2013; Swango-Wilson, 2011).

Sexual Development

The first step in supporting sexual identity and orientation is providing the science behind sexual identity assignment. The biological sense includes genetic makeup, hormones, and body parts, internal and external sex organs, and chromosomes. Biological sex begins, genetically, with the egg fertilization process. Moore, Persaud & Torchia (2011) describes embryonic stages of gender differentiation, which include pre-differentiation, differentiation and development. The pre-differentiation phase refers to a phenotype that is similar in male and female. Hormonal changes during the differentiation phase result in internal and external morphology that differentiates the fetus as female, male, or in rare instances, intersex (Diamond & Beh, 2008). At the moment of birth, family, society, culture, and physical environment in which the infant is raised shape and nurture aspects of sexual development. Therefore, while nature biased or predisposed aspects of gender and sexuality prenatally, it is a combination of both nature and nurture that will form an individual's self-identity with respect to their sexual orientation. Diamond (2006) described this as biased-interaction theory of psychosexual development.

Sexual Orientation

Sexual orientation, or the dominance of attractions, arousal and sexual behavior is rooted in emotional and physical attractions. Everyone has a sexual orientation; people who identify as heterosexual are attracted to individuals of the same sex, while those who identify as homosexual are attracted to individuals of the same sex. Like gender, sexual orientation is multi-faceted, and expansive rather than binary. People who are bisexual are attracted to both sexes. Individuals who are attracted to all forms of gender expression are considered pansexual. It is possible for an individual to not be sexually aroused by any gender, which is referred to as asexual (Testa, Coolhart, & Peta, 2015). Or perhaps one is "questioning" or unsure about sexual orientation (Planned Parenthood, 2017). Some people are firmly rooted in a particular orientation, while others experience a fluid sexual orientation, meaning they are comfortable with an ebb and flow of sexual attractions. LGBTQ, a common acronym for Lesbian, Gay, Bisexual, Transgender and Queer or Questioning, is ever evolving with the addition of more letters to represent an expanding identification of variations in sexual orientation. In this article, LGBTQ+ will be used, with the + representing individuals who identify as all other gender or sexual variation not represented by LGBT or Q (Bolger, 2015).

Clearly exploring sexual orientation assists with any ambivalence caused by outside influences, but it also helps navigate any challenges with sexual expression. Navigating the process of identifying one's sexual orientation can be delicate and frightening; integrating a sexual orientation identity within another identity is challenging, especially if other cultural viewpoints indicate same-sex relationships are negative or wrong. Instead of feeling

empowered regarding personal sexuality, people may fear that “something went wrong” or that they are “sinners.”

Heteronormativity

Heteronormativity is the societal assumption that all individuals are cisgender, and have a corresponding heterosexual orientation that matches their assigned biological sex, which is automatically attached to gender identity (Bryan, 2012). For example, assuming that a woman has a husband, a teenage girl will develop a romantic crush on a masculine, athletic boy, and a young girl enjoys dressing up in feminine dresses with a frilly bow in their hair, and dainty shoes. While these are all stereotypes, each of these notions is rooted in heteronormative assumptions. Heteronormativity impacts cultural norms, societal expectations, legal definitions of relationships, parental values, and teacher’s behavior and expectations in the classroom.

From the heteronormative perspective, any variation or non-conforming gender identity or a sexual identity that is not heterosexual is considered atypical or abnormal. Heteronormative assumptions explain why the American Psychological Association once defined heterosexuality as a mental disorder prior to 1973 (Ford, 2013). Transgender individuals were once referred to as “hermaphrodites.” In order for transgender people to access hormone therapy or gender reassignment surgery, their gender identity must first be diagnosed as a gender identity disorder. Challenging heteronormativity embraces gender and sexuality as a welcomed aspect of human diversity, rather than a medical condition.

Every educator and every child comes to school daily with sexuality as part of their identity. From the heteronormative perspective, a teacher who identifies with a

sexual orientation other than heterosexual often times must consciously suppress their sexuality, so as not to be “outed” to administrators, colleagues, students or parents. Just the awareness of the teacher’s non-conforming identity may raise questions that would raise discussion about sexuality in school.

If schools are a place to develop the whole child, socially, emotionally and academically, then challenging heteronormative assumptions should be openly promoted. School environments have been described by Kothlow and Chamberlain (2002) as asexual. The concept of sexuality has historically been hidden, not discussed, or largely ignored. Just as individuals who experience marginalization based on disability, race, ethnicity, religion, individuals who are marginalized based on heteronormative assumptions of gender identity or sexual diversity need to be supported in inclusive environments.

The challenges for people with intellectual or developmental disabilities who experience struggles with personal sexual identity are often the result of discouragement from personal exploration or their sexuality. Historically, individuals with intellectual or developmental disabilities were viewed as perpetual children (Swango-Wilson, 2008). Caregivers and educators tended to discourage the integration of safe sexuality, ultimately forcing an unhealthy dissociation from self and others. Such forces of exclusion led to negative cycles of mental health. Depression and suicide rates are significantly higher among repressed communities, alongside increased rates of abuse (Dillon & Collins, 2004). Individuals with intellectual and developmental disabilities were often times subjected to eugenics, because others decided it would be inappropriate for a

woman with an intellectual disability to bear a child. Essentially, individuals with intellectual and developmental disabilities are often denied the ability to pursue sexual attraction, explore sexual orientation, make decisions about sexual behavior; and therefore have a sequestered sexuality.

Sexual exploitation and abuse pose particular challenges for people with intellectual and developmental disabilities, but full acquisition of self-determination can minimize these risks. When families, educators, and individuals universally prioritize self-determination while balancing the individual's wishes, safety, and cognitive abilities, individuals are more aware of any risks, are better prepared to protect themselves, and can access opportunities for safe and appropriate sexual and gender expression and growth. Children with intellectual or developmental disabilities especially depend on a system of collective accountabilities in order to fully prevent sexual exploitation. Autonomous, yet a supportive environment at home, school, and in communities promotes the skills and independence needed to actively prevent or respond to any incidents that perpetuate against personal boundaries.

Inclusive Sex Education

Effective curriculum is individualized, theory or evidence-based, has appropriate needs assessments and evaluations, and measurable outcomes (Schaafsma et al., 2013). Practices such as structured instruction delivery, task analysis, positive behavior supports, simple and concrete terminology, and visual and environmental supports strengthen student comprehension and skill generalization. One resource to help is the Sexuality Education and Information Center of the United States (SEICUS) Guidelines that categorizes six key concepts including human development,

relationships, personal skills, sexual behavior, sexual health and society/culture (SEICUS, 2004). The National Sexuality Education Standards provide essential content and skills for a comprehensive sexuality education K–12. These standards are evidence-informed and have clear, concise recommendations on what is age-appropriate to teach students at different grade levels (FOSE, 2017).

Resources for inclusive gender and sexuality diversity are not as widespread, but The Ackerman Institute for the Family: The Gender and Family Project has gender inclusive resources for educators and families that includes training for school officials, specific curricula for elementary, middle, and high school classrooms, and information for families and caregivers. It also provides further resources, referrals, and children's literature that can help explore more gender diversity across a variety of reading comprehension levels (Ackerman Institute for the Family, 2014).

Students with intellectual and developmental disabilities cannot necessarily relate to cultural standards of gendered behavior (Planned Parenthood, 2017). This grows especially complicated when asking them to consider others' sexual orientation and gender identity. Oftentimes, biases are hard to see as most people have been unconsciously exposed prior to birth; students with intellectual and developmental disabilities especially may not be aware. They may not recognize how societal and psychosocial barriers interfere with individual development; this lack of understanding ultimately impacts their tolerance for others'.

Self-determination and Gender Identity and Sexual Diversity

If society's cultural norms influence how

people act, feel, and ultimately identify, ableism can be incredibly problematic. Ableism, or the attitudes in society that devalue and limit the potential of people with disabilities, is the equivalent to racism, homophobia, sexism, and transphobia (Planned Parenthood, 2017). This belief system underlays negative attitudes, stereotypes, and stigma toward people with disabilities; it is linked to prejudicial attitudes (deeply held negative perceptions and feelings) or negative stereotyping (generalization of assumptions about qualities and characteristics of cultural groups). Any resulting stigmas like ignorance or discrimination may be conscious or unconscious and are often deeply embedded in institutions or the broader culture of a society. Ultimately, this reduces opportunities for inclusion and acceptance (Law Commission of Ontario, 2012). People with intellectual and developmental disabilities are particularly viewed as less worthy of respect and consideration, less able to contribute and participate, or of less inherent value than others.

Stereotypes are very diverse and lead the general public to overlook certain populations. In many cases, a particular subcultural identity, like gender identity or disability may only affect a small percentage of an individual's life, however, others consider it a defining characteristic. These forms of prejudice, whether ableism, homophobia, or transphobia, affect all aspects of daily living. Incomplete information, mistaken perceptions, isolation and segregation have perpetuated many of these stereotypes, and viewing a person according to these stereotypes limits what society expects of them and how they respond; it is rooted in misinformation and misunderstandings about what it's like to live with an alternative form of identity.

Society's structured responses and limited supports for children with intellectual or developmental disabilities are centered on notions of their dependency. This form of ableism not only contributes to higher rates of sexual abuse, but also reinforces a culture of compliance. Without proper education, support, and experiences, people with intellectual and developmental disabilities aren't equipped to develop mutually agreed-upon values that promote interactive dialogues, skill development, or diverse opportunities for safe practice.

The acquisition and expression of self-determination is developmental and must be fostered regularly if students are to become self-sufficient adults. Children with intellectual and developmental disabilities are often not given consistent opportunities to make choices about basic decisions (National Center on Secondary Education and Transition, 2010). They are often denied the right to make daily decisions such as what they will wear or eat, leaving them completely unequipped to say no when someone is trying to hurt them. When students control personal decision-making within the initiation, maintenance, and regulation of their behavior, they can better explore sexuality. These skills also can protect individuals from any further abuse and exploitation, contribute to psychological freedom, and increase individual cognitive capacity to consent.

Right to Sexual Equality

As self-determined individuals, people with intellectual and developmental disabilities are often denied the right to make daily decisions such as personal clothing or food choices, leaving them completely unequipped to say no when someone is trying to hurt them. They also have the right to explore their gender identity and sexuality. Guidance and support in

understanding and navigating the complexities of gender and sexuality diversity provide the necessary understanding needed to explore and understand one's unique gender identity, provide the means to decide how to express their gender identity, and to know that gender is a self-defined expression of their unique individuality.

Exploration of sexuality requires an understanding of sexual diversity, and also requires opportunities to experience and explore feelings of sexual attraction and sexual arousal. A safe and respectful opportunity to engage in healthy and informed consensual sexual behavior is a human right. Promoting self-determination for individuals with intellectual and developmental disabilities includes supporting healthy, safe, and respectful aspects of their sexuality.

Caregivers, families, and educators have historically denied sexual or intimate relationships from people with intellectual and developmental disabilities, in an injudicious attempt to stop sexual exploitation and abuse, unwanted pregnancy, and disease; this ultimately reaffirms societal views that people with more significant disabilities are incompetent to explore intimate relationships, which contributes to increased social isolation (Perry, 2016). Healthy sexual relationships are important to living independent, fully integrated lives however, and these risks should not automatically preclude individuals from experiencing healthy sexual relationships. Supporting people with intellectual and developmental disabilities as they pursue appropriate relationships with others will not only help contribute to the overarching culture of acceptance that people with intellectual and developmental disabilities are fully capable of feeling or

sharing love with others, but also contribute to successful and responsible decision-making skills, and full relatedness in the individual (Wade, 2002).

Suggestions for Supporting Gender and Sexuality Diversity

Building empathy while promoting inclusive diversity promotes actions based on personally endorsed values and needs. For students with intellectual and developmental disabilities, caregivers or parents, support providers, and special educators are on the front line to identify and correct negative stereotypes; they are able to model and influence values of inclusion related to gender identity and sexual diversity. Special educators can create inclusive and tolerant school-based activities and curricula that promote inclusive sexuality education. Research indicates this is most likely to contribute to a successful acquisition of one's identity (Luyckx, et al., 2009).

Exploring different belief systems, promoting dialogues about sexual values with religious, cultural, and social considerations, and providing necessary skills training in a variety of settings is considered best practice. Ideally, families, caregivers, and schools will work collaboratively in these efforts, but for some students, informed and sympathetic school environments are their only opportunities to develop these skills. Currently only 19 states require medical, factual, or technically accurate curriculum. Most states do not require sexuality education, some ban discussions about contraceptives or abortion, or mandate abstinence and heterosexuality-focused instruction (Blad, 2014).

Parental Support

Parents can focus on developing understanding that gender or sexuality are a natural part of human development, affirm

that gender and sexuality are unique parts of an individual's identity; social influences should support unique self-identity exploration and are a natural part of growing up. This is, in essence, similar to accepting disability as part of identity. The personal identity process takes time, patience, and understanding, and requires positive and welcoming attitudes alongside the acceptance and ability to navigate biases. Accepting people with differences as individuals capable of the same needs and feelings as oneself sends overall messages of acceptance, and builds personal awareness of how any kind of stereotype can hurt.

Educator Training

At the start, educators can create safe and welcoming classroom environments by recognizing and addressing heteronormative assumptions, to avoid unintentionally creating sexist or homophobic classroom environments. Honor and respect the diverse experiences and potential in students' own lives. Educators can emphasize examples that honor non-traditional gender roles, foster understanding of gender non-conforming variations to the gender binary, and LGBTQ+ identified people; during discussions, they can use examples that range from male to female, and heterosexual to homosexual.

Another important step educators can take is to make explicit expectations in the classroom, that everyone deserves respect, especially considering elements of gender or sexual identity or expression. Students with intellectual and developmental disabilities may experience increased challenges mastering these concepts due to innate difficulties that prevent access to personal sexuality and gender identification. Educators can address specific societal stereotypes that limit students, their sexual health, and their tolerance for others' by

including biological, social, and legal factors of sexual and gender expression.

Inclusive and Supportive School Communities

Student clubs and activities can embrace gender and sexual orientation diversity, and administrators can offer training opportunities for students and staff on the needs of gender and sexual orientation diverse students (American Psychological Association, 2017). The development of social and sexual behavior can help students understand that actions can be misinterpreted as inappropriate behavior; the importance of interpersonal skills, including communication, decision-making, assertiveness, and refusal skills; and sexual health and hygiene as related to sexuality and specific disabilities. Other important elements include any risks of victimization, abuse and exploitation, and unwanted pregnancy and disease. The school is also in a position to identify community members (family members, friends, teachers, service providers, etc.) who can help students navigate this process safely at the appropriate cognitive level (Planned Parenthood, 2017).

When teachers and administrators address bullying and harassment proactively by developing policies that prohibit discrimination based on sexual orientation, gender identity, or gender expression, schools are better equipped to promote positive messages of acceptance. In traditional educational models, educators post rules in their classrooms that include the rights, responsibilities, or morals that support the school's values or mission. Students are almost never involved in establishing value systems; rather their jobs are to do as they are told – ultimately supporting any feelings of helplessness or a lack of control, common for individuals who

have intellectual or developmental disabilities. When educators support respectful, diverse communities that provide opportunities to further establish and respect personal value systems, personal expression and identity enhance classroom and school cultures.

Conclusion

Individuals with intellectual and developmental disabilities have gender identities and sexuality, and their gender and sexuality could be diverse. As a basic human right, support and encouragement must be provided for the ability to explore, identity and express gender identity, gender expression and sexual orientation. Because of vulnerability, parents, educators and caretakers often feel obligated to protect individuals with intellectual and developmental disabilities against potential abuse, or make feel that sexuality is

inappropriate due to the other delayed aspects of the person's development. This leads to a sequestered sexuality.

As self-determined individuals, who are provided with inclusive sexually education that is individualized to their unique capabilities, individuals with intellectual and developmental disabilities can enjoy intimate relationships, explore and define a gender identity and expression that represents their individuality. Every individual with intellectual and developmental disabilities is unique, and will have the capability to explore and comprehend the complexities of gender and sexuality diversity to varying degrees. Being supported in discovering gender and sexual identity is a form of individuality that should not be denied. These are aspects of the human experience to which every individual should be entitled.

References

- The Ackerman Institute for the Family: The Gender and Family Project (2014). Retrieved from <http://www.ackerman.org/gfp/>
- American Psychological Association. (2017). Resolution of Gender and Sexual Orientation Diversity in Children and Adolescents in Schools. Accessed from <http://www.apa.org/about/policy/orientation-diversity.aspx> on February 13, 2017.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55, 469– 480.
- Blad, E. (2014) New Teacher-Preparation Standards Target Sex Education. *Education Week*. 33(30):14.
- Bolger, M. (2015). LGBTQ+ terminology – An evolution over time. [blog post]. Retrieved from <http://thesafezoneproject.com/update/lgbtq-terminology-an-evolution-over-time/>
- Bryan, J. (2015). Beyond tomboys, sissies, and ‘that’s so gay’. Team Finch. Accessed from <https://teamfinchconsultants.com/wp-content/uploads/2016/06/Beyond-Tomboys-Sissies-and-Thats-So-Gay-2-1-3.pdf>.
- Bryan, J. (2012). *From the dress-up corner to the senior prom*. New York: Routledge.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268.
- Dillon, B., & Collins, E., (2004). Mental Health: Lesbians and Gay Men (Strategies to Promote the Mental Health of Lesbians and Gay Men). Gay HIV Strategies in conjunction with
- Diamond, M. (2006). Biased-interaction theory of psychosexual development: “How does one know if one is male or female?” *Sex Roles*, 55, 589-600.

- Diamond, M., & Beh, H. G. (2008). Changes in management of children with difference of sex development. *Nature Clinical Practice: Endocrinology & Metabolism* 4(1). 4-5.
- Diamond, M. (2009). Clinical implications of the organizational and activational effects of hormones. *Hormones and Behavior*, 55, 621-632.
- Ford, M. (2013). *A brief history of homosexuality in America* (2013). (Manual). Retrieved from <http://www.gvsu.edu/alliaes/a-brief-history-of-homosexuality-in-aerica-30.htm>
- Future of Sex Education (FOSE) (2017). Youth Health and Rights in Sex Education (2017). Accessed from <http://www.futureofsexed.org/youthhealthrights.html> on January 9, 2017.
- James, S. E., Herman, J. L., Rankin, S., Keisling, M., Mottet, L., & Anafi, M. (2016). *The Report of the 2015 U.S. Transgender Survey*. Washington, DC: National Center for Transgender Equality.
- Kothlow, K. & Chamberlain, K. (2012). *Disrupting Heteronormativity in schools*. (Doctoral dissertation.) Retrieved from ProQuest Dissertations and Theses <http://hdl.handle.net/libproxy.Lib.unc.edu/2429/42758>
- Law Commission of Ontario. (2012). *Advancing Equality for Persons with Disabilities Through Law, Policy and Practice: A Draft Framework* at 3, available online at: www.lco-cdo.org/disabilities-draft-framework.pdf.
- Luyckx, K., Vansteenkiste, M., Goossens, L., & Duriez, B. (2009). Basic need satisfaction and identity formater: Bridging self-determination theory and process-oriented identity research. *Journal of Counseling Psychology*. doi: 10.1037/a0015349.
- Moore, K. L., Persaud, T. V. N., Torchia, M. G. (2011). *The developing human: Clinically oriented embryology* (9th ed.). Philadelphia: Saunders.
- National Center on Secondary Education and Transition, Institute on Community Integration (2010). University of Minnesota, Minneapolis MN. Retrieved from <http://www.ncset.org/>
- Planned Parenthood. (2017). Retrieved from <https://www.plannedparenthood.org/learn/sexual-orientation-gender/gender-gender-identity#sthash.9xfuo4U7.dpuf>
- Perry, D. Sexual Abuse and Disability: The erasure of victims with disabilities. *Pacific Standard*. Retrieved from <https://psmag.com/news/sexual-abuse-and-disability>
- Schaafsma, D., Stoffelen, J. M. T., Kok, G., & Curfs, L. M. G. (2013). Exploring the development of existing sex education programs for people with intellectual disabilities: An intervention mapping approach. *Journal of Applied Research in Intellectual Disabilities*, 26, 157-166. doi:10.1111/jar.12017
- Schwartz, B. (2000). Self-determination: The tyranny of freedom. *American Psychologist*, 55, 79–88.
- Schwartz, S. J., Coˆte´, J. E., & Arnett, J. J. (2005). Identity and agency in emerging adulthood: Two developmental routes in the individualization process. *Youth & Society*, 37, 201–229.
- Sexuality Information Education Council of the United States. (2004). *Guidelines for comprehensive sexuality education: Kindergarten through 12th grade* (3rd ed.) New York: Author.
- Smith, N. & Harrell, S. (2013). Sexual Abuse of Children with Disabilities: A National Snapshot. VERA Institute of Justice: Center on Victimization and Safety. Retrieved from <http://tinyurl.com/15jw928>
- Swango-Wilson, A. (2008). Caregiver perceptions and implications for sex education for individuals with intellectual and developmental disabilities. *Sexuality and Disability*,

26, 16-174.

- Testa, R.J, Coolhart, D., & Peta, J. (2015). *The Gender Quest Workbook: A guide for teens and young adults exploring gender identity*. New Harbinger Publishing, Inc. Oakland, CA: New Harbinger Publications.
- Vansteenkiste, M., Ryan, R. M., & Deci, E. L. (2008). Self-determination theory and the explanatory role of psychological needs in human well-being. In L. Bruni, F. Comim, & M. Pugno (Eds.), *Capabilities and happiness* (pp. 187-223). Oxford, UK: Oxford
- Wade, Holly A (2002). Discrimination, sexuality and people with significant disabilities: Issues of access and the right to sexual expression in the united states. *Disability Studies Quarterly*, 22(4), 9-27.

Correspondence concerning this article should be addressed to Gloria Y. Niles, University of Hawaii - West Oahu, 91-1001 Farrington Hwy., Kapolei, HI 96707. E-mail: gniles@hawaii.edu

Investigating the Symptoms of Traumatic Stress in Fathers of Children Diagnosed with Autism

Clinton Smith

The University of Tennessee at Martin

Laura Baylot Casey

The University of Memphis

Robert L. Williamson

Simon Fraser University

Susan E. Elswick

The University of Memphis

The current study focused exclusively on exploring traumatic stress on fathers of children with an autism spectrum. The purpose of the current study was two-fold. First, the existence of any stress in fathers of children with ASD regarding the thoughts of receiving their child's diagnosis was explored. The participants in this study consisted of 83 fathers of children diagnosed with autism recruited from across the United States. The Los Angeles Symptom Checklist (LASC) was used to measure a specific traumatic event, the diagnosis of autism for their child. The data from the LASC suggest that some fathers do experience such stress. With 17.6% of participants receiving the LASC categorization of PTSS positive and 30% being categorized as partial PTSS positive, it is clear that just under half of the sample indicated levels of stress associated with PTSD. Further statistical analysis backs up the findings that differences exist in the magnitude of stress symptoms felt across fathers when considering the initial diagnosis of their child with an ASD. While just under half of the father participants in the current study were considered to experience at least partial symptoms of PTSS, all participants varied greatly in the magnitude of the symptoms each experienced. Suggestions are given for supporting fathers who have children diagnosed with autism those in the health care and behavioral communities. It is important to provide supportive information on evidence-based treatments to families regarding interventions for their child and multi-systemic programming that is available to them as they navigate service delivery and supports for their family and individual needs. Interventions with fathers should focus on the reduction of using avoidance strategies to cope with their stress and implement a more problem-based approach to cope with stress.

The prevalence of autism has risen significantly over the past 25 years with one recent report suggesting that as many as one out of 68 children are diagnosed with an autism spectrum disorder (Baio, 2014; Freedman, Jaffe, Cono, Richards, & Iademarco, 2014). The deficits and impairments of autism not only affect children, but also have an effect on families, caretakers, teachers, and the community (Karst & Van Hecke, 2012). Negative implications on families are unfortunately far reaching with some parents of children with

autism reporting to have increased levels of stress as compared to parents of children with other types of disabilities (Brobst, Clopton & Hendrick, 2009), including Down Syndrome (Dabrowska & Pisula, 2010; Roach, Orsmond, & Barratt, 1999), developmental disabilities (Dyson, 1993; Smith, Oliver, & Innocenti, 2001; Schieve, Blumberg, Rice, Visser, & Boyle, 2007), and/ or intellectual disability (Rodrigue, Morgan, & Geffken, 1991). Physiological symptoms have also been measured in this subgroup of parents. Of the markers measured, it was determined

that blood pressure and cortisol levels of parents of children with autism are often comparable to combat soldiers and holocaust survivors. All groups show increased heart rates in both mothers and fathers and the levels of cortisol in mothers is either higher or lower when child had “good behavior days” vs “bad behavior days” (Foody, James, & Leader 2014; Foody, James, & Leader, 2015; Seltzer et. al, 2010).

The underlying cause of the stress is not clear but some evidence of this stress can be found in reports of strain, pressure, and tension revolving around the task of day-to-day parenting a child with autism (Rao & Beidel, 2009). This stress could also be caused by a lack of support by professionals (Sakaguchi & Beppu, 2007), receiving a diagnosis (Casey et al., 2012), communication difficulties with the child (Goin-Kochel & Myers, 2005), inappropriate behaviors exhibited by the child (Bishop, Richler, Cain, & Lord, 2007; Hastings, 2003), and/or an over reliance on maladaptive coping strategies incorporated by parents (Lyons, Leon, Phelps, & Dunleavy, 2010). Additionally, waiting to receive appropriate interventions, difficulties in selecting and then implementing various therapies, and a possible lack of overall parenting support from extended family and community can cause increased stress levels in these parents (Beresford, 1994; Williams, MacDermott, Ridley, Glasson, & Wray, 2008; Mansell & Morris, 2004; Tobing & Glenwick, 2002). Sadly, many times, these issues may impact the relationships between the parents and could lead to a risk of the parents separation (Freedman & Boyer, 2000; Harper, Dyches, Harper, Roper & South, 2013; Hartley et al., 2010).

Does Stress Impact Mothers and Fathers Equally?

Several studies have been authored in the literature that compare the levels of stress that

are experienced by mothers and fathers of children diagnosed with autism. Some confirm that mothers and fathers of children with autism typically share high levels of stress and depressive symptoms (Brobst et al., 2009; Davis & Carter, 2008; Hastings & Johnson, 2001; Mancil, Boyd, & Bedesem, 2009) with Sharpley, Bitsika, and Efremidis (1997) reporting that as many as 80% of parents of children with autism reported high levels of stress. Moes, Koegel, Schreibman, & Loos (1992) reported that mothers tended to show more stress than fathers; while Hastings (2003) and Noh, Dumas, Wolf, and Fisman (1989) found that both parents experienced similar levels of stress. Koegel, Schreibman, Loos, & Dirlich-Wilhelm (1992) noted that mothers of children with autism across different cultural and geographical boundaries experience stress due to the various behavioral, social, and cognitive aspects of autism. However, no studies were found that specifically studied the effects that stress may have on just fathers of children diagnosed with autism; specifically, the impact that the diagnosis may have, types of stress experienced, or coping strategies engaged in by fathers.

Rationale

The current study focused exclusively on fathers of children with an autism spectrum disorder in an attempt to fill a void in the current literature that is primarily focused on parents (both moms and dads) or only mothers. In order to systematically extend the research in the area of parental stress and autism, the authors selected the Casey et al., (2012) pilot study looking at post-traumatic stress symptoms and parents of children with autism. The 2012 study was a retrospective study focusing on the research of Manne (2009) and Phipps, Larson, Long, & Rai (2006), which both reported that while parents of children with chronic illness, potentially life-threatening disorders, and other disabilities did not meet the full DSM-

IV-TR (manual at the time of the study) criteria for post-traumatic stress disorder (PTSD); however, a subset reported negative reactions. Reactions that were often associated with PTSD. This evidence of sub-clinical levels was referred to as post-traumatic stress symptoms (PTSS) to delineate from a diagnosis of PTSD but to suggest a shared set of symptoms. This work set the stage for the Casey et al., (2012) study to focus on parents of children with autism to investigate if similar reactions would hold true for this subset of parents.

In the Casey et al. (2012) study, 265 parents of children diagnosed with autism completed self-report surveys via online instruments. The findings concluded that approximately one in five (20%) responding parents (both mothers and fathers) self-reported that they identified with certain criteria associated with post-traumatic stress symptoms (PTSS). However, because of the low number of father respondents, 8% ($n=21$), this current study isolated respondents to only fathers to determine if the results of 1 in 5 would hold true with a larger sample consisting of only fathers of children diagnosed with an ASD. Thus, the goal was to gauge responses and symptoms of fathers caring for a child with autism in order to better understand this target population that has been underrepresented in previous work; this study was not an attempt to diagnosis PTSD.

Purpose

The purpose of the current study was specific with a focus on fathers. First, as described in the rationale, the authors wanted to explore a particular type of stress, traumatic stress, in fathers of children with autism. Second this work sought to be able to provide suggestions based on a trauma-based framework to assist the fathers. The second goal was based on the literature that fathers may incorporate different coping strategies than mothers (Essex, Seltzer, & Krauss, 1999), are

generally more reluctant to seek out help from others including therapies from health professionals (Astor-Dubin & Hammen, 1984; Husaini, Moore, & Cain, 1994), likely to self-medicate (Lewis, Pagura, Sareen, & Bolton, 2010), prefer other coping strategies (Boyd & Beail, 1994; Krugman, 1996; Wade et al., 2010), and unfortunately have grave physical responses to stress (Wade et al., 2010). Because of this relative lack of information specifically focusing on fathers, the important role that the men play in their child's life, and the notion that historically men are reluctant to seek out mental health services (Hecker, 1991; Little, 2002), the current study sought to focus in on fathers and help answer these unknowns. The current study does not claim that any participant met criteria of PTSD; rather they share a cluster of symptomologies common to post-traumatic stress (e.g., intrusion of thoughts, avoidance, blame self, marked diminished interest in activities) which the authors are referring to as traumatic stress in the results and data analysis below.

Method

Participant Recruitment

Upon obtaining approval from an appropriate University based ethics board, participants were recruited through a variety of sources. These included parent and autism support groups for dads on Facebook, newsletters from autism support groups throughout the southern portions of the United States, and through the Autism Society of America's (ASA) website and monthly magazine. Participants were provided with a direct link to the survey and a description of the purpose of the study. They were told that their survey answers were and would remain confidential and that they could discontinue the survey at any point. A father included anyone who self-identified as the primary male care taker of a child with autism.

Participants

The participants in this study consisted of 83 fathers of children diagnosed with autism from across the United States. Fifty (62%) of the fathers were over the age of 40, 24 (30%) were between the ages of 31-40, six (7%) were between the ages of 21-30, and one (1%) was under the age of 21. Of the 83 participants, 77% reported that both parents were living in the home, 13% reported having at least one other child with an autism spectrum disorder living in the home, and 56% reported having at least one other child not diagnosed with autism spectrum disorder living in the home. As it relates to the amount of aggression displayed by their child(ren) with autism: 45% of fathers reported no aggression, 43% reported occasional aggression, 8% reported moderate aggression, and 4% reported severe aggression in their child with autism. As for diagnosis, 51% reported a diagnosis of autism, 27% reported a diagnosis of pervasive developmental disorder not otherwise specified (PDD-NOS), and 22% reported a diagnosis of Asperger's Syndrome based on the DSM-IV criteria. The number of hours of applied behavior analysis (ABA) training received each week were reported as follows: 49.4% - 0 hours, 23% - 1 to 5 hours, 12% - 5 to 10 hours, 3.6% - 10 to 15 hours, 2.4% - 15-20 hours, and 3.6% - more than 20 hours, 6% of fathers did not report.

Instrument

LASC. The Los Angeles Symptom Checklist (LASC) is a 43-item measure of stress and associated features that are self-reported (King, King, Leskin, & Foy, 1995). King et al. (1995) demonstrated that the LASC possesses high internal consistency (alphas ranging from .88 to .95), test-retest reliability (coefficients of .90 and .94 with a 2-week interval), and acceptable levels of convergent validity. The LASC does not key to any specific trauma or inquire about the presence of problems (King et al., 1995). The LASC

followed an introductory paragraph referring the participants back to the initial diagnosis experience to ensure that the fathers were still thinking back to the diagnosis. Of the 43 items, there were 17 items that were taken directly from the DSM-IV-TR symptoms of PTSD. These 17 questions are embedded among the 26 other items that assess more general psychological distress and were easily discernable based on the wording. All items were rated on a 5-point Likert type scale ranging from 0 ("no problem") to 4 ("extreme problem"). For the purposes of this study the LASC was utilized to identify levels of stress and need for the participants, and not in an attempt to obtain a DSM-IV-TR diagnosis.

For the purposes of this study, the specific traumatic event that the participant was to refer to was the diagnosis of autism for their child. To ensure that each father thought back to the same event, the diagnosis itself was selected. This common feature of receiving the diagnosis ensured that each parent reflected on the same possible stressor, which also consequently maintained the integrity of the responses. In other words, this reflection back to a specific event, one common to all parent participants and not a situation only unique to any individual family, allowed the opportunity to make generalizations about the participants' reaction to the diagnosis as a group because they were all referring back to the same possible trauma. The current study does not claim to examine if any participant met criteria of PTSD nor does it aim at diagnosis; rather just to explore if any shared cluster of symptomologies, common to post-traumatic stress, existed: intrusion of thoughts, avoidance, blame self, marked diminished interest in activities, etc.

Specifically, the introductory paragraph to the study was worded as follows:

"This study is designed to better understand needs of fathers directly

related to raising a child diagnosed with Autism Spectrum Disorder. We are specifically trying to understand personal experiences post diagnosis. It is important that you are as honest as possible as you think back to receiving the diagnosis as you answer each question.”

Data Analysis

The LASC results were scored using the two methodologies outlined within the LASC assessment procedures (King et al., 1995). First, each participant’s score was analyzed categorically. Within the categorical scoring paradigm, individual questions were categorized into three areas of re-experiencing trauma, avoidance and numbing, and increased arousal regarding the event of diagnosis. Within each of the categories, a participant needed to indicate a score of two or higher on a pre-determined amount of questions within the subset to be considered positive within that subset of questions. For categorization, the authors decided it would be prudent to adhere to the scoring guide and referred to the groups in the following manner: 1. All three areas indicating positive would result in being categorized as traumatic stress positive. 2. Two of three areas indicating a positive would result in being categorized as partial traumatic stress positive and 3. If only one or none of the three groups were indicated as positive, the participant would be categorized as non-traumatic stress positive.

The LASC was also scored using a continuous scoring method as indicated by the authors of the instrument. To achieve continuous scores for each participant, the summed total of all their scores for the 17 traumatic stress items (listed within the categories above) were computed. Additionally, the summed scores for all 43 items in the instrument were likewise computed. These summed scores resulted in

all participants being rank-ordered as to the severity of any traumatic stress symptom ratings (17 items) and rank ordered as a global assessment of distress and adjustment problem symptomologies (all 43 items). The global assessment was calculated on all participants that had answered all LASC items while the severity scale was calculated for both traumatic stress positive and partial traumatic stress positive participants separately.

Results

While initial participants in this study consisted of 83 fathers of children diagnosed with autism from across the United States, this number was reduced to 74 participants after eliminating any participant with an unanswered LASC question. Upon examination of the LASC data and using the above outlined analysis methods as prescribed by the authors of the LASC instrument, 31 (41.9%) of participants indicated that they may be re-experiencing trauma related to the diagnosis of their child as having ASD. Seventeen (22.9%) participant scores indicated they may experience avoidance and numbing around thoughts regarding the diagnosis of their child and fully 52 (70.0%) of participant scores indicated they may experience increased arousal when thinking of the diagnosis event. According to the LASC scoring instructions, those participants that indicated positive in three of the three categories may be experiencing symptoms of traumatic stress and should be noted as traumatic stress positive as defined by the LASC. Thirteen (17.6%) participants fell into this traumatic stress positive category. Those participants indicating a positive score for only two of the three categories were designated as possibly experiencing partial traumatic stress according to the LASC instructions. Twenty-two participants (29.7%) fell into this category from the given sample.

Regarding the calculated global assessment of distress index from the LASC (all 43 items summed scores) across all 74 participants, the data revealed a range from two through 95 (range = 93) with an average score of 34.22 (max theoretical index score of 172 possible). The median for this global scale across all participants was calculated to be 31.5 while the mode was 32. The standard deviation across all summed scores was 19.87. Regarding the group that indicated as traumatic stress positive as defined by the LASC, global scores revealed that continuous global assessment of distress index scores ranged from 13-83 (range = 70) with an average score of 44.55. This PTSS positive group revealed a median global distress score of 44 with a mode of 13. Standard deviation for the total scores of those noted as positive for traumatic stress as identified by the LASC was 21.41. The partial traumatic stress group scores revealed a range from 10-95 (range = 85) with a mean score of 46.83, a median of 47 and a minimum mode of 47 as a global assessment of distress index. Standard deviation for the partial traumatic stress positive group was calculated to be 20.54. (See Table 1)

Calculations of only those participants that indicated as traumatic stress positive, the

categorical scoring method (summed scores of only the 17 traumatic stress related questions with a maximum theoretical score of 68) revealed a mean score of 21.45 with a median score of 21 and a mode of 25. The range of scores within this group were from 9 to 42 (range = 33) and the standard deviation was 8.93. Regarding the Partial traumatic stress positive group, the categorical scoring method revealed a range from 4 to 50 (range = 46) with a mean score of 22.74, median of 22 and a minimum mode of 15. Standard deviation for the partial TS group on the summed 17 scores was 11.17 (See Table 1).

An independent samples *t*-test was used to analyze any difference in mean global assessment of distress and adjustment scores (mean of summed scores on all LASC items) between fathers reporting both parents living at home and those reporting only one parent living at home. A one parent household suggested that the child was not cared for by both parents on a daily basis in the home in which the child with ASD resides. Results indicated that on average, no significant difference existed in the mean scores between those where both parents are living in the home (M=34.07, SE=2.71) and those where only one parent is living in the home (M=35.0, SE=4.76), $t(71) = -.163, p = 0.871$.

Table 1. *Descriptive Statistics of Results by Groupings*

Grouping	Measures				
	mean	median	Mode	range	SD
Global (n=74)	34.22	31.5	32.0	93	19.87
Global TS + (n=11)	44.55	44.0	13*	70	21.41
Global Partial TS+ (n=23)	46.83	47.0	47*	85	20.54
Global Non TS+ (n=40)	24.13	23.5	12.0	65	12.45
Global TS Severity Scale	16.74	15	15	49	9.83
TS Severity Scale for TS+ Positive group (n=11)	21.45	21	25	33	8.93
TS Severity Scale for partial TS Positive group (n=23)	22.74	22	15*	46	11.17
Non TS + (n=40)	12.00	12	15	34	6.28

*Multiple modes exist; The smallest one is shown.

Likewise, an independent samples *t*-test was used to analyze any difference in the mean global assessment of distress and adjustment scores between fathers of male children with ASD ($n=69$) and fathers with female children with ASD ($n=5$). Results indicated that no significant difference ($p<.05$) existed between the mean scores between the male child group ($M=34.65$, $SE=2.43$) and the female child group ($M=28.2$, $SE=6.78$), $t(72)=.699$, $p=0.487$. Note that the difference in group size may have influenced these results. A minimum group size of six is generally recommended when running an independent samples *t*-test however the information presented here may still be of general interest.

A one-way ANOVA was used to analyze the extent to which any significant difference ($p<.05$) existed between fathers of children with PDD-NOS, Autism, and Asperger Syndrome. Results indicated that no significant difference $F(2, 60) = .869$, $p=.424$ in mean levels of stress as measured by the LASC global assessment of distress and adjustment scores existed between these three groups.

Originally, a one-way ANOVA was to be used to analyze the extent to which any significant difference in the LASC mean global assessment of distress scores might exist depending on the age of the child at the time of the father reporting. Age groups of the child included the following groupings: one to two ($n=0$), older than two to three ($n=1$), older than three to four ($n=4$), older than four to five ($n=4$), and above the age of five ($n=64$). Because of the large difference in *n* values between the group of children over the age of five and those under the age of five, no comparison was examined.

Another one-way ANOVA was used to analyze the extent to which any significant

difference ($p<.05$) might exist between fathers' distress levels depending on the age of the child when the child was diagnosed. Age groups included: Up to two years old ($n=11$), older than two up to three years old ($n=30$), older than three up to four years old ($n=11$), older than four up to five years old ($n=9$) and over five years of age ($n=12$). Results indicated that no significant difference in stress levels existed $F(4, 68) = .537$, $p=.709$ between the mean global distress scores based on the age of their child at diagnosis.

Discussion

The purpose of the current study was two-fold. First, the existence of any stress in fathers of children with ASD regarding the thoughts of receiving their child's diagnosis was explored. To this end, the data from the LASC suggest that some fathers do experience such stress. With fully 17.6% of participants receiving the LASC categorization of PTSS positive and 30% being categorized as partial PTSS positive, it is clear that just under half of the sample indicated levels of stress associated with PTSD.

Further analysis continues to back up the findings that differences exist in the magnitude of stress symptoms felt across fathers when considering the initial diagnosis of their child with an ASD. Even within each categorical group, overall scores varied widely in range. Fathers designated in the PTSS positive group had a global magnitude range of 85. Those categorized as partial PTSS had a global magnitude range of 75 and those categorized as non-PTSS had a range of 93. This indicates that great differences exist from father to father even when measured between fathers in the same LASC categorized grouping. While just under half of the father participants in the current study were considered to experience at least partial

symptoms of PTSS, all participants varied greatly in the magnitude of the symptoms each experienced. This could be reflective of the great diversity of symptom magnitude shown by the children with ASD themselves.

To address the second focus of this current work, it is prudent to suggest evidence based ways in which fathers experiencing stress may be supported. Due to the fact that health care providers are the clinicians that most often diagnose children with autism, the primary health care provider should be encouraged to provide professional support to fathers of children diagnosed with ASD. Fathers should also have the opportunity to sit down with their health care provider and discuss the information related to the diagnosis of their child (Keen, Couzens, Muspratt, & Rodger, 2010). Psychoeducation about formal diagnosis and the impact that the diagnosis will or may have on the client and the family is important. Psychoeducation is an evidence-based process that incorporates diagnosis-specific information and tools for managing circumstances related to the diagnosis (Lukens & McFarlane, 2004). Psychoeducational programming and supports should be embedded in the service delivery provided by diagnosticians and clinicians within the fields of medical, behavioral and social sciences.

It would also be beneficial for health care providers to implement early intervention processes for fathers. This can be offered by providing a father-centered assessment of stress symptoms after a diagnosis of autism for their child is obtained, and as a routine screening in primary health care settings. Health care providers should also offer training for their staff to understand symptoms of stress in fathers, and encourage brief screenings such as the LASC be utilized routinely within their practice. Once the brief screenings are conducted health care providers and mental health professionals

should collaborate to ensure that fathers who experience stress have access to support from mental health professionals to help them understand stress, where to seek help, and to create a follow-up plan for the fathers who experience more serious to extreme levels of stress (Best, Streisand, Catania, & Kazak, 2001; Casey, et al., 2012; Kazak, Boeving, Alderfer, Hwang, & Reilly, 2005). Many primary care offices are beginning to embed integrated behavioral health practices into their clinic environment, in order to better serve the physical and behavioral health needs of their clients. This integrated behavioral model, often referred to as patient-centered medical home (PCMH) encourages on-site medical and mental health collaborations in order to better improve outcomes for the clients (Foy, 2015). Integrated behavioral health is brief-solution-focused programming, aimed at correcting a current need identified by a screening or assessment conducted by the primary care physician. Brief interventions are provided to the client in the doctor's office as a way to educate, inform, and connect the client to supports and effective self-directed behavioral interventions; however, if the assessment and screening indicate severe or clinically significant levels of stress then a more formalized continuous counseling regiment would be recommended and provided on-site at the primary care physicians office by a licensed mental health clinician.

In addition, to integrated behavioral health interventions, a multi-systemic approach to programming and supports is imperative for family success. Multi-systemic service delivery/ therapy (MST) includes programming that if offered to the client across multiple settings that rests on the understanding that there are possible etiological factors associated with behavioral success (Henggeler et al., 1996). Services that include direct applied behavior analysis

(ABA) for the child with ASD, supportive parent programming in the home is helpful, family therapy, supports related to the child's school and community functioning, and the inclusion of individualized supports for the mother and father may also be warranted. It is important to provide supportive information on evidence-based treatments to families regarding interventions for their child and multi-systemic programming that is available to them as they navigate service delivery and supports for their family and individual needs. Interventions with parents should focus on the reduction of using avoidance strategies to cope with their stress and implement a more problem-based approach to cope with stress (Hastings et al., 2005). Fathers may also benefit from a parent education group that focuses on the inclusion of the parent in the intervention process and being included in the child's ABA program. Involvement in the child's therapy has been touted to reduce stress levels (Brookman-Fraze & Koegel, 2004). In addition, parent education surrounding behavior management, schedules, and daily routines, can help show improvement in mental health (Baker-Riczen, Brookman-Graze, & Stahmer, 2005; Tonge et al., 2006). Another intervention that may benefit fathers is a peer support group, although clinicians should ensure that those from lower socioeconomic groups have access to these types of supports as well (Mandell & Salzer, 2007).

Limitations and Future Directions

While the current study continues to add to the literature in the area of stress and parents of children with autism, the current study does have limitations. One limitation of this study is that it was conducted online and follow-up questioning for clarification purposes was not viable. However, the online survey allowed for participants across the nation to respond and allowed for the completion of the survey in an anonymous manner. A second limitation is that the study relies upon parental self-report and perception of their experience at the time their child was diagnosed. Another limitation is that the findings have limited generalization to families without access to resources and/or computer access since the study was an internet-based survey.

While this study provided insight to a specific, vulnerable population ($n = 83$), the sample size was low and there is a need for future research to better conceptualize stress, coping, and interventions with fathers who have a child with autism. In addition, more randomized studies across diverse demographic variables, in-person interviews which allow for follow up, and/or a study investigating types of interventions would provide more understanding of the impact of the diagnosis of autism on fathers.

References

- Astor-Dubin, L., & Hammen, C. (1984). Cognitive versus behavioral coping responses of men and women: A brief report. *Cognitive Therapy and Research*, 8(1), 85-90.
- Baio, J. (2014). Prevalence of autism spectrum disorder among children aged 8 years-autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *Morbidity and Mortality Weekly Report*, 63, 1-21.
- Baker-Ericzn, M. J., Brookman-Fraze, L., & Stahmer, A. (2005). Stress levels and adaptability in parents of toddlers with and without autism spectrum disorders. *Research and Practice for Persons with Severe Disabilities*, 30, 194-204.
- Beresford, B. A. (1994). Resources and strategies: How parents cope with the care of a disabled child. *Journal of Child Psychology and Psychiatry*, 35, 171-209.

- Best, M., Streisand, R., Catania, L., & Kazak, A. E. (2001). Parental distress during pediatric leukemia and posttraumatic stress symptoms (PTSS) after treatment ends. *Journal of Pediatric Psychology, 26*, 299-307.
- Bishop, S. L., Richler, J., Cain, A. C., & Lord, C. (2007). Predictors of perceived negative impact in mothers of children with autism spectrum disorder. *American Journal on Mental Retardation, 112*, 450-461.
- Boyd, J., & Beail, N. (1994). Gender issues in male sexual abuse. *Clinical Psychology Forum, 64*, 35-35.
- Brobst, J. B., Clopton, J. R., & Hendrick, S. S. (2009). Parenting children with autism spectrum disorders: The couple's relationship. *Focus on Autism Other Developmental Disabilities, 24*, 38-49. doi:10.1177/1088357608323699.
- Brookman-Frazer, L., & Koegel, R. L. (2004). Using parent/clinician partnerships in parent education programs for children with autism. *Journal of Positive Behavior Interventions, 6*, 195-213.
- Casey, L. B., Zankas, S., Meindl, J. N., Parra, G. R., Cogdal, P., & Powell, K. (2012). Parental symptoms of posttraumatic stress following a child's diagnosis of autism spectrum disorder: A pilot study. *Research in Autism Spectrum Disorders, 6*, 1186-1193.
- Dabrowska, A., & Pisula, E. (2010). Parenting stress and coping styles in mothers and fathers of pre-school children with autism and Down syndrome. *Journal of Intellectual Disability Research, 54*, 266-280.
- Davis, N., & Carter, A. (2008). Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: Associations with child characteristics. *Journal of Autism and Developmental Disorders, 38*, 1278-1291.
- Dyson, L. (1993). Response to the presence of a child with disabilities: Parental stress and family functioning over time. *American Journal of Mental Retardation, 98*, 207-218.
- Essex, E. L., Seltzer, M. M., & Krauss, M. W. (1999). Difference in coping effectiveness and well-being among aging mothers and fathers of adults with mental retardation. *American Journal of Mental Retardation, 104*, 545-563.
- Foody, C., James, J. E., & Leader, G. (2014). Parenting stress, salivary biomarkers, and ambulatory blood pressure in mothers of children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 8*, 99-110.
- Foody, C., James, J. E., & Leader, G. (2015). Parenting stress, salivary biomarkers, and ambulatory blood pressure between mothers and fathers of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 45*, 1084-1095.
- Foy, J. M. (2015). The medical home and integrated behavioral health. *Pediatrics, 135*, 930-931.
- Freedman, R. I., & Boyer, N. C. (2000). The power to choose: Supports for families caring for individuals with developmental disabilities. *Health and Social Work, 25*, 59-68.
- Freedman, T. R., Jaffe, H. W., Cono, J., Richards, C. L., & Iademarco, M. F. (2014). Prevalence of Autism Spectrum Disorder among children aged 8 Years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2010, *Morbidity and Mortality Weekly Report, 63*(2), 1-21.
- Goin-Kochel, R. P., & Myers, B. J. (2005). Parental report of early autistic symptoms: Differences in ages of detection and frequencies of characteristics among three autism-spectrum disorders. *Journal on Developmental Disabilities, 11*, 21-39.
- Harper, A., Dyches, T. T., Harper, J., Roper, S. O., & South, M. (2013). Respite care, marital quality, and stress in parents of children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 43*, 2604-2616, DOI:10.1007/s10803-013-1812-0

- Hartley, S. L., Barker, E. T., Seltzer, M. M., Floyd, F., Greenberg, J., Orsmond, G., & Bolt, D. (2010). The relative risk and timing of divorce in families in children with an autism spectrum disorder. *Journal of Family Psychology, 24*, 449–457.
- Hastings, R. P. (2003). Child behaviour problems and partner mental health as correlates of stress in mothers and fathers of children with autism. *Journal of Intellectual Disability and Research, 47*, 231-237.
- Hastings, R. P. & Johnson, E. (2001). Stress in UK families conducting intensive home-based behavioral interventions for their young child with autism. *Journal of Autism and Developmental Disorders, 31*, 327-336.
- Hastings, R. P., Kovshoff, H., Brown, T., Ward, N. J., Degli Espinosa, F., & Remington, B. (2005). Coping strategies in mothers and fathers of preschool and school-age children with autism. *Autism, 9*, 377-391.
- Hecker, L. L. (1991). Where is dad? 21 ways to involve fathers in family therapy. *Journal of Family Psychotherapy, 2*, 31-45.
- Henggeler, S. W., Cunningham, P. B., Pickrel, S. G., Schoenwalkd, S. K., and Brondino, M. J. (1996). Mutisystemic therapy: An effective violence prevention approach for serious juvenile offenders. *Journal of Adolescence 19*, 47-61.
- Husaini, B. A., Moore, S. T., & Cain, V. A. (1994). Psychiatric symptoms and help-seeking behavior among the elderly: An analysis of racial and gender differences. *Journal of Gerontological Social Work, 21*, 177-193.
- Karst, J. S., & Van Hecke, A. V. (2012). Parent and family impact of autism spectrum disorders: A review and proposed model for intervention evaluation. *Clinical Child and Family Psychology Review, 15*, 247-277.
- Kazak, A. E., Boeving, C. A., Alderfer, M. A., Hwang, W. T., & Reilly, A. (2005). Posttraumatic stress symptoms during treatment in parents of children with cancer. *Journal of Clinical Oncology, 23*, 7405-7410.
- Keen, D., Couzens, D., Muspratt, S., & Rodger, S. (2010). The effects of a parent-focused intervention for children with a recent diagnosis of autism spectrum disorder on parenting stress and competence. *Research in Autism Disorders, 4*, 229, 241.
- King, L. A., King, D. W., Leskin, G., & Foy, D. W. (1995). The Los Angeles Symptom Checklist: A self-report measure of posttraumatic stress disorder. *Assessment, 2*(1), 1-17.
- Koegel, R., Schreibman, L., Loos, L., & Dirlich-Wilhelm, H. (1992). Consistent stress profiles in mothers of children with autism. *Journal of Autism & Developmental Disorders, 22*, 205–216.
- Krugman, S. (1996, March). Traumatic arousal in men. Paper presented at *Men: The Challenges: Being a Patient-Being a Therapist Conference, Boston, MA*.
- Lewis, M., Pagura, J., Sareen, J., & Bolton, J. M. (2010). The use of alcohol and drugs to self-medicate symptoms of posttraumatic stress disorder. *Depression and Anxiety, 27*, 731-736.
- Little, L. (2002). Differences in stress and coping for mothers and fathers of children with Asperger's syndrome and nonverbal learning disorders. *Pediatric Nursing, 28*, 565.
- Lukens, E. P., & McFarlane, W. (2004). Psychoeducation as evidence-based practice: Considerations for practice, research, and policy. *Brief Treatment and Crisis Intervention, 4*, 205-225.
- Lyons, A. M., Leon, S. C., Phelps, C. E. R., & Dunleavy, A. M. (2010). The impact of child symptom severity on stress among parents of children with ASD: The moderating role of coping styles. *Journal of Child and Family Studies, 19*, 516-524.

- Mancil, G., Boyd, B., & Bedesem, P. (2009). Parental stress and autism: Are there useful coping strategies? *Education and Training in Developmental Disabilities, 44*, 523–537.
- Mandell, D. S., & Salzer, M. S. (2007). Who joins support groups among parents of children with autism? *Autism, 11*, 111-122.
- Manne, S. (2009). Commentary: Adopting to a broad perspective on posttraumatic stress disorders, childhood medical illness and injury. *Journal of Pediatric Psychology, 34*, 22. doi:10.1093/jpepsy/jsn042.
- Mansell, W., & Morris, K. (2004). A survey of parents' reactions to the diagnosis of an autistic spectrum disorder by a local service Access to information and use of services. *Autism, 8*, 387-407.
- Moes, D., Koegel, R. L., Schreibman, L., & Loos, L. (1992). Stress profiles for mothers and fathers of children with autism. *Psychological Reports, 71*, 1272-1274.
- Noh, S., Dumas, J. E., Wolf, L. C., & Fisman, S. N. (1989). Delineating sources of stress in parents of exceptional children. *Family Relations: Journal of Applied Family & Child Studies, 38*, 456-461.
- Phipps, S., Larson, S., Long, A., & Rai S. N. (2006). Adaptive style and symptoms of posttraumatic stress in children with cancer and their parents. *Journal of Pediatric Psychology, 31*, 298–309.
- Rao, P. A., & Beidel, D. C. (2009). The impact of children with high- functioning autism on parental stress, sibling adjustment, and family functioning. *Behavior Modification, 33*, 437–451.
- Roach, M. A., Orsmond, G. I., & Barratt, M. S. (1999). Mothers and fathers of children with Down Syndrome: Parental stress and involvement in childcare. *American Journal of Mental Retardation, 104*, 422–36.
- Rodrigue, J. R., Morgan S. B., & Geffken, G. (1991) A comparative evaluation of adaptive behaviour in children and adolescents with autism, Down syndrome, and normal development. *Journal of Autism and Developmental Disorders, 21*, 187–96.
- Sakaguchi, M., & Beppu, S. (2007). Structure of stressors in mothers of preschool children with autism. *Japanese Journal of Special Education, 45*, 127.
- Schieve, L. A., Blumberg, S. J., Rice, C., Visser, S. N., & Boyle, C. (2007). The relationship between autism and parenting stress. *Pediatrics, 119*, S114–S121.
- Seltzer, M. M., Greenberg, J. S., Hong, J., Smith, L. E., Almeida, D. M., Coe, C., & Stawski, R. S. (2010). Maternal cortisol levels and behavior problems in adolescents and adults with ASD. *Journal of Autism and Developmental Disorders, 40*, 457-469.
- Sharpley, C. F., Bitsika, V., & Efremidis, B. (1997). Influence of gender, parental health, and perceived expertise of assistance upon stress, anxiety, and depression among parents of children with autism. *Journal of Intellectual and Developmental Disability, 22*, 19–28.
- Smith, T. B., Oliver, M. N. I., & Innocenti, M. S. (2001). Parenting stress in families of children with disabilities. *American Journal of Orthopsychiatry, 71*, 257–261.
- Tobing, L. E. & Glenwick, D. S. (2002). Relation of the Childhood Autism Rating Scale-Parent version to diagnosis, stress, and age. *Research in Developmental Disabilities, 23*, 211-223.
- Tonge, B., Brereton, A., Kiomall, M., Mackinnon, A., King, N., & Rinehart, N. (2006). Effects on parental mental health of an education and skills training program for parents of young children with autism: A randomized controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 45*, 561-569.

- Wade, S. L., Walz, N. C., Cassedy, A., Taylor, H. G., Stancin, T., & Yeates, K. O. (2010). Caregiver functioning following early childhood TBI: Do moms and dads respond differently? *NeuroRehabilitation*, *27*(1), 63-72.
- Williams, K., MacDermott, S., Ridley, G., Glasson, E. J., & Wray, J. A. (2006). The prevalence of autism in Australia: Can it be established from existing data? *Journal of Paediatrics and Child Health*, *44*, 504-510.

Correspondence concerning this article should be addressed to Clinton Smith, The University of Tennessee at Martin, 240B Gooch Hall, Martin, TN 38238. E-mail: csmit279@utm.edu



Council for
Exceptional
Children

DADD

***Division on Autism and
Developmental Disabilities***

The voice and vision of special education

Visit the official Website of the
Division on Autism and Developmental Disabilities:
<http://www.daddcec.org>
