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Research to Practice

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

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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.

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

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On January 21 – 23, 2015, the Council for Exceptional Children Division on Autism and Developmental Disabilities (DADD) sponsored its Sixteenth 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.

As the incidence of autism spectrum disorder (ASD) continues to rise, the need for research-based strategies becomes more critical to individuals with ASD. In the first article, “*Research Synthesis: Effective Practices for Improving the Reading Comprehension of Students with Autism Spectrum Disorder*,” author Amy L. Accardo reviewed, identified, and assessed research-based strategies related to teaching reading comprehension skills to students with ASD. Accardo reports that explicit reading strategies such as: anaphoric cueing, cooperative learning, compare and contrast charts, direct/explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure or

character event maps, and systematic prompts were effective in teaching these skills. Accardo also states that research on teaching reading comprehension skills to students with ASD is limited; therefore, additional research must be conducted.

Visual activity schedules are a critical aspect in providing a structured environment for students with autism spectrum disorder (ASD) and intellectual disability (ID). In the next article, the authors of this study investigated the use of visual activity schedules (VAS) to teach common skills to students with ASD and ID. Additionally, in *“How to Implement Visual Activity Schedules for Students with Disabilities,”* Amy D. Spriggs, Wilhelmina van Dijk, and Pamela J. Mims provided an overview of VAS and provided guidelines on schedule variations, creating schedules, and implementing schedules. VAS meets the requirements of evidence-based practices (Horner et al., 2005) when used for increasing on-task, on-schedule, and transition behaviors for school-age children with ASD. The authors also state that VAS can be used for adolescents and adults with ID for teaching new skills, and facilitating independence and on-task behaviors. In conjunction with their strength as an evidence based practice, VAS are cost effective, easy to implement, and non-intrusive for students. In conclusion, Spriggs et al. state that VAS is a viable, evidence-based strategy that provides students with ID and ASD with flexibility and structure making it a highly effective strategy for students of any age or ability.

The need for support from Vocational Rehabilitation (VR) agencies for young adults with autism spectrum disorder (ASD) continues to increase. In the next article *“Relationships among State and Special Education Factors and Employment*

Outcomes of Transition-Aged Adults with ASD,” Sloane Burgess and Robert Evert Cimera seek to understand why only 36% of young adults who receive VR services become competitively employed. Special education and state factors were evaluated to determine their role in the low employment rate. The authors described and evaluated the relationships between both factors on employment outcomes for transition-aged adults with ASD served by VR agencies. Results indicated state factors played a larger role in employment outcomes.

The prevalence rate and diagnosis of autism spectrum disorder (ASD) is increasing among children in the United States; however, the rate of diagnosis is not increasing among African American children with ASD. In the literature review, *“Disparities in Diagnoses and Access to Services for African American Children with Autism,”* Jamie N. Pearson discusses what is known about diagnosis and access to services for African American children with Autism. The author notes that many times African American students are diagnosed later than other children with ASD, making it hard for them to receive early interventions and services. After reviewing research findings, Pearson states there is a need for parent education programs and training for medical professionals to help address the needs of African American students with ASD. Current research on this topic is limited; therefore, additional research should be conducted.

A recent emphasis on preparing pre-service teachers for their future classrooms by promoting diverse and global perspectives in teacher preparation programs is emerging. Researchers have suggested that promotion of these perspectives will better prepare teachers by broadening their cultural and global lenses. In the next article Meaghan

M. McCollow, Jordan Shurr, and Andrea D. Jasper describe their investigation of the effects of global competence on pre-service teacher readiness in “*Cross-cultural Experience in Special Education: The Impact of a Study Abroad Program for Special Education Pre-Service Teacher Candidates*”. In the study the authors evaluated 14 pre-service teachers before and after a travel abroad experience. Qualitative methods were used to examine the change in cultural perceptions among the special education teacher candidates. The results of this study indicate that study abroad opportunities enhance cultural perspectives and global competence.

Improving independent completion of vocational skills is critical for individuals with autism spectrum disorders (ASD) and/or intellectual disability (ID) to obtain and sustain employment; however, another consideration is maintenance of those skills, particularly when there are interruptions in work schedules. In their article, “*Effectiveness of Using Video Modeling Booster Sessions to Maintain Vocational Skills*,” authors Toni Van Laarhoven, Wendy Bonneau, Daina Hunt, Ximena Burgin, Erika Blood, and Jesse W. Johnson designed this study to determine if watching video modeling “booster” sessions of a work-related task would assist students with ASD/ID in maintaining or improving vocational skills, following a 12-week summer break. Six young adults participated and each was assigned two vocational tasks at his or her employment settings. Their independence with each task was measured prior to and following break and evaluated using a nonequivalent dependent variables design. One task was assigned to a control condition (no video) and the other was assigned to a video modeling booster condition (watching video model three times before going to work). The authors discuss

the findings of their research and the potential benefits to using video-based supports to promote independence in employment settings.

Current trends in educational reform are not just about “access” but also emphasize that this access in a general education environment should be meaningful for learners with disabilities, where they show improvement; this is of great significance for teachers of students with severe disabilities. In the next article “*Examining Preservice Teachers’ Concepts and Beliefs Related to Curriculum*,” Elizabeth West, Maggie Schulze, and Jose Hernandez identified two purposes for this study: (1) to understand whether and how pre-service teachers’ concepts of curriculum for learners with severe disabilities changed from before to after a course in curriculum; and (2) to explore the use of a concept map approach as a tool for understanding pre-service teachers’ changes in concept and beliefs. Pre-service teachers drew concept maps around curriculum and wrote explanatory paragraphs on the first and last day of the course. Results were analyzed qualitatively and quantitatively and indicated statistically significant changes in concepts and beliefs related to *general education*, the *least restrictive environment (LRE)* and *differentiation* after the course. Under the general education and LRE category, *alignment* and *entry and grade level curriculum* had statistically significant higher entries post-course. Results of this two-pronged study suggest that an introduction to this content in meaningful and deep ways can change pre-service teachers’ concepts and beliefs related to their thinking of curriculum for students with severe disabilities.

The next article “*Using Comics to Measure Social Evaluative Reasoning in the*

Workplace: Instrument Calibration using a Rasch Modeling Approach” was a response to a dearth in the literature focusing on effective employment instruction for secondary students with Autism Spectrum Disorder (ASD), Jerred Jolin designed this pilot study utilizing a multidimensional Rasch modeling approach to determine the effectiveness of using comic strips as a visual-based assessment tool to measure students’ with Level 1 ASD abilities to make evaluative judgments in the context of workplace scenarios heavy in customer service demands. Results show that a two-dimensional model, one that differentiates between items tapping local and global processing abilities, fit the data best. Jolin suggests that with this kind of information, it becomes possible to design a range of targeted, curricular materials that may be effective for learners along the spectrum who are beginning their transition education. The author concludes with a discussion of potential future applications of this assessment approach, based on some of the reported findings.

Engagement in learning is critical to student learning outcomes. According to Aleksandra Hollingshead, Matthew Wappett, and Nicole Erikson, the authors of *“Examining the Effectiveness of Technology-Based Intervention on Student Engagement and Products of Learning in an Earth Science Class,”* meaningful inclusion of students with disabilities, including those with autism spectrum disorder (ASD) should support engagement in order to ensure their learning and quality of learning products. This exploratory case study examined the effectiveness of a technology-based intervention designed within the principles of Universal Design for Learning (UDL) for a high school student with ASD, enrolled in an earth science class. It is worth noting that the study was based on the following

propositions, which are supported by the literature: (1) increased student engagement is linked to improved learning outcomes; and (2) self-directed learning incorporating the use of technology stimulates engagement. The authors conclude that the research findings support the importance of aligning instruction with UDL principles in order to ensure learning of all students.

In order to succeed in school, career and life, it is necessary to be able to understand written material. Reading comprehension is an essential component of developing literacy. In their article, *“Teaching Reading Comprehension Strategies to Students with Autism Spectrum Disorders: Initial Analysis of a Survey on Current Classroom Practices,”* Elizabeth Finnegan and Amanda L. Mazin of St. Thomas Aquinas College discuss a study designed to ascertain the kind of training and experience teachers had in providing literacy instruction to students with ASD and to determine instructional approaches and materials used to develop reading comprehension in students with ASD. The results of this study shed light on practices employed by teachers in the area of literacy. By identifying reading programs currently in use, the authors propose that it is possible to formulate hypothesis on teacher’s instructional decision-making, frame further research questions and improve teacher education in instruction in reading comprehension. The findings indicate that there is a high level of experience and education amongst teachers, although not specifically in teaching literacy to students with ASD. Collectively, the participants in this study had many years teaching experience, as well as a high level of education and knowledge of a range of reading programs. The study has implications for professionals in teacher education, showing that teachers need education and preparation, not only in the

general characteristics of individuals with ASD, but also in developing understanding of how those characteristics affect reading comprehension and other academic skills.

A wide range of behavioral interventions have been designed to improve symptoms associated with ASD. In their article "*The iPad as an Alternative Reinforcer during Functional Communication Training: Effects on Self-Injury and Aggression*," Catherine Acotto, Kathleen McCoy, Stanley Zucker, and Sarup Mathur discuss a single case study to examine the effects of using an Apple iPad in reducing severe aggression. The study used a multiple baseline design across settings to examine the effects of using an iPad as an alternative reinforcer on self-injury and aggression when reinforcement for communication was delayed or unavailable during Functional Communication Training (FCT) in an adolescent with ASD, ID, and severe aggression. Findings indicated that use of an iPad as an alternative reinforcer decreased the duration of self-injury and physical aggression in the subject across three varied settings. Results of this study support prior research on FCT as an effective intervention for individuals with severe problem behaviors and demonstrate that using an iPad as an alternative reinforcer was effective in decreasing aggressive behaviors in the subject studied. Results of this study further support the limited research on interventions to facilitate the application of FCT in natural environments.

The next article, "*Autism in the Arctic: A Capacity Building Project in Rural Alaska*," Krista James of the Anchorage School District and Tara Maltby from the Alaska Autism Resource Center deals with challenges in providing education services to children with autism in Alaska. Due to the size of Alaska and the state's diverse

geographical regions, educators experience extreme distance related challenges in providing services to individuals with autism spectrum disorder (ASD). The majority of Alaskan communities are accessible only by small plane or boat, with hundreds of miles of tundra separating villages. While in the larger areas, individuals with autism have access to a variety of ASD services, there are insufficient services in the rural and remote areas to meet the existing needs. Between the lack of services and lack of trained professionals to implement evidence-based interventions, the rate of out of district placement for students with autism has risen steadily. In Alaska, out of district translates to "out of village and/or state". When children are placed out of their villages or out of the state, they lose their connection to their family, their Alaskan Native culture, and their community. This article describes how a grant from Autism Speaks aided the Alaska Autism Resource Center in Anchorage to create a project to increase ASD capacity in rural Alaska. The authors report in this paper that the project was successful in beginning to build capacity in remote villages by providing three highly trained individuals in each community to train, consult, and share resources with families, and schools. Services were improved so that more children with ASD were able to be served within their home communities instead of being sent out of state, permitting them to remain in their villages and maintain their cultural and familial connections.

In the article, "*Identification and Labels for Young Tanzanian Children: An Examination of Labels for Children with Intellectual Disabilities Using the Capability Approach*," Angi Stone-MacDonald, presents an examination of how the capability approach supports identification

and education of young children with mild intellectual disabilities and developmental delays in Tanzania, as an alternate way to look at labeling for children with disabilities. The author uses two case studies to analyze cultural and practical understandings of disability in Tanzania. Findings from the two studies are discussed with regard to how different labels and terms about students may influence service delivery. In the article, practices in an inclusive public primary school and a special needs faith-based school are examined, with a focus on the level of community participation in each setting. Challenges related to labels, disability advocacy, and current school practices in both school and community settings are explored. Findings from the two studies indicate that stakeholders, parents and teachers in Tanzania prefer young children to start their education from a position of strength and build on those capabilities. The capability approach is shown to foster a holistic view of the child and support the growth of that child's knowledge, skills, and capabilities.

Today students with autism spectrum disorder (ASD) are entering universities at increasing rates. Transition to postsecondary education poses several challenges for individuals with ASD. Difficulties may include problems in (a) navigating the new college environment, (b) engaging in varied social situations, (c) managing and organizing time and responsibilities, (d) meeting academic demands (e) accessing support services, (f) managing anxiety and

stress, and (g) developing a social and extracurricular life. In the final article, "*The Peer Assisted College Support Program: Supporting Students with Autism Spectrum Disorder in the University Setting*," Erica Howell and Debra Cote from California State University, Fullerton discuss development, aims, curriculum, implementation, and evaluative measures to increase transition success. The article highlights the Peer Assisted College Support (PACS) program at the Center for Autism at California State University Fullerton (CSUF), which was developed to meet the needs of college students with ASD. In PACS, veteran college students who have experienced success at the college level are paired with students with ASD. These partners meet bi-weekly in order to discuss issues related to the transition to college. The goal is for students with ASD to utilize the peer mentor as a resource, in addition to the available campus resources through the Office of Disability Support Services. The overall anticipated impacts of the PACS program are that students with ASD will improve their academic skills, increase their comfort level interacting with peer on campus, and be better able to navigate the campus environment.

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.

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Research Synthesis: Effective Practices for Improving the Reading Comprehension of Students with Autism Spectrum Disorder

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Abstract: The incidences of autism spectrum disorder (ASD) continue to rise steadily increasing the need for research-based strategies to support this population in the core academic content area of reading comprehension. A research synthesis was conducted with the purpose of (1) reviewing existing research to determine effective practices for teaching reading comprehension to students with ASD, (2) identifying the features of effective practices that appear to influence comprehension outcomes, and (3) assessing the quality of the research related to comprehension strategies and students with ASD. A functional relation was identified between the increased reading comprehension of students with ASD and each of the instructional practices of anaphoric cueing, compare & contrast charts, cooperative learning, explicit/direct instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure and character event maps, and systematic prompts. Research in this area is limited and suggestions for both educators and researchers are provided.

Federal mandates in the form of No Child Left Behind (NCLB, 2002) and the Individuals with Disabilities Education Act (IDEA, 2004) require teachers of learners with disabilities to utilize research-based practices in making educational decisions. These mandates have resulted both in a research dialogue to define the term evidence-based practice (EBP), and in the identification of EBPs to support classroom instruction (Browder & Cooper-Duffy, 2003; Cook, Smith, & Tankersley, 2012; Odom et al., 2005; Spooner, Knight, Browder, & Smith, 2011). In consideration of these mandates, concern exists regarding both the quality of practices implemented in our classrooms, and the best method of disseminating essential research information to our classroom teachers (Odom et al., 2005). The use of EBPs by teachers is especially applicable to students with autism spectrum disorder (ASD) due to (a) the continuously increasing prevalence, (b) the complex characteristics and need for

individualization of practices, (c) an availability of alternative interventions that may not be research-based, and (d) teacher requirement to comply with federal regulation (Mayton et al., 2010). Moreover, as a result of federal mandates requiring schools to utilize scientifically based programs, instructional practices for learners with disabilities, including learners with ASD, are increasingly being held to EBP standards (Mesibov & Shea, 2011).

The Center for Disease Control and Prevention has reported that 1 in 42 boys and 1 in 68 children in the United States are currently identified with ASD (CDC, 2014, p. 1). This marks a 29% increase from the prior 2012 report (CDC, 2012). With an increase in autism rates coinciding with an increase in inclusive placements, many teachers are not equipped to meet the needs of students with ASD in the classroom (Brown, Oram-Cardy, & Johnson, 2013). The underrepresentation of students with

complex disabilities (such as ASD) in studies investigating practices to improve academic skills is of concern (Spooner & Browder, 2015). Research related to comprehension and ASD is of specific concern, as it is well established that individuals with ASD have difficulty with comprehension (Williamson, Carnahan, Birri, & Swoboda, 2014). The identification of EBPs and research-based practices that teachers can implement to support students with ASD is necessary to improve access to core content through reading comprehension.

Comprehension instruction promotes active thinking skills and application of thinking processes (Browder et al., 2009). The use of effective practices to teach comprehension to learners with ASD is crucial as literacy skills are critical for quality of life in areas such as community living, shopping, and following directions (Carnahan, Williamson, & Haydon, 2009), and instruction in comprehension may carry over to socialization skills (Smith & Barnhill, 2001). Research during the past decade provides a consensus that individuals with ASD often exhibit significant difficulties with reading comprehension, despite demonstrating competency and even excelling in the areas of phonics, word recognition, and fluency (Ricketts, 2011; Whalon & Hart, 2011). All learners with ASD are unique, and these differences create an explicit need for teachers to identify individualized approaches to help students achieve their academic goals (Mayton, Wheeler, Menendez, & Zhang, 2010). Meeting the unique needs of each individual learner with ASD through teacher knowledge and preparedness to use multiple research-based practices to teach comprehension is essential.

A search of the literature uncovered several

comprehensive reviews specific to EBPs and autism. Chronologically, Odom and colleagues (2003) conducted a review and analysis of single subject design EBPs for young children with ASD from 1990-2002; Mayton and colleagues published a review of the literature in 2010 applying the Horner et al. 2005 criteria to ten years of research spanning from 2000-2009; and, Mesibov and Shea prepared a comprehensive report in 2011 examining clinical ASD research to strengthen recommendations for effective instruction for educators and parent practitioners. Unfortunately, EBPs specific to reading comprehension and students with ASD were not identified in any of these comprehensive reviews.

Furthermore, Whalon, Al Otaiba, and Delano (2009) reviewed the literature with a focus on quantitative research relevant to the five components of reading instruction as identified by the National Reading Panel (NRP). The NRP Report by the National Institute of Child Health and Human Development (NICHD) established a solid guideline for the instruction of reading, breaking instruction into the five major categories of phonemic awareness, phonics instruction, fluency, vocabulary, and text comprehension (2000). Specific to comprehension, Whalon and colleagues' findings suggest that cooperative learning, anaphoric cueing, and one-to-one direct instruction are promising interventions to facilitate reading comprehension improvement in students with ASD. This research synthesis aims to build on the findings of Whalon and colleagues. In contrast to the broad focus on all five components of reading instruction, this synthesis specifically examines the efficacy of instructional practices designed to improve the main reading need of students with ASD, text comprehension.

Due to the dearth of EBPs specific to comprehension and ASD, a research synthesis was designed to identify effective practices relevant to supporting these learners in the area of reading comprehension. For the purposes of this study, *effective practices* are defined as research-based practices identified through high quality quantitative study, but not yet meeting the strict criteria needed to obtain EBP designation. The purpose of this research synthesis is to explore quantitative studies related to reading comprehension and individuals with ASD in relation to the questions:

1. What are the effective practices for teaching reading comprehension to students with ASD?
2. What features of identified effective practices appear to influence comprehension outcomes?
3. What is the quality of the research related to effective practices and students with ASD?

Method

Review of the existing research began with a computerized search of the ERIC, SAGE, and OMNI databases using the keywords *autism, ASD, reading, comprehension, literacy, reading, and thinking*. Furthermore, while the NRP Report (2000) is now over a decade old, it has remained a significant guideline for the instruction of reading since its publication. As a result, it was used as a keyword search framework. Utilized search terms included the six instructional practices recommended for vocabulary: *keyword method, incidental learning, repeated exposure, pre-teaching of vocabulary, restructuring reading material, and context method*; and the eight instructional practices recommended for comprehension: *comprehension monitoring, cooperative learning, use of graphic organizers, question answering, question generation,*

story structure, summarization, and a multiple strategies approach (International Reading Association, 2002). A search of the literature using the terms *autism*, and each instructional vocabulary practice resulted in no related findings. A search using the comprehension terms, however, did result in findings relevant to learners with ASD and the instructional practices of cooperative learning, graphic organizers, question generation, story structure, and a multiple strategies approach.

Initial findings were expanded via an ancestral hand search of articles from the reference sections of emergent studies. An inclusion criteria and coding guide were established and applied to identify only studies utilizing quantitative methodology with high quality research design.

Inclusion Criteria

For inclusion in the synthesis, studies were required to (a) use a true or quasi-experimental group, or single-case research design, (b) include baseline and intervention data specific to students diagnosed with ASD, and (c) include reading comprehension as a dependent variable. Inclusion criteria limited studies to the specific population of students with ASD, encompassing students with a diagnosis of ASD, PDD, PDD-NOS, Asperger syndrome or a dual diagnosis including ASD. Studies focusing on groups of students including some participants with ASD were excluded unless the study provided separate data points for the population with ASD. In terms of setting, criteria included students with ASD in all grade levels, K-12, and all school settings, including both private and public schools, and both self-contained special education and inclusive classroom settings. Moreover, the dependent variables measured throughout each included study were limited to forms of reading *comprehension*.

Included research explores reading interventions measuring student understanding of text (i.e., passage comprehension, making inferences, and understanding analogies). Studies measuring the effect of interventions on the ability of students with ASD to learn to read (decoding, fluency) with and without a dual focus on comprehension were excluded, unless the studies reported the specific comprehension data points separately.

Coding Procedures

A single-case design coding guide was developed for this research synthesis using the guidelines recommended by Cooper (2010). Specifically, coding began with consideration of Cooper's eight identified primary categories of reporting, independent variable, setting, participants, dependent variable, research design, data outcomes, and coder characteristics. A small sampling of studies were read prior to drafting the guide to identify general themes related to both instruction of students with ASD, and implementation of reading comprehension interventions. Adapting Cooper's recommendations to single-case design and utilizing the organizational framework of Santangelo and Graham (2012) as an exemplar, along with consideration of the quality criteria for single subject design provided by Reichow, Volkmar, and Cicchetti, (2008), and Kratochwill (2013), a guide was developed to code study characteristics and quality indicators. The guide was reviewed by a second researcher and three doctoral students for content and ease of use, resulting in the addition of ceiling and floor effect indicators. As a quality check, two studies were coded by a doctoral student with 100% inter-rater reliability.

Each study was coded for variables in the areas of: setting and participants;

independent variables; and quality indicators, along with the category of results and measures reported on in the findings section. The category of setting and participants included the eight characteristics of location, number of settings, familiarity of setting, number of participants, grade level, diagnosis, reading comprehension level, and other participants. The category of independent variables included the 11 characteristics of instructional strategy, baseline condition, secondary intervention, duration, materials, individualization, pre-teaching, co-occurring strategies, group format, interventionist, and training details. Upon identification, quality indicators were coded as one point, resulting in a quality indicator range of 0-12 points for each study. Quality indicators included: functional relation, coding one point if the design had potential to demonstrate experimental control; baseline stability, coding one point if the study provided evidence of a stable baseline before intervention; and four characteristics related to floor and ceiling effects, with one point coded in each category at both baseline and intervention. The category of interventionist coding was included with each study receiving one point if the interventionist received professional development or was a known expert. Study implementation was coded based on evidence the treatment was administered as intended with integrity (fidelity reporting of $\geq .8$). Furthermore, to assess the quality of research results each study was coded for the three areas of maintenance, generalization, and social validity as reported. Finally, to assure reliability of results, each study was coded for reliability of measures, with one point correlating to reporting of reliability ≥ 0.8 in all measures. A designation of one half point was coded for all studies with partial reliability displaying ≥ 0.8 reliability in some measures, and as in all quality

characteristic, a zero code was used to indicate both a no response to each coding question, and a not reported response to applicable questions.

Results

Thirteen studies met inclusion criteria, with 12 utilizing a single-case design. Six of the studies used a multiple baseline across participants design (Hua et al., 2012; Kamps, Barbetta, Leonard, & Delquadri, 1994; Mims, Hudson, & Browder, 2012; Stringfield, Luscre, & Gast, 2011; Whalon & Hanline, 2008; Williamson et al., 2014), three used an ABAB design (Carnahan & Williamson, 2013; Kamps, Leonard, Potucek, & Garrison-Harrell, 1995a – Experiment 1; Kamps et al., 1995b – Experiment 2), two used a multiple baseline across behaviors design (Flores & Ganz, 2007; Flores & Ganz, 2009), and one used an alternating treatments design (Solis, McCulley & Zein, 2013). The final study utilized a randomized experimental design (Roux, Dion, Barrette, Dupere, & Fuchs, 2014).

In addition to the included research, six additional studies were identified and excluded. Exclusions were due to a lack of baseline criteria, to a group data reporting format in which specific data for students with ASD was not available, and to a format in which data specific to comprehension was not available. An overall lack of research emerged with only 13 studies found meeting inclusion criteria spanning two decades, from 1994-2014. Thirty-three total students participated in the 12 single-case design studies, and 43 total students participated in the recent randomized block design study by Roux and colleagues, encompassing an overall total of 76 participants.

Research Question 1: Effective Practices for Reading Comprehension and ASD

A review of the included studies resulted in the identification of 10 effective practices to teach reading comprehension to students with ASD. Specifically, the 10 effective practices include: anaphoric cueing, a technique in which students are taught to look back to referents in text to identify the meaning of words such as pronouns (Solis et al., 2013), compare and contrast diagrams (Carnahan & Williamson, 2013), cooperative learning (Kamps et al., 1994,1995a), direct/explicit instruction (Flores & Ganz, 2007; Flores & Ganz, 2009; Roux et al., 2014), graphic organizers (Carnahan & Williamson, 2013), question generation (Hua et al., 2012), read-alouds (Mims et al., 2012), reciprocal questioning (Whalon & Hanline, 2013), story structure maps/character event maps (Stringfield et al., 2011; Williamson et al., 2014), and systematic prompts (Mims et al., 2012). A combination of effective practices or a multiple strategy approach in which a primary intervention was supplemented with another effective practice as a secondary intervention also occurred. For example, in addition to Carnahan and Williamson studying the use of compare and contrast Venn diagrams, a form of graphic organizer, Whalon and Hanline used a graphic story map organizer in their study of reciprocal questioning, and Mims and colleagues included graphic organizers in their study of systematic prompts.

A synthesis of the research reveals a functional relation between the explicit use of instructional practices and the comprehension of students with ASD, with 11 of 13 studies resulting in comprehension gains. Two studies were reported to be inconclusive by the original researchers due to minimal outcome gains; however, no instructional practices were shown to be clearly ineffective as those deemed inconclusive were shown to be effective by

alternate included research. Specifically, Kamps and colleagues reported inconclusive findings regarding the use of cooperative learning strategies on comprehension of students with ASD (1995b), yet a functional relation between cooperative learning and reading comprehension was established by Kamps and colleagues in two additional studies (1994, 1995a). Similarly, Hua and colleagues reported inconclusive findings regarding the use of question generation on comprehension of students with ASD (2012), yet a functional relation between question generation and reading comprehension was established by Solis and colleagues (2013) (see Table 1).

Research Question 2: Features of Identified Effective Practices

Each research study was coded for variables and analyzed for patterns in the three areas of: setting and participants; independent variables; and quality indicators. Emerging patterns were explored with the purpose of identifying features of effective practices that appear to influence comprehension outcomes. Findings are reported by area.

Setting and participants. The study by Roux et al. included 43 elementary school students spanning in age from 7 to 10. The remaining studies each included two to four participants. Participants in nine studies were reported as having reading comprehension levels significantly below average (three or more years below grade level). Participants included students diagnosed with ASD, high functioning ASD (HFASD), Asperger syndrome, and pervasive developmental disorder (PDD). Participants spanned from first grade through high school with the majority of studies conducted in a third or fifth grade classrooms. Coding revealed a lack of

research at the high school level with only one study conducted in grades 9 through 12.

No pattern emerged related to the variable of intervention location in terms of public or private school, however in terms of familiarity of setting, only one study was conducted in a non-familiar setting and this study was one of two total studies reported as inconclusive by the original researchers. Approximately 50% of studies conducted included other participants ranging from general education peers to students with other disabilities. The inclusion of other participants did not appear to have a direct effect on intervention.

Independent variables. During independent variable coding, instructional practices were aligned with the terminology of the eight identified research-based interventions recommended by the NRP: “comprehension monitoring,” “cooperative learning,” “use of graphic organizers,” “question answering,” “question generation,” “story structure,” “summarization,” and a “multiple strategies” approach (International Reading Association, 2002, p. 14). Identified effective practices aligned with NRP recommendations include: cooperative learning, graphic organizers, question generation, and story structure. Additional effective practices beyond those recommended by the NRP include the interventions of anaphoric cueing, compare and contrast charts, explicit/direct instruction, read-alouds, reciprocal questioning, and systematic prompting.

Analysis of patterns related to study features included coding variables of co-occurring instructional practices. Visual supports across studies included picture cues and arrays, graphic organizers, story boards,

Table 1. *Effective Practices to Teach Reading Comprehension to Learners with ASD*

a. Practices	b. Author(s)	c. Data points	d. Findings
Anaphoric Cueing	Solis et al. 2013.1	RCA- Rdg Comp Q Mean (M): B- 68.75% I- 92.5%	✓ Effective: 2/2 students increased passage comprehension using anaphoric cueing intervention, a 24% mean increase baseline to intervention. (Alt. Treatment Design/see Question Generation below)
Cooperative Learning	Kamps et al., 1994	RCA- 5 Rdg Comp Qs (5Ws) M: B-46% I1-78% B- 64% I2- 89%	✓ Effective: During classwide peer tutoring with a cooperative role reversal, 3/3 students increased correct responses to wh questions, a 43% increase.
	Kamps et al., 1995a	RCA- 5 Rdg Comp Qs (5Ws) M: B-27% I1-52% B- 25% I2- 58%	✓ Effective: One student increased correct responses to reading comprehension questions while responding to novels with peers, a 31% increase B to I
	Kamps et al., 1995b	RCA- 10-12 Rdg Comp Qs # answered correctly B-1 I1-3 B-1.25 I2-3.5	Inconclusive: 2/2 students using 5 th grade level novels with peers displayed variability in pre/post test scores. As a result, the intervention was modified to basal readers at their level, a minimal 2% -3% increase.
Direct/ Explicit Instruction	Flores & Ganz, 2007	RCA- Reading Comp. Q M: Inferences Facts Analogies B-18 I-91 B-0 I-89% B-27 I- 90%	✓ Effective: 2/2 students showed gains in all 3 reading comprehension skills of analogies, statement inferences and facts on researcher created probes (mean of all 3 categories) , a 75% mean increase B to I.
	Flores & Ganz, 2009	RCA- Reading Comp. Q M: Analogies Inductions Deductions B-25 I-100 B-0 I-88% B-15 I- 87%	✓ Effective: 2/2 students showed gains in all 3 reading comprehension skills of analogies, deductions, and inductions on reading probes (mean of all 3 categories), a 78% mean increase B to I.
	Roux et al., 2014	RCA- Post Test Vocabulary- effect size 1.06 Main Idea- effect size .92	✓ Effective: In a randomized experimental design of 43 students with ASD across 6 elementary schools, explicit instruction along with visual boards resulted in increased intervention group results.
Graphic Organizer (compare/contrast)	Carnahan & Williamson, 2013	RCA- Reading Comp Q M: B-66% I-96%	✓ Effective: 3/3 students increased passage comprehension using a venn diagram to read 3 paragraph passages of science text, a 30% mean increase B to I.
Question Generation	Solis et al. 2013.2	RCA- Reading Comp Q M: B-47.5% I-82.5%	✓ Effective: 2/2 students increased passage comprehension using QG intervention, a 35% mean increase B to I.
	Hua et al., 2012	RCA- 8 Reading Comp. Q M: Facts B-31% I-40% Inferences B-25% I-35%	Inconclusive: 3/3 students increased the number of correctly answered factual and inferential questions; however results were modest with a mean increase of less than one question correct, a 10% increase.
Story Structure Map or Character Event Map	Stringfield et al., 2011	CBA- Qs read orally M: B- 16% Maint.- 93.3%	✓ Effective: During maintenance of story map instruction, 3/3 students scored a mean of 93.3% from a baseline of 16%; a mean increase of 77.3%.
	Williamson et al., 2014	RCA- 10 Reading Comp Q M: B- 51% I.- 90%	✓ Effective: 3/3 students increased comprehension of narrative chapters using a character event map, along with books on tape and teacher modeling of think alouds. A 39% mean increase baseline to intervention.
Systematic Prompts w/ Read-alouds	Mims et al., 2012	RCA- 11 Rdg Comp. Questions (5Ws, First, Next, Last, etc.) M: B- 23% I- 73%	✓ Effective: 4/4 increased comp. using systematic prompt removal with read-alouds, story structure and graphic organizers, 50% increase B to I.
Reciprocal Questioning	Whalon & Hanline, 2008	RCA- Rdg Qs asked/answered M: Unprompted Q's B- 0 I-2.8 Response to Peers B- 0 I-3.5	✓ Effective: 3/3 increased asking unprompted comp. questions, responding to peer questions while reading storybooks with gen. ed. peers; using self-monitoring and graphic story maps, a 31.5% increase B to I.

Note. ✓Denotes use of visual strategies; ✓Denotes use of motivational plan; Effective- functional relation established between intervention & comprehension; Inconclusive- as reported by primary researcher(s); RCA- Researcher created assessment; CBA- Curriculum based assessment; B- Baseline; I- Intervention; 5Ws- who, what, where, when & why questions

picture exchange system (PECS), support for non-verbal participants, word cards, and Velcro storyboards. The use of visual supports emerged as a common pattern of effective intervention. Analysis showed the two studies deemed inconclusive did not use a visual component during intervention. Moreover, motivational strategies were employed as a secondary intervention in multiple studies and included additional visuals in the forms of graphic progress charts and stickers.

The remaining intervention features of format, duration, and materials show variability. Intervention format results include: small group instruction (54%), dyad format (23%), and individual instruction (23%). Duration of intervention ranged from approximately 135 to 2000 minutes. Regarding reading material, approximately 46% of studies used books, 38% used paragraphs or short passages, and 15% used sentences, with only five of 13 interventions reportedly individualizing materials for students. In terms of assessment measures, commonality did emerge from the measures used to assess outcomes. Researcher created

assessments, most commonly in the form of who, what, when, where, why questions were utilized in 92% of studies with only one study using a program curriculum based assessment.

Research Question 3: Quality of Research

Quality indicators were coded as one point each, resulting in a quality indicator range of 0 – 12 points for each study. The mean quality score for all included studies was 7.2 out of a total possible 12 points. Four quality indicators were identified in 80% or more of the included studies: ceiling effects at baseline (92%); floor effects at intervention (92%); reliability of measures (85%); and design allowing for functional relation (85%). Four quality indicators were evident in 50 – 79% of studies: fidelity of treatment (77%), training of interventionist (69%), social validity (62%), and maintenance (54%). Finally, four quality indicators were met by less than 50% of studies indicating a limited collective focus on the quality indicators of: baseline stability prior to intervention (31%); floor effects at baseline (46%); ceiling effects at intervention (23%); and generalization (8%) (see Table 2).

Table 2. Mean Quality Indicator Reporting

Overall Percentage of Studies	Reported Quality Indicator	M
≥ 80% of studies	Floor Effect at Intervention	92%
	Ceiling Effect at Baseline	92%
	Reliability of Measures (reported ≥. 80)	85%
	Functional Relation/ Internal Validity	85%
50% - 80% of studies	Fidelity of Treatment (reported ≥. 80)	77%
	Training of Interventionist	69%
	Social Validity	62%
	Maintenance Data over Time	54%
<50% of studies	Floor Effect at Baseline	46%
	Stable Baseline Before Intervention	31%
	Ceiling Effect at Intervention	23%
	Generalization	8%

Discussion

In a 2009 synthesis, Whalon and colleagues reviewed the research related to reading instruction and students with ASD. Results included the recommendation that comprehension based instructional practices become a priority for children with ASD, who often exhibit decoding skills but struggle with comprehending text (Whalon et al., 2009). Whalon et al. found, “when considering the instructional methods used to increase meaning-focused skills, specifically, direct comprehension instruction, the lack of such interventions targeting individuals with ASD is surprising” (p. 10). This synthesis extended the 2009 review of Whalon and colleagues by limiting the focus of included studies to comprehension, and by including strategies beyond those recommended by the National Reading Panel. Results of this review, however, establish that despite more than 60% of the included studies taking place since 2009, there remains a surprising lack of research focusing on reading comprehension and ASD.

The purpose of this synthesis was to explore quantitative studies related to reading comprehension and individuals with ASD (1) reviewing existing research to identify effective practices to teach reading comprehension of students with ASD, (2) identifying features of effective practices that appear to influence comprehension outcomes, and (3) assessing the quality of the overall research related to comprehension interventions and students with ASD. Instructional practices were found to be effective with a functional relation established between increased reading comprehension of students with ASD and each of the 10 effective practices of anaphoric cueing, cooperative learning, compare and contrast charts, direct/ explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure or character

event maps, and systematic prompts. Overall findings provide strong support for teachers to implement the explicit use of reading comprehension strategies in the classroom for students with ASD.

This research synthesis reveals the need for classroom teacher support and education. While not labeled as such within studies, a multiple strategy approach seemed to be effective with multiple studies combining primary interventions with teaching practices including not only visual graphic organizers, but also behavior plans, and/ or motivational materials. The pairing of explicit instruction with visual representation emerged as the intervention feature most frequently utilized to positively influence comprehension outcomes. The coding of secondary interventions used within each study identified the use of visual supports and graphic organizers as effective in conjunction with a primary strategy. In addition, effective strategies were found to be used repeatedly, e.g. using a consistent who, what, where, when, why graphic organizer for multiple passage readings throughout an entire marking period. A multiple strategy approach to comprehension instruction appears to be highly effective but is potentially more difficult to implement than strategies in isolation. Research studying teacher access to and knowledge of identified effective practices may be warranted, along with ongoing professional development for special education teachers related to the teaching of reading comprehension.

Unfortunately, most classroom teachers lack both the time to search for evidence-based treatments, and the access to information related to research-based practices (Kretlow & Blatz, 2011). In an effort to make EBPs readily available to practitioners, multiple research organizations have established free, on-line information databases including the What Works Clearinghouse

(<http://ies.ed.gov/ncee/wwc/>), the Best Evidence Encyclopedia (<http://www.bestevidence.org/>), and the Promising Practices Network (<http://www.promisingpractices.net/>) (Kretlow & Blatz, 2011). It appears until EBPs related to comprehension and ASD are available, teachers also need avenues to access effective practices to teach comprehension to learners with ASD in their classrooms.

The third purpose of this study was to investigate the quality indicators underlying the existing research. This synthesis shows an overall research emphasis on reliability of measures, and on single-case-design allowing for establishing a functional relation, however, this synthesis revealed a limited number of studies investigating comprehension and ASD. This lack of research identifies a clear need for large group quasi-research or true research design studies in the area of reading comprehension and students with ASD, perhaps through implementation of effective practices across autistic support classrooms in an entire school district, or across all students in a private school for students with ASD. In addition, a focus on research quality in terms of criteria required for EBP designation, such as maintenance of intervention, and generalization of reading comprehension to other tasks, emerges as limited. A hierarchical method to prioritize research-based practices when no, or limited, EBPs exist emerges as a need to meet the mandates of IDEA and to provide teachers with appropriate and effective options for instructing learners with ASD in the area of comprehension.

Study Limitations

Single-case design research results included a limited reporting of student comprehension outcomes using primarily researcher created assessments. Effect sizes were available for only one study, and study

comparisons were limited to descriptive data and data derived from student percentage of increase on assessments with unclear comparability. As a result, the rating of identified instructional practices by effectiveness was not attempted. Findings of this synthesis are limited to the outcomes and quality indicators of each single-case study as reported by original authors.

Future Research Recommendations

Studies with experimental design assessing larger populations of students with ASD are essential to further prove efficacy and prioritize effectiveness of instructional practices identified within this research synthesis. Additional areas of recommended research include: specific study of the effect of using visual supports on reading comprehension in conjunction with a primary intervention; the effect of increased instructional time on reading comprehension; the effect of delivering comprehension strategies through multiple means of instruction including the use of technology; and the use of effective practices in middle and high school classrooms.

Time spent on comprehension intervention implementation varied greatly and, further research is recommended to investigate how much time is actually being spent on instruction of reading comprehension in the classrooms for students with ASD. Specific comprehension instruction guidelines along with time spent on instruction guidelines are recommended to correlate the importance of reading comprehension remediation with other provided services on student IEPs, such as speech therapy and behavioral therapy. Studies assessing the direct effect of increased instructional time on reading comprehension and increased social understanding for students with ASD are recommended as an expansion of comprehension research. Furthermore, a search of the literature revealed no studies

meeting inclusion criteria using technology to teach reading comprehension to students with ASD. Research is recommended specifically integrating the effective practices identified, along with the use of technology.

In conclusion this review of the extant literature indicates reading comprehension instruction for learners with ASD is an established area of need. Multiple effective practices to teach reading comprehension to students with ASD have been identified, yet concern exists that these effective practices may not be readily accessible to teachers because they lack the EBP designation.

Research connecting learning needs of students with ASD, effective practices, teacher training, and teacher perceptions of their own ability to teach reading comprehension to learners with ASD is scarce. Furthermore teachers report a lack of knowledge in accessing empirical research (Burns & Ysseldyke 2009; Mazzotti, Rowe, & Test, 2012). Future research investigating teacher knowledge and perception of the identified effective practices is recommended to guide future research, and to provide appropriate professional development for teachers leading to the use of targeted comprehension interventions in the classroom.

References

- Browder, D. M., & Cooper-Duffy, K. (2003). Evidence-based practices for learners with severe disabilities and the requirement for accountability in “no child left behind.” *The Journal of Special Education*, 37, 157-163.
- Browder, D., Gibbs S., Ahlgrim-Delzell, L., Courtade, G. R., Mraz, M. & Flowers, C. (2009). Literacy for learners with severe disabilities: What should we teach and what do we hope to achieve? *Remedial and Special Education*, 30, 269-282.
- Brown, H. M., Oram-Cardy, J., & Johnson, A. (2013). A meta-analysis of the reading comprehension skills of individuals on the autism spectrum. *The Journal of Autism and Developmental Disorders*, 43, 932-935. doi: 10.1007/s10803-012-1638-1
- Burns, M. K., & Ysseldyke, J. E. (2009). Reported prevalence of evidence-based instructional practices in special education. *The Journal of Special Education*, 43, 3-11. doi:10.1177/0022466908315563
- *Carnahan, C. R., & Williamson, P. S. (2013). Does compare-contrast text structure help students with autism spectrum disorder comprehend science text? *Exceptional Children*, 79, 347-363.
- Carnahan, C. R., Williamson, P. S., & Haydon, T. (2009). Matching literacy profiles with instruction for learners on the spectrum: Making reading instruction meaningful. *Beyond Behavior*, 19, 10-16.
- Centers for Disease Control and Prevention. (2014, March 28). Prevalence of autism spectrum disorder among children age 8 years – Autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *CDC Online Newsroom Press Release*, Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6302a1.htm?s_cid=ss6302a1_w
- Centers for Disease Control and Prevention. (2012, March 29). CDC estimates 1 in 88 children in united states has been identified as having an autism spectrum disorder. *CDC Online Newsroom Press Release*, Retrieved from http://www.cdc.gov/media/releases/2012/p0329_autism_disorder.html

- Cook, B. G., Smith, G. J., & Tankersley, M. (2012). Evidence-based practices in education. In K. R. Harris, S. Graham, & T. Urdan (Eds.), *APA educational psychology handbook* (Vol. 1, pp. 495-528). Washington, DC: American Psychological Association.
- Cooper, H. (2010). *Research synthesis and meta-analysis: A step-by-step approach* (4th ed.). Los Angeles, CA: Sage Publications.
- *Flores, M. M., & Ganz, J. B. (2007). Effectiveness of direct instruction for teaching statement inference, use of facts, and analogies to students with developmental disabilities and reading delays. *Focus on Autism and Other Developmental Disabilities, 22*, 244-251.
- *Flores, M. M., & Ganz, J. B. (2009). Effects of direct instruction on the reading comprehension of student with autism and disabilities. *Education and Training in Developmental Disabilities, 44*, 39-53.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.
- *Hua, Y., Hendrickson, J. M., Therrien, W. J., Woods-Groves, S., Ries, P. S., & Shaw, J. J. (2012). Effects of combined reading and question generation on reading fluency and comprehension of three young adults with autism and intellectual disability. *Focus on Autism and Other Developmental Disabilities, 27*, 135-146. doi: 10.1177/1088357612448421
- Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- International Reading Association. (2002). *Summary of the (U.S.) National Reading Panel report: Teaching children to read*. Newark, DE: U.S. Division of Research and Policy. Retrieved from http://www.reading.org/Libraries/reports-and-standards/nrp_summary.pdf?sfvrsn=0
- *Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). Classwide peer tutoring: An integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers. *Journal of Applied Behavior Analysis, 27*, 49-61.
- *Kamps, D. M., Leonard, B., Potucek, J., & Garrison-Harrell, L. (1995a, b). Cooperative learning groups in reading: An integration strategy for students with autism and general classroom peers. *Behavioral Disorders, 21*, 89-109.
- Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindsopf, D. M., & Shadish, W. R. (2013). Single-case intervention research design standards. *Remedial and Special Education, 34*, 26-38. Doi:10.1177/0741932512452794
- Kretlow, A. G., & Blatz, S. L. (2011). The ABCs of evidence-based practice for teachers. *Teaching Exceptional Children, 43*(5), 8-19.
- Mayton, M. R., Wheeler, J. J., Menendez, A. L., & Zhang, J. (2010). An analysis of evidence-based practices in the education and treatment of learners with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities, 45*, 539-551.
- Mazzotti, V. L., Rowe, D. R., & Test, D. W. (2012). Navigating the evidence-based practice maze: Resources for teachers of secondary learners with disabilities. *Intervention in School and Clinic, 48*, 159-166. doi: 10.1177/1053451212454004
- Mesibov, G. B., & Shea, V. (2011). Evidence-based practices and autism. *Autism 15*, 114-133. doi:10.1177/136236130934-8070
- *Mims, P. J., Hudson, M. E., & 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. doi: 10.1177/1088357612446859

- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.
- No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1452 (2002).
- 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.
- Odom, S. L., Brown, W. H., Frey, T., Karasu, N., Smith-Canter, L. L., & Strain P. S. (2003). Evidence-based practices for young children with autism: Contributions for single-subject design research. *Focus on Autism and Other Developmental Disabilities, 18*, 166-175.
- Reichow, B., Volkmar, F. R., Cicchetti, D. V. (2008). Development of the evaluative method for evaluating and determining evidence-based practices in autism. *Journal of Autism and Developmental Disorders 31*, 1311-1399. doi:10.1007/s10803-007-0517-7
- Ricketts, J. (2011). Research review: reading comprehension in developmental disorders of language and communication. *The Journal of Child Psychology and Psychiatry, 52*(11), 1111-1123. doi: 10.1111/j.1469-7610.2011.02438.x
- *Roux, C., Dion, E., Barrette, A., Dupere, V., & Fuchs, D. (2014). Efficacy of an intervention to enhance reading comprehension of students with high-functioning autism spectrum disorder. *Remedial and Special Education, 1-12*. doi: 10.1177/0741932514533998
- Santangelo, T., & Graham, S. (February, 2012). *Spelling Instruction for elementary-aged students: A meta-analytic review*. Presentation given at the annual Pacific Coast Research Conference, Coronado, CA.
- Smith, S. W., & Barnhill, G. P. (2001). Current topics in review: What's new in AS research: A synthesis of research conducted by the Asperger syndrome project. *Intervention in School and Clinic, 36*, 300-305.
- *Solis, M., McCulley, L., & Zein, F. E. (2013). *An alternating treatments comparison of reading comprehension interventions for students with autism spectrum disorders*. Presentation given at The Meadows Center. Texas
- Spooner, F., & Browder, D. M. (2015). Raising the bar: Significant advances and future needs for promoting learning for students with severe disabilities. *Remedial and Special Education, 36*, 28-32. doi:10.1177/074193251455022
- Spooner, F., Knight, V. F., Browder, D. M., & Smith, B. R. (2011). Evidence-based practice for teaching academics to learners with severe developmental disabilities. *Remedial and Special Education, 33*, 374-387. doi:10.1177/0741932511421634
- *Stringfield, S. G., Luscre, D. & Gast, D. L. (2011). Effects of a story map on accelerated reader postreading test scores in students with high-functioning autism. *Focus on Autism and Other Developmental Disabilities, 26*, 218-229. doi:10.1177/1088357611423543
- Whalon K. J., Al Otaiba S., & Delano, M. E. (2009). Evidence-based reading instruction for individuals with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 24*, 3-16. doi:10.1177/1088357608328515
- *Whalon K. J., & Hanline, M. F. (2008). Effects of reciprocal questioning on the question generation and responding of children with autism spectrum disorder. *Education and Training in Developmental Disabilities, 43*, 367-387.
- Whalon K. J., & Hart, J. E. (2011). Children with autism spectrum disorder and literacy instruction: An exploratory study of elementary inclusive settings. *Remedial and Special Education, 32*, 243-255. doi:10.1177/0741932510362174

*Williamson, P., Carnahan, C. R., Birri, N. & Swoboda, C. (2014). Improving comprehension of narrative using character event maps for high school students with autism spectrum disorder. *The Journal of Special Education*, advance online publication, 1-11.
doi:10.1177/0022466914521301

*References marked with an asterisk indicate studies included in the research synthesis.

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How to Implement Visual Activity Schedules for Students with Disabilities

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Abstract: Based on recent literature reviews on the use of Visual Activity Schedules (VAS) for students with intellectual disability and autism, the strategy has been deemed an evidence based practice. Using the literature highlighted in the recent reviews, this article provides an overview of VAS and common skills VAS has been used to teach. Additionally, the authors provide guidelines on schedules variations, creating schedules, and implementing the schedules. Finally, several examples of VAS are included.

Visual activity schedules (VAS) have been a common practice used in many classrooms for children with disabilities for decades. Included as a component of the Treatment and Education of Autistic and Communications-Handicapped Children (TEACCH) program, VAS are considered an essential aspect of a structured environment, providing predictability to scheduled activities. Visual activity schedules are visual supports used to show a list or sequence of events. Some schedules, known as between activity schedules, contain transitions between activities for a full day, much like a daily agenda; others only show part of a day (e.g., assignments to do during math class, family's routine on Saturday morning). Additionally, VAS can illustrate transitions within activities (known as within activity schedules), including the individual steps of a specific activity (e.g. making a sandwich, brushing teeth, solving a math problem). Many people use some type of VAS in their daily lives, such as daily planners, printed directions from an online map service, or when following an instruction manual to assemble a new piece of furniture.

In educational settings, VAS can be beneficial for students that have difficulty with organization, working memory, or changes in routine. Visual activity schedules have been shown to increase a variety of skills for students with intellectual disability (ID) and autism spectrum disorder (ASD) including daily living skills (e.g., Alberto, Cihak, & Gama, 2005), physical activities (e.g., Cannella-Malone, Mizrachi, Sabielny, & Jimenez, 2013); on task behaviors (Bryan & Gast, 2000), vocational skills (e.g., Rouse, Everhart-Sherwood, & Alber-Morgan, 2014), leisure skills (e.g. Blum-Diamaya, Reeve, & Reeve, 2010), academic skills (e.g., Spriggs, Gast, & Ayres, 2007), and navigation skills (e.g., Kelley, Test, & Cooke, 2013) as well as decrease problem behaviors (e.g., Massey & Wheeler, 2000), time to begin a new activity (Dettmer, Simpson, Myles, & Ganz 2000), and tantrums during transitions (Schmit, Alper, Raschke, & Ryndak, 2000). Students often do not know what will happen during a given day without a schedule, and they usually have no control or choice over daily activities. This lack of control or anticipation can create problems for students during transitions, leading to

increased reliance on adult prompts, off-task behaviors, and other inappropriate behaviors (Banda & Grimmert, 2008). Visual schedules have also been found to compensate for difficulties in expressive and receptive communication skills, attention, organization, and memory (Quill, 1995).

Generally, transitions at school happen between classes, activities, and environments. Each of these transitions can be demonstrated for students using a VAS. There are several reasons for doing this. First, VAS can help teachers establish and maintain routines. Predictable routines have been shown to increase on-task behaviors and decrease disruptive behaviors (Dettmer et al., 2000). By making the routine visual, it is easier to signify when changes will occur, whether these changes are one time only or long term. For example, some teachers will add a star on an event in the day that is new, or cross out a non-occurrence. Depending on the student, times can be paired with each item on the schedule, letting them know when they can expect the activity to occur. Secondly, VAS can help students see exactly which steps or activities are part of the routine, giving children boundaries in which to maneuver. Setting these parameters can reduce disruptive behaviors related to materials or activities that students want, but are not included in a particular lesson (Waters, Lerman, & Hoyanetz, 2009). Additionally, VAS can include basic Premack principles by letting a preferred activity follow a non-preferred assignment. The Premack principle can increase a student's motivation, because it shows the reinforcer for completing a hard activity (Rabian, 2005). Showing that visually and honoring it consistently can reduce aberrant behaviors during non-preferred tasks and transitions. Finally, VAS can help students become more independent (e.g., Duttlinger, Ayres, Bevill-Davis, & Douglas, 2013;

Kelley et al., 2013; Mechling, Gast, & Seid, 2010; Purrazzella & Mechling, 2013). The visual cue of what comes next reduces reliance on adults, and thus students can increase number of tasks completed independently as well as time on-task.

Recent reviews of literature have identified VAS as evidence-based practices (EBP) for individuals with ASD (Knight, Sartini, & Spriggs, 2015) and ID (Spriggs, Mims, & van Dijk, *under review*). With current federal legislation dictating the use of EBP when instructing students with disabilities, practitioners need to know how to implement these practices as intended.

Schedule Variations

There are many different types of VAS. Choosing a specific variation depends on the preferences and abilities of the user(s) of the schedule. Considering a student's level of symbolic communication is very important when identifying the visual representation for the student (Browder, Flowers, & Wakeman, 2008). For example, students with visual impairments and students who are at the pre-symbolic communication level may benefit more from a schedule where each activity corresponds with an object (e.g. a pre-k schedule where a block represents the block center, a fork lunch, and a blanket nap time). Students with concrete symbolic representation abilities could use picture schedules where real pictures are used to represent each activity (e.g., a picture of the classroom calendar is used for calendar time, a picture of a teacher represents working with that specific teacher). Students who communicate at the abstract symbolic level can possibly use line drawings and/or words to delineate what activities are to be completed. An assessment of symbolic level is an appropriate way for teachers to identify the best visual representations to use when working with this population (e.g., objects,

picture symbols). In a study by Browder et al. in 2008 they developed an assessment for teachers to use with students with significant disabilities in order to identify their current symbolic level. Using this type of assessment can provide students with an appropriate format for visual supports. This progression from symbolic to written schedules follows the natural literacy and communication development of children (Browder, Spooner, & Mims, 2011). As such, it is important that picture schedules use a combination of words and pictures or words and objects. Additionally, using strong response and stimulus prompting strategies can help systematically move students from a more concrete symbolic level to a more abstract level versus allowing them to only remain static in their current symbolic level throughout grade bands (Browder et al., 2008; Browder et al., 2011).

Recently, research is also evaluating the use of small video clips modeling activities or steps embedded into the VAS. Spriggs, Knight, and Sherrow (2014), for example, taught high school students to independently complete four functional skills (e.g., entering data into a spreadsheet, writing a paragraph, setting the table) using VAS where each picture could be touched on a touch-screen tablet to activate a short video model (VM) of the skill to be completed. Students in this study could independently follow a static picture schedule of familiar tasks prior to the study; embedding VM allowed each student to complete novel activities in a schedule without adult support. Although VM is different than VAS, it is still a viable option as a variation to VAS to support the needs of students with intellectual disabilities and autism.

Other variations of VAS are often based on teacher and student preferences. For

example, a classroom schedule can either hang in a fixed location so it is easy to find for its users, or the student can carry it while moving between activities. Many reasons can influence a decision between the two (e.g., the distance between activities and the schedule, how much space is available in the classroom(s), if the student will transition between classrooms or community environments, the availability of a high-tech portable device). Typically, a mobile VAS is preferred when students are included in several different environments within the school or community.

Creating Schedules

There are several aspects to consider when creating VAS for an individual or a group of students. First, schedules must use age appropriate representations regardless of which type of schedule used. Whereas a preferred bath toy may be used to represent bath time for a toddler, a miniature shampoo bottle would be more appropriate for young adults. Additionally, knowing where, when, and how they will be used can aide in schedule creation. Decisions have to be made as to where they will be used. Will they be used only in the special education classroom? Will they be used at home or in the community? Will they be used across settings? These decisions will affect when they will be used (e.g., if it is decided they will be used across all school environments, then the “when” would be while the child is at school). How the VAS will be used will likely be influenced by the type of schedule being used. For example, if a student is using a stationary object schedule in the classroom, he might check his schedule by going to the schedule and removing an object of the activity just completed and placing it in a finished box on the floor. The next object will illustrate where the child is to go next. For a mobile picture schedule, the student might remove the picture of the











next activity, and transition to that activity, matching the picture to the same picture in that area (e.g., for a student transitioning to math, the picture of math would be on the student's schedule as well as in the math center; the picture in the math center might have Velcro pieces on it for the schedule pictures to hang). When the activity is complete, the student can check their schedule to see what activity is next. If a student is using a written schedule, he might cross off an activity that has been completed. The following written word will indicate the next activity the child is to complete. Some schedules include a self-monitoring piece. For example, a student might move a picture from the "To Do" side to the "Finished" side and then circle a smiley face (good), straight face (needs some improvement), or a sad face (unacceptable) based on work completion or time on-task. Once you know where, when, and how VAS will be used, the environment has to be set up to facilitate their use. The schedules have to be created in the form needed for the student. Depending on schedule type, a place in a classroom might need to be cleared for the schedule to hang. If students are going to use a picture schedule like the one described above, where they will match their picture to the area in the classroom where the activity is to take place, pictures will need to be made and hung around the classroom.

Making a schedule does not have to be costly. There are many low-cost resources available for practitioners, such as copyright free images on the internet, photos taken with a digital camera or telephone, line drawings taken from BoardMaker® (if

available in an educational setting). If a student has constant access to a tablet, for example as an augmentative and alternative communication device, a practitioner can choose the tablet as a platform for the VAS and choose between a variety of applications. The decision between a high tech or low tech schedule will depend mainly on the preferences of the student and the teacher and the availability of materials. Recent research comparing different types of technology suggests that students acquire and maintain skills equally across technology types, but that personal preference can have a slight influence on the results (Alberto et al., 2005; Cihak, Alberto, Taber-Doughty, & Gama, 2006; Mechling et al., 2010; Van Laarhoven, Kraus, Karpman, Nizzi, & Valentino, 2010).

In general, there are two common ways to sequence the events in a VAS, top to bottom or left to right. Even though there is no common rule, top to bottom sequences usually display daily events as a to-do list, whereas left to right sequences are used to show steps within a task according to a task analysis. The left to right order can promote reading readiness since reading is done in the same way. The length of or number of activities on a schedule depends on a student's ability to work independently. A First-Then schedule will help remind students of a preferred activity after a less desired one. Students can then move towards VAS with three activities at a time, half-day schedules, and ultimately VAS for a full day. Figures 1 – 9 illustrate various types of schedules.

Figure 1. Example of a between Activity Schedule using Boardmaker

AL		Monday	
	<input checked="" type="checkbox"/>		
1	<input type="checkbox"/> Put Things Away 		6 <input type="checkbox"/> Lunch w/ Friend 
2	<input type="checkbox"/> Calendar 		7 <input type="checkbox"/> Walk 
3	<input type="checkbox"/> Next Dollar 		8 <input type="checkbox"/> Sequencing 
4	<input type="checkbox"/> Work Tasks 		9 <input type="checkbox"/> Speech 
5	<input type="checkbox"/> Make Lunch 		10 <input type="checkbox"/> Prepare to go Home 

Made with Boardmaker and the Picture Communication Symbols© 1981-2001
Mayer-Johnson, Inc. - P.O. Box 1579, Solana Beach, CA 92075 U.S.A. Phone (858) 550-0084
web site: www.mayer-johnson.com

Figure 2. Example of a First, Then Visual Activity Schedule using Picture Symbols

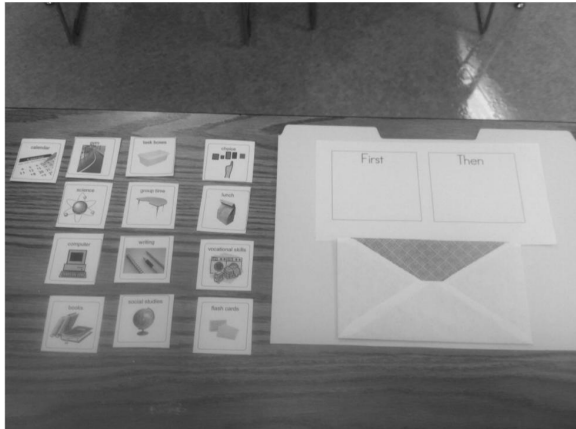


Figure 3. Example of a Daily Schedule with a Self-Monitoring Check

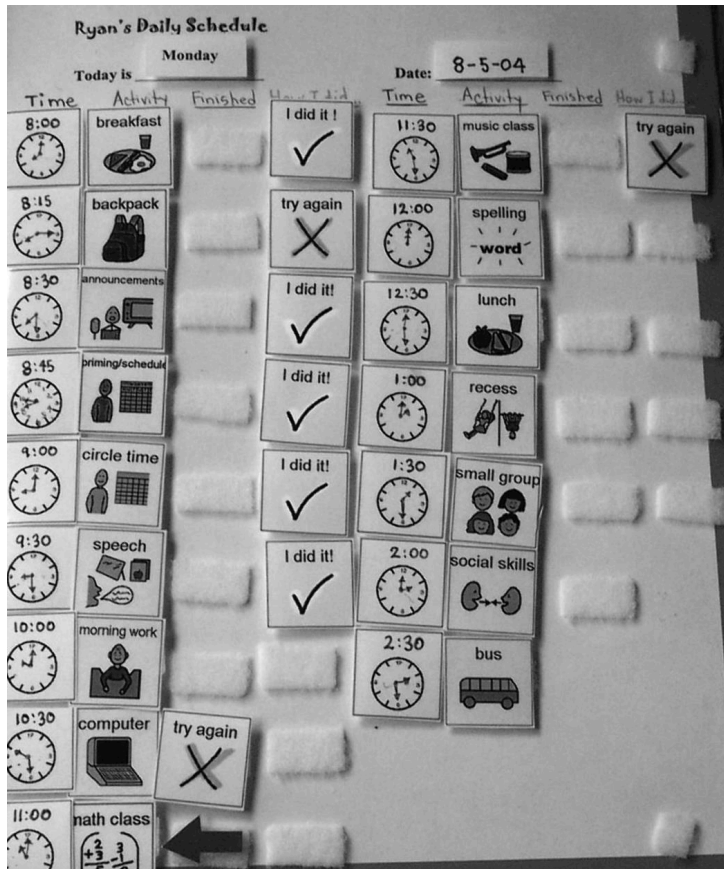


Figure 4. Example of a Daily Schedule with a Self-Monitoring Check



Figure 5. Example of Steps to Follow for Transitioning to a New Activity

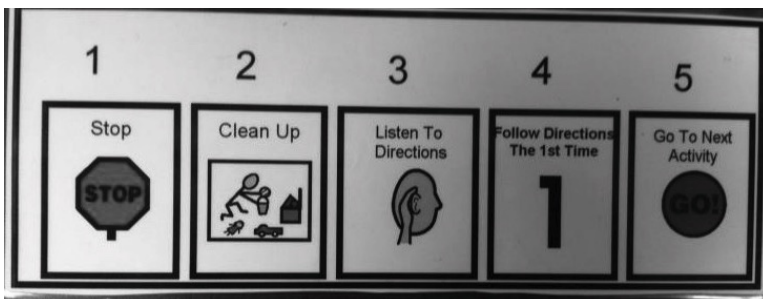


Figure 6. Example of a Within Activity Schedule

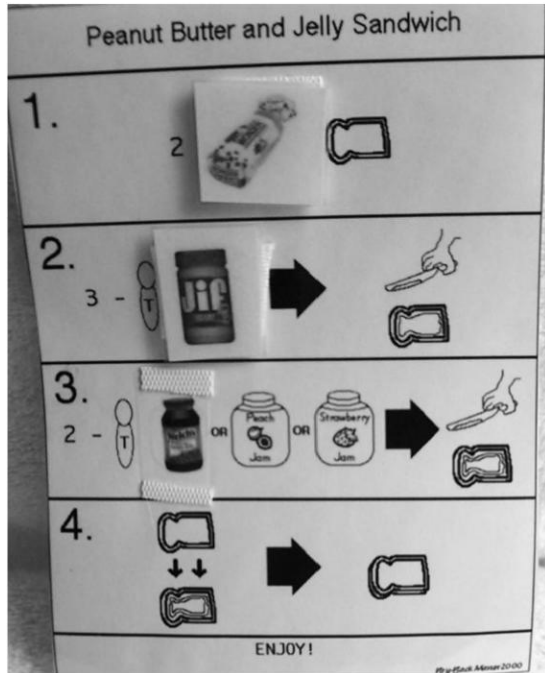


Figure 7. Example of a Within Activity Schedule



Figure 8. *Example of a Between Activity Schedule*



Figure 9. *Example of an Object Visual Activity Schedule*



Implementing the Schedule

While the decisions about the form and function of VAS are tied to their effectiveness, the most important factor for success is the implementation of the VAS. Students have to be taught how to use the schedule. It is therefore crucial to establish a routine based on (1) the type of schedule chosen that students are to follow, (2) the environment where the schedule will be used, and (3) the practicality for teachers and students. As stated above, predictable routines can help diminish disruptive behavior and it is therefore important to be consistent in the implementation of the routines. Some examples of routines for indicating a step has been completed are crossing off pictures or words as steps are completed, much like crossing off items on a to-do list; moving pictures from a to-do column to a finished column; placing pictures in an 'all done' folder after completion (e.g. Whatley, Gast, & Hammond, 2009). To smoothen transitions between activities, students can take a picture from their folder and bring it to the corresponding center.

Similar to decisions about form and function of the VAS, decisions about routines and teaching strategies are dependent on the preference of the teacher and the student needs. Research suggests the use of several EBP to teach students how to use their schedules. System of least to most prompts (e.g., Duttlinger et al., 2013; Spriggs et al., 2007), constant time delay (e.g. Whatley et al., 2009), progressive time delay (e.g., Carlile, Reeve, Reeve, & DeBar, 2013) and graduated guidance (Bryan & Gast, 2000) are some of the systematic instructional procedures that have been used to teach VAS use. Others have used reinforcement techniques in combination with other strategies. Examples include using descriptive verbal praise (e.g. Mechling et

al., 2010), edible rewards (e.g., Carson et al., 2008), and access to preferred reinforcers (e.g., Cuhadar & Diken, 2011). Some of these strategies have the additional benefit of being able to show students' progress in detail. For example, a teacher can collect data on prompt levels within or between activities; a student can show increased independence if he moves from needing predominantly physical prompts to mostly gestural prompts (Collins, 2012). Student need and VAS type will determine what data are collected and what system of instruction is used. If transitioning from one task to another takes a long time for a particular student, a teacher could collect latency data from the time the student is finished with one activity and begins another. Decreases in latency could be rewarded with time with a reinforcer. Percent time on-task might be the data collected for a student needing to increase time working on scheduled materials. Constant time delay with a verbal controlling prompt might be used to teach the student how to complete activities depicted on the schedule. Learning a brand new task might be monitored using number steps completed independently on a teacher-created task analysis, teaching the skills via system of least prompts. Collecting this data can also help make instructional decisions, such as extending a schedule, changing the symbolic level of the visual cues, or expanding the use of the VAS to additional environments.

In addition, all adults involved with the student while the schedule is in use will have to be trained. Consistency in schedule implementation is crucial for the schedule to work in increasing desired behaviors as well as decreasing undesired behaviors. To increase consistency of implementation across all those who will be teaching the schedule, a systematic instruction plan (SIP) should be used (Spooner, Browder, & Mims,

2011). A SIP is a prescribed teaching protocol that is very individualized for the target student and skill and designed to include very specific details about instruction to ensure consistency across instructors.

Conclusion

Within the current educational climate, teachers need a range of EBP in their repertoire. Two recent literature reviews have indicated that the use of VAS meet the requirements for EBP set by Horner et al. (2005). Knight et al., (2015) found that VAS could be considered EBP for increasing on-task, on-schedule, and transition behaviors for school-age children with ASD. Spriggs et al. (*under review*) found that VAS can also be considered an EBP for adolescents and adults with ID for teaching new skills, as well as facilitating independence and on-task behaviors. Translating this research to practice is crucial when implementing EBP with students with disabilities.

Visual schedules have been used to effectively increase on-task and on-schedule behaviors for students with ASD (e.g., Bryan & Gast, 2000) and ID (e.g., Spriggs et al., 2007). They have also been used to teach new skills such as using a debit card (Alberto et al., 2005; Cihak et al., 2006), cooking (Mechling et al., 2010; Mechling & Gustafson, 2009; Mechling & Stephens, 2009; Morrison, Sainato, Benchaaban, & Endo, 2002), navigation skills (Mechling & Seid, 2011; Purrazzella & Mechling, 2013; leisure skills (Blum-Diamaya et al., 2010; Carlile et al., 2013; Chan, Lambdin, Graham, Fragale, & Davis, 2014; Whatley et al., 2009), as well as a variety of daily living (Van Laarhoven et al., 2010), vocational (Carson, Gast, & Ayres, 2008; Duttlinger et al., 2013; Rouse et al., 2014;), and academic skills (Bryan & Gast, 2000; Cuhadar & Diken, 2011; Dettmer et al.,

2000; Duttlinger et al., 2013; Spriggs et al., 2007; Waters et al., 2009). Four younger students, VAS have been used to teach playing skills (Betz, Higbee, & Reagon, 2008). This versatility makes VAS an option when teaching bigger transitions between activities or small transitions within activities.

Social validity research to date indicates that VAS can be easy to implement and cost effective. Regardless of VAS type, teachers report that they are non-intrusive and easily incorporated into daily activities and routines. Schedules made with supplies already available is an option to keep costs down (e.g., using pictures off of the internet, using written words, using software provided by the school system). When VAS were compared to VM (i.e., static vs. video), teacher and student preference varied. When asked, the majority of students preferred VM to static schedules (Mechling et al., 2010; Mechling & Gustafson, 2009; Van Laarhoven et al., 2010). One teacher reported the VM easier, requiring less time to prepare (Alberto et al., 2005). Alternatively, a teacher in another study found the static materials easier to create (Cihak et al., 2006). In one study, teachers reported liking the high-tech option, but the device used was too expensive to sustain (Mechling & Seid, 2011). Van Laarhoven et al. (2010) found that although staff reported better results with videos, they preferred static materials because they were easier to create. Regardless of student and teacher preference, both static schedules and VM were effective in increasing the desired behavior of students with disabilities. Student and teacher preference, availability, and cost should be taken into account when deciding between low-tech and high-tech options.

In conclusion, VAS are a viable strategy that allows a lot of flexibility in form and function and has been shown to be highly effective for individuals across a wide spectrum of ability levels and ages. Careful considerations need to be made when

selecting the type of VAS to use as well as instruction for teaching the targeted skill using VAS. Following best practices and implementing these careful considerations, VAS is a durable option for students with autism and intellectual disability.

References

- Alberto, P. A., Cihak, D. F., & Gama, R. I. (2005). Use of static picture prompts versus video modeling during simulation instruction. *Research in Developmental Disabilities, 26*, 327-339.
- Banda, D. R., & Grimmer, E. (2008). Enhancing social and transition behaviors of persons with autism through activity schedules: A review. *Education and Training in Developmental Disabilities, 43*, 324-333.
- Betz, A., Higbee, T. S., & Reagon, K. A. (2008). Using joint activity schedules to promote peer engagement in preschoolers with autism. *Journal of Applied Behavior Analysis, 41*, 237-241.
- Blum-Diamaya, A., Reeve, S. A., & Reeve, K. A. (2010) Teaching children with autism to play a video game using activity schedules and game-embedded video modeling. *Education and Treatment of Children, 33*, 351-370. doi:10.1353/etc.0.0103
- Browder, D., Flowers, C., & Wakeman, S. (2008). Facilitating participation in assessments and the general curriculum: Level of symbolic communication classification for students with significant cognitive disabilities. *Assessment in Education: Principles, Policy, & Practice, 15*, 137-151.
- Browder, D., Spooner, F., & Mims, P. J. (2011). Chapter eleven: Communication Skills. In D. Browder, & F. Spooner (Eds.). *Curriculum and instruction for students with moderate and severe disabilities: Finding the balance*. New York, NY: Guilford Press.
- Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-functioning children with autism via picture activity schedules. *Journal of Autism and Developmental Disorders, 30*, 553-567.
- Cannella-Malone, H. I., Mizrahi, S. B., Sabielny, L. M., & Jimenez, E. D. (2013). Teaching physical activities to students with significant disabilities using video modeling. *Developmental Neurorehabilitation, 16*, 145-154
- Carlile, K. A., Reeve, S. A., Reeve, K. F., & DeBar, R. M. (2013). Using activity schedules on the iPod touch to teach leisure skills to children with autism. *Education and Treatment of Children, 36*, 33-57.
- Carson, K. D., Gast, D. L., & Ayres, K. M. (2008). Effects of a photo activity schedule book on independent task changes by students with intellectual disabilities in community and school job sites. *European Journal of Special Needs Education, 23*, 269-279.
- Chan, J. M., Lambdin, L., Graham, K., Fragale, C., & Davis, T. (2014). A picture-based activity schedule intervention to teach adults with mild intellectual disability to use an iPad during a leisure activity. *Journal of Behavioral Education, 23*, 247-257.

- Cihak, D., Alberto, P. A., Taber-Doughty, T., & Gama, R. I. (2006). A comparison of static picture prompting and video prompting simulation strategies using group instructional procedures. *Focus on Autism and Other Developmental Disabilities, 21*, 89-99.
- Collins, B. C. (2012). *Systematic instruction for students with moderate and severe disabilities*. Baltimore, MD: Paul H. Brookes Publishing Company.
- Cuhadar, S., & Diken, I. H. (2011). Effectiveness of instruction performed through activity schedules on leisure skills of children with autism. *Education and Training in Autism and Developmental Disabilities, 46*, 386-398.
- Dettmer, S., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2000). The use of visual supports to facilitate transitions of students with autism. *Focus on Autism and Other Developmental Disabilities, 15*, 163-169.
- Duttlinger, C., Ayres, K. M., Beville-Davis, A., & Douglas, K. H. (2013). The effects of a picture activity schedule for students with intellectual disability to complete a sequence of tasks following verbal directions. *Focus on Autism and Other Developmental Disabilities, 28*, 32-43.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.
- Kelley, K. R., Test, D. W., & Cooke, N. L. (2013). Effects of picture prompts delivered by a video iPod on pedestrian navigation. *Exceptional Children, 79*, 459-474.
- Knight, V. K., Sartini, E., & Spriggs, A. D. (2014). Evaluating visual activity schedules as evidence-based practice for individuals with autism. *Journal of Autism and Developmental Disorders, 45*, 157-178.
- Massey, N. G., & Wheeler, J. J. (2000). Acquisition and generalization of activity schedules and their effects on task engagement in a young child with autism in an inclusive pre-school classroom. *Education and Training in Mental Retardation and Developmental Disabilities, 35*, 326-335.
- Mechling, L. C., Gast, D. L., & Seid, N. H. (2010). Evaluation of a personal digital assistant as a self-prompting device for increasing multi-step task completion by students with moderate intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 45*, 422-439.
- Mechling, L. C., & Gustafson, M. (2009). Comparison of the effects of static picture and video prompting on completion of cooking related tasks by students with moderate intellectual disabilities. *Exceptionality, 17*, 103-116.
- Mechling, L. C., & Seid, N. H. (2011). Use of a hand-held personal digital assistant (PDA) to self-prompt pedestrian travel by young adults with moderate intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 46*, 220-237.
- Mechling, L. C., & Stephens, E. (2009). Comparison of self-prompting of cooking skills via picture-based cookbooks and video recipes. *Education and Training in Developmental Disabilities, 44*, 218-236.
- Morrison, R. S., Sainato, D. M., Benchaaban, D., & Endo, S. (2002). Increasing play skills of children with autism using activity schedules and correspondence training. *Journal of Early Intervention, 25*, 58-72.
- Purrazzella, K., & Mechling, L. C. (2013). Use of an iPhone 4 with video features to assist location of students with moderate intellectual disability when lost in community settings. *Education and Training in Autism and Developmental Disabilities, 48*, 178-189.

- Quill, K. A. (1995). Visually cued instruction for children with autism and pervasive developmental disorders. *Focus on Autism and Other Developmental Disabilities, 10*, 10-20.
- Rabian, B. (2005). Premack principle. In M. Hersen, J. Rosqvist, A. Gross, R. Drabman, G. Sugai, & R. Horner (Eds.), *Encyclopedia of behavior modification and cognitive behavior therapy: Volume 1: Adult clinical applications volume 2: Child clinical applications volume 3: Educational applications*. (Vol. 2, pp. 967-969). Thousand Oaks, CA: SAGE Publications, Inc. doi: <http://dx.doi.org/10.4135/9781412950534.n2094>
- Rouse, C. A., Everhart-Sherwood, J. M., & Alber-Morgan, S. R. (2014). Effects of self-monitoring and recruiting teacher attention on pre-vocational skills. *Education and Training in Autism and Developmental Disabilities, 49*, 313-327.
- Schmit, J., Alper, S., Raschke, D., & Ryndak, D. (2000). Effects of using a photographic cueing package during routine school transitions with a child who has autism. *Mental Retardation, 38*, 131-137.
- 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, NY: Guilford Press.
- Spriggs, A. D., Gast, D. L., & Ayres, K. M. (2007). Using picture activity schedule books to increase on-schedule and on-task behaviors. *Education and Training in Developmental Disabilities, 42*, 209-223.
- Spriggs, A. D., Knight, V., & Sherrow, L. (2014). Talking picture schedules: embedding video models into visual activity schedules to increase independence for students with ASD. *Journal of Autism and Developmental Disorders*, DOI: 10.1007/s10803-014-2315-3
- Spriggs, A. D., Mims, P. J., & van Dijk, W. (under review) The use of visual activity schedules for students with an intellectual disability: A review of the literature to evaluate the evidence base.
- Van Laarhoven, T., Kraus, E., Karpman, K., Nizzi, R., & Valentino, J. (2010). A comparison of picture and video prompts to teach daily living skills to individuals with autism. *Focus on Autism and Other Developmental Disabilities, 25*, 195-208.
- Waters, M. B., Lerman, D. C., & Hovanetz, A. N. (2009). Separate and combined effects of visual schedules and extinction plus differential reinforcement on problem behavior occasioned by transitions. *Journal of applied behavior analysis, 42*, 309-313.
- Whatley, A. D., Gast, D. L., & Hammond, D. L. (2009). Visual activity schedules: Teaching independent transitioning during recreation and leisure. *Therapeutic Recreation Journal, 43*(2), 27-42.

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Relationships among State and Special Education Factors and Employment Outcomes of Transition-Aged Adults with ASD

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Abstract: The purpose of this study was to evaluate the relationships among state and special education factors, and employment outcomes of transition-aged adults with ASD who applied for services through VR agencies over the past 3 years. Employment outcomes of interest were percent of adults who became employed, hours worked, wages earned, and cost of VR services. Four of the five state factors included in this study; per capita income, employment rate, per student instructional spending, and percent urban were found to be positively related to the percent of participants who achieved employment and/or wages earned. Only two of the four special education factors, percent of transition-aged students with ASD included 80% or more in general education classrooms and percent of highly qualified teachers, were found to be related to any employment outcome. There was a good deal of variability in state and special education factors, and employment outcomes among states. Implications for supporting positive employment outcomes for transition-aged adults with ASD are discussed.

The number of young adults with autism spectrum disorder (ASD) receiving services from state-federal Vocational Rehabilitation (VR) agencies has increased steadily over the past decade; ranging from 1,089 in 2003 to 9,903 in 2012, and totaling 43,304 (Rehabilitation Services Administration, 2014). The average per person cost of providing VR services during this time period was \$2,254 with the resulting cost of services for this group totaling over 90 million dollars (\$97,607,216). Unfortunately, only somewhat more than one-third (36%) of young adults with ASD who received VR services became competitively employed, meaning that over 62 million dollars was spent on providing services to young adults with ASD who did not achieve successful employment. Given the relatively high cost of providing VR services to young adults with ASD, it seems imperative that factors related to positive employment outcomes be identified.

Literature Review

Employment Outcomes

Employment outcomes for adults with ASD are generally poor (Lawer, Brusilovskiy, Salzer, & Mandell, 2009; Levy & Perry, 2011; Lin, Yu, & Yu, 2012; Taylor & Seltzer, 2011; Schall, Wehman, & McDounough, 2012; Shuttuck, Narendorf, Cooper, Sterzing, Wagner, & Taylor, 2012). Adults with ASD have lower rates of employment after exiting high school than peers with other disabilities (Newman et al., 2011; Schattuck et al., 2012). They are more likely to be identified as too disabled to work (Lawer et al., 2009) and are more expensive to serve than adults with most other disabilities (Cimera & Cowan, 2009; Lawer et al., 2009). Additionally, they are most frequently employed in part time jobs earning wages below poverty thresholds (Cimera & Cowan, 2009; Lawer et al., 2009; Smith & Lugas, 2010).

Variability in employment outcomes for adults with ASD has been identified in relation to individual characteristics (Anderson, Liang, & Lord, 2014; Billstedt, Gillberg, & Gillberg, 2005; Eaves & Ho, 2008; Engström, Ekström, & Emilsson, 2003; Holwerda, van der Klink, Groothoff, & Brouwer, 2012; Howlin, Goode, Hutton, and Rutter, 2004). In their review of studies evaluating factors that facilitate and hinder work participation in adults with ASD, Holwerda and colleagues (2012), found that IQ was the most consistent predictor of positive employment outcomes. Other individual factors that may be related to employment outcomes for adults with ASD include being male, older, white, having attained higher levels of education, have fewer functional limitations, and not having secondary disabilities (Lawer et al., 2009; Migliore, Timmons, Butterworth, & Lugas, 2012; Schaller & Yang, 2005; Shattuck et al., 2012).

Employment outcomes have also been shown to vary in relation to the types of employment services adults with ASD receive. A recent review of services and supports provided to adults with ASD suggested that supported employment services and utilization of technology-based tools may be important in promoting positive employment outcomes (Nicholas, Attridge, Zwaigenbaum, & Clarke, 2014). A longitudinal study evaluating changes in employment in adults with ASD over a 10-year period of time, found that receiving a greater number of supports was a factor related to more positive employment outcomes (Taylor & Mailick, 2014). Specific to the provision of services through state VR agencies, on the job supports and higher cost of services (Lawer et al., 2009), and job placement, finding, and maintenance (Schaller & Yang, 2005) have been found to predict achievement of competitive

employment. Receiving college services and participating in post-secondary education have been found to predict hours worked and wages earned for adults with ASD (Migliore et al., 2012).

Additionally, there is emerging evidence that employment outcomes for adults with ASD vary by state. A recent study of employment outcomes of transition-aged adults with ASD who applied for VR services between 2002-2011 (inclusively), found that the rate of successful employment achieved by this group ranged from a high of 61% in Delaware to a low of 21% in Oklahoma and that weekly wages ranged from a high of \$256 in North Dakota to a low of \$156 in Idaho (Burgess & Cimera, 2014). The authors hypothesized that state factors such as unemployment rates, the number of adults served, or per-capita income may have influenced their results. A second study evaluating differences in employment outcomes for adults with ASD among states found more positive employment outcomes for adults with ASD from states that begin providing transition services earlier (at age 14) rather than later (at age 16 as mandated by IDEA) (Cimera, Burgess, & Wiley, 2013). There is a paucity of studies evaluating state factors that may be related to employment outcomes for adults with ASD.

The current study aims to add to the growing body of literature on factors that may be related to employment outcomes of adults with ASD served by VR agencies by evaluating the relationships among several state and special education factors, and employment outcomes for this group. State factors included in this study are unemployment rate, per capita income, instructional costs per student, average student to teacher ratio, and percent of the state that is urban. Special education factors

included in this study are the percent of transition-aged students with ASD served in general-education settings 80% or more of the school day, the percent of teachers who are highly qualified (HQT), the number of transition-aged students with ASD served, and whether transition planning is begun early (at age 14) or late (at age 16). Employment outcomes include the percent of transition-aged adults with ASD who achieve employment as the result of their participation with VR service agencies, weekly hours worked, weekly wages earned, and cost of services provided.

Research Questions

1. What variability exists among state and special education factors?
2. What relationships exist between state factors and employment outcomes for transition-aged adults with ASD?
3. What relationships exist between special education factors and employment outcomes for transition-aged adults with ASD? Are there differences in employment outcomes for transition-aged adults with ASD from early and late transition states?
4. What state and special education factors predict employment outcomes for transition-aged adults with ASD?

Method

Source of Data

Data from the Rehabilitation Services Administration (RSA) 911-database was used for this study. The 911-data base includes detailed records on all individuals who apply for services through Vocational Rehabilitation. Data are entered by certified rehabilitation counselors and then checked for potential errors (RSA, 2004). Data

includes applicant's demographic information, descriptions of vocational services received, and descriptions of outcomes achieved when their cases were closed.

Participants

Study participants include 24,928 transition-aged adults with ASD (e.g., younger than 22 years, $M = 18.51$) in the 50 States who had their VR cases closed during the period from 2010 to 2012 inclusively. This number represents all transition-aged adults with ASD who applied for VR services regardless of whether that was their primary or secondary disorder. Transition-aged adults were selected as the focus of this study because current state and special education factors might be expected to be related to their employment outcomes more closely than individuals who had been out of school and/or employed for longer periods of time. The majority of the sample was comprised of white males who had participated in secondary education but did not earn a diploma. See Table 1 for a summary of participant demographics.

Employment Outcome Variables

Successful employment, hours worked, wages earned, cost of services. When an individual's case file was officially closed, case coordinators documented whether the individual was competitively employed. When an individual was successfully employed, data were also gathered on the average number of hours worked, wages earned per week, and the cost of services provided. Dollar values varied from year to year so all monetary values included reported in this study were converted to 2012 US dollars by multiplying the monetary value (i.e., weekly wages

Table 1. *Demographics of Transition-Aged Adults with ASD Served by VR Agencies from 2010 – 2012*

<i>Characteristics</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>Mean</i>
<i>N</i>	6,885	8,140	9,903	8,309
Age at Application	18.5	18.5	18.5	18.5
Male	83.9	83.5	84.1	83.8
Female	16.1	16.5	15.9	16.2
White	85.6	85.7	86.6	86.0
African American	11.5	11.3	11.5	11.4
Native American	1.2	1.3	1.4	1.3
Asian	2.8	2.8	2.1	2.6
Pacific Islander	0.6	0.7	0.5	0.6
Hispanic	5.1	6.4	5.7	5.7
Multiple Disabilities	58.6	59.8	60.2	59.5
Level of Education				
No Formal Schooling	0.1	0.1	0.2	0.1
Elementary 1-8 grade	1.1	1.0	1.0	1.0
Secondary Education, no degree	52.7	51.5	51.4	51.9
SPED certificate	18.8	18.4	17	18.1
High School Graduate	21.9	22.7	24.2	22.9
Post-Secondary, no degree	4.3	5.2	5.2	4.9
Associates or Vocational Degree	0.8	0.9	0.7	0.8
Bachelor's degree	0.2	0.2	0	0.1

Note: Individuals could identify themselves as members of multiple ethnicities therefore cumulative percentages do not equal 100. The total number of transition-aged adults with ASD served in 2010-2012 was 24,928.

earned) by the consumers' price index (CPI) for 2012 and then dividing by the CPI of the year from which the dollar value originated (Levin & McEwan, 2000). Outcomes variables are reported as mean values for 2010-2012 inclusively.

Data Collection

State Factors: Per capita income, unemployment rate, instructional costs per student, student to teacher ratio, and percent urban. Although not previously evaluated as factors that may be related to employment outcomes for transition-aged adults with ASD served by VR, it was

hypothesized that this group may have more positive outcomes in states with better general fiscal health. The two factors reflecting the fiscal health of states included in this study are unemployment rates and per capita earnings. Additionally, it was hypothesized that instructional costs per student and student to teacher ratios might be related to employment outcomes. Increased instructional costs per student might be expected to result in the provision of more and/or superior teaching staff, services, and supports leading to more positive outcomes. Lower student to teacher ratios have been identified as an important

factor in providing benefit to younger students with disabilities in schools (Hestenes, Cassidy, Shim, & Hegde, 2008; Irvin, Hume, Boyd, McFee, Odom, 2013). It was hypothesized that they might also better prepare students for employment upon exiting school. The final state factor included in this study was the percent of each state that is urban. Lack of access to transportation has been identified as a potential barrier to employment for adults with varied disabilities (Lindsay, McDougall, Menna-Dack, Sanford, & Adams, 2014) and urban areas are likely to have broader ranges of transportation options. Additionally, urban workers typically earn higher wages than rural workers (United States Department of Labor, 2014) and this trend might also be evidenced for transition-aged adults with ASD.

State unemployment rate data came from the Bureau of Labor Statistics (2014), and per-capita income data came from the United States Bureau of Commerce, Bureau of Economic Analysis (2013). Values represent means for the last three years of available data; 2011- 2013 for unemployment, and 2010 - 2012 for per-capita earnings. The source of per-student spending and student to teacher ratios was the National Center for Educational Statistics' Common Core of Data (United States Department of Education, 2014). Values represent mean values for the last three years of available data; 2008-2009, 2009-2010, and 2010-2011. Data on the percent of each state that was urban came from the most recent census data in 2010 (United States Census Bureau, 2014).

Special Education Factors: Percent of transition-aged students with ASD served in general education classrooms 80% or more of day, percent highly qualified

teachers, number of transition-aged students with ASD served, and early versus late transition planning. Little is known about the relationships between factors related of the provision of special education services to transition-aged students with ASD and employment outcomes. Three current trends in special education were hypothesized to be related to employment outcomes for this group; inclusivity of educational programming, receipt of special education services by highly qualified teachers, and the number of transition-aged students with ASD served. The Individuals with Disabilities Education Act (IDEA, 2004) requires provision of special education services in the least restrictive environment (LRE) to provide students with disabilities access to the same curriculum as their typically developing peers and No Child Left Behind (NCLB, 2002) requires that special education teachers be highly qualified in academic content areas. Presumably the impetus for such legislative acts it to support more positive outcomes for individuals with disabilities. It was therefore hypothesized that more positive employment outcomes would be identified for more inclusive states (greater percentages of transition-aged students with ASD served in general education settings 80% or more of their school days) and those with a greater percentages of highly qualified teachers. It was also hypothesized that more positive employment outcomes would be identified for states that served greater numbers of transition-aged students with ASD as they would be expected to have developed greater expertise in meeting transition needs. A final special education factor, age at which transition is addressed, was also included in this study with age of 14 being identified as the criteria for early transition and 16 identified as late transition. Prior research has identified more positive

employment outcomes for adults with ASD served by VR agencies from early transition states in terms of percent employed, wages earned, and costs of services (Cimera et al., 2013).

The source of inclusion and HQT was the IDEA Data Center (United States Department of Education, 2014). Values represent mean values for the last three years of available data; 2009 - 2011. The percent included 80% or more reflects only data for transition-aged students (ages 12-21). HQT data represents the percent of teachers who were highly qualified for all students who receive special education services (it is not reported in relation to student age or disability category). The IDEA Data Center (United States Department of Education, 2014) was also the source for the number of transition-aged students with ASD served per year. Age at which transition was addressed data was accessed from state departments of education via phone, email, or information posted online. Age at which transition was addressed was coded as a dummy variable (0 = early, 1 = late).

Results

Question 1: What variability exists among state and special education factors, and employment outcomes?

Descriptive statistics were used to describe state and special education factors, and employment outcomes. As can be seen in Table 2, there was a great deal of variability in state and special education factors among states. The state with the lowest unemployment rate was North Dakota (M = 3%) and the state with the highest unemployment rate was Nevada (M = 12%). Mean per capita income ranged from a high of \$57,412 in Connecticut to a low of \$31,971 in Mississippi. Mean instructional

costs per student ranged from \$12,704 in New York to \$4,166 in Utah. Student to teacher ratios ranged from 11:1 in North Dakota to 24:1 in California. The most urban states were California and New Jersey, both of which were 95% urban and the least urban states were Maine and Vermont, which were both 39% urban.

Somewhat over one-third of transition-aged students with ASD were included in general education classrooms for 80% or more of each day. Inclusion rates ranged from 62% in Iowa to 0% in Montana. The vast majority of special education teachers in all states were highly qualified, with a range from 100% in Connecticut, Indiana, Minnesota, New Jersey and Ohio to 68% in Wyoming. The number of transition-aged students with ASD served by state ranged from a high of 46,469 in California to a low of 373 in Montana. Twenty-three states indicated that they adhered to mandates from the federal law (IDEA, 2004) to address transition beginning at age 16 (late transition states). Twenty-two indicated that they begin addressing transition at age 14 (early transition states). The other 5 states indicated that they began between 14 and 16 years of age; one at 14 ½ years, three at 15 years, and one when students were in 9th grade. These five states were not included in analysis.

Employment outcomes also varied among states. See Table 3 for a summary. One-third of transition-aged adults with ASD achieved competitive employment as a result of receiving VR services with a range from 59 in Vermont to 17 in Arkansas. The number of hours worked was fairly consistent among states with a mean of 23 hours per week. Wages earned ranged from \$243 in Nebraska to \$146 in Montana with a mean of \$198. The mean cost of services provided

was \$2,732 with a range of \$4,704 in Alaska to \$308 in Mississippi.

Question 2: What relationships exist between state factors and employment outcomes for transition-aged adults with ASD?

Pearson correlations (1-tailed) were used to evaluate relationships between state factors and employment outcomes. A significant and strong relationship was found between unemployment rate and the percent of transition-aged adults with ASD who became employed $r(48) = -.482, p < .01$. More modest relationships were found between per capita income and percent employed $r(48) = .267, p < .05$, and instructional costs per student and percent employed $r(48) = .318, p < .05$. Significant relationships were also found for per capita income and wages earned $r(48) = .259, p < .05$ and percent urban and wages earned $r(48) = .342, p < .01$. No significant relationships were found between any state factors and hours worked or cost of services.

Question 3: What relationships exist between special education factors and employment outcomes for transition-aged adults with ASD? Are there differences in employment outcomes for transition-aged adults with ASD from early and late transition states?

Pearson correlations (1-tailed) were used to evaluate relationships between special education factors and employment outcomes. Independent samples t-tests were utilized to evaluate differences in employment outcomes between early and late transition states. Significant relationships were found between the percent of students who spent 80% or more of each day in general education classrooms and weekly hours worked, $r(48) = .289, p < .05$ and the percent of highly qualified teachers and weekly hours worked, $r(48) =$

$.359, p < .01$. No significant relationships were found between any special education factors and percent employed, weekly wages earned, or cost of services. No significant differences were found for any employment outcome between early and late transition states.

Question 4: What state and special education factors predict employment outcomes for transition-aged adults with ASD?

Multiple regression analyses were used to evaluate if state factors and special education factors significantly predicted employment outcomes. The results of the regression for state factors indicated that three factors explained 41.5% of the variance for percent employed ($R^2 = 41.5, F(6, 43) = 5.09, p < .01$). These factors were unemployment rate ($\beta = -.56, p < .001$), instructional costs per student ($\beta = .61, p < .01$), and student to teacher ratio ($\beta = -.46, p < .05$). No state factors were found to predict hours worked, wages earned, or cost of services. Additionally, no special education factors were found to predict any employment outcome.

Discussion

This purpose of this study was to describe and evaluate the relationships between state and special education factors, and employment outcomes for transition-aged adults with ASD served by VR agencies. The state factors included in this study were unemployment rate, per capita income, per student instructional spending, student to teacher ratio, and percent of each state that was urban. The special education factors included in this study were the percent of transition-aged students with ASD served in inclusive settings 80% or more each day, the

Table 2. *Summary of State and Special Education Factors by State*

<i>State</i>	<i>State Factors</i>				<i>Special Education Factors</i>				
	<i>Per Capita Income</i>	<i>Unemployment Rate</i>	<i>Cost per Student</i>	<i>Student/Teacher Ratio</i>	<i>Percent Urban</i>	<i>Included 80%</i>	<i>Percent HQT</i>	<i>Number Served</i>	<i>Early/Late</i>
Alabama	34,738	7	5,176	1:15	59	51	94	3,515	1
Alaska	45,397	7	8,867	1:16	66	21	87	751	1
Arizona	34,938	9	4,377	1:21	90	21	93	5,775	1
Arkansas	33,612	8	5,306	1:16	56	33	91	2,199	1
California	43,507	10	5,599	1:24	95	29	95	46,469	1
Colorado	43,765	8	5,077	1:17	86	48	91	3,052	-
Connecticut	57,412	8	9,950	1:13	88	46	100	5,100	-
Delaware	40,938	7	7,587	1:14	83	23	91	931	0
Florida	39,442	9	5,409	1:15	91	29	83	14,158	0
Georgia	35,793	9	5,904	1:15	75	38	88	10,238	1
Hawaii	42,634	6	7,313	1:16	92	7	94	1,033	1
Idaho	32,729	7	4,280	1:18	71	48	85	1,932	0
Illinois	43,520	9	6,859	1:16	89	28	90	14,913	-
Indiana	35,540	8	5,474	1:18	72	50	100	11,214	0
Iowa	40,388	5	5,997	1:14	64	62	94	763	0
Kansas	40,421	6	6,058	1:14	74	35	100	2,323	0
Kentucky	33,845	9	5,309	1:16	58	38	71	3,178	0
Louisiana	38,359	7	6,238	1:14	73	22	98	2,978	1
Maine	38,136	7	7,503	1:12	39	40	94	1,865	0
Maryland	50,416	7	8,629	1:15	87	35	93	8,243	0
Massachusetts	53,100	7	9,466	1:14	92	27	87	9,313	0
Michigan	36,029	9	6,012	1:18	75	40	96	14,573	1
Minnesota	44,438	6	7,104	1:16	73	46	100	13,309	-
Mississippi	31,971	9	4,693	1:15	49	30	96	1,812	0
Missouri	37,808	7	5,769	1:14	70	35	83	6,318	1
Montana	35,930	6	6,285	1:14	56	0	94	373	1
Nebraska	41,679	4	7,399	1:13	73	60	98	1,832	1
Nevada	36,701	12	4,981	1:20	94	43	96	2,327	0

New Hampshire	45,636	5	8,452	1:13	60	41	87	1,657	1
New Jersey	52,162	9	10,203	1:13	95	20	100	9,976	0
New Mexico	34,051	7	5,464	1:15	77	34	98	1,217	0
New York	50,780	8	12,704	1:13	88	23	98	19,250	-
North Carolina	35,894	9	5,230	1:15	66	34	94	10,008	0
North Dakota	47,197	3	6,036	1:11	60	49	92	642	1
Ohio	37,685	8	6,327	1:16	78	41	100	15,375	0
Oklahoma	37,407	6	4,470	1:16	66	38	97	2,798	1
Oregon	37,406	9	5,519	1:20	81	49	98	7,576	1
Pennsylvania	42,117	8	7,745	1:14	79	40	94	15,507	0
Rhode Island	43,622	10	8,982	1:13	91	50	98	1,748	0
South Carolina	33,282	9	5,215	1:16	66	21	96	2,944	0
South Dakota	42,478	4	5,209	1:13	57	28	96	680	1
Tennessee	36,449	9	5,173	1:15	66	40	98	4,919	1
Texas	39,947	7	5,219	1:15	85	42	93	25,571	1
Utah	33,410	6	4,166	1:23	91	19	99	3,751	1
Vermont	41,434	5	9,479	1:12	39	40	90	885	1
Virginia	45,774	6	6,459	1:18	76	34	97	9,339	0
Washington	43,772	8	5,771	1:19	84	28	84	7,995	1
West Virginia	33,229	7	6,867	1:14	49	36	97	1,116	1
Wisconsin	39,374	7	7,062	1:15	70	40	85	7,386	0
Wyoming	47,307	5	8,985	1:12	65	36	68	519	0
Total Mean	40,332	7	6,358	1:16	74	35	93	6,956	

Note: Reported data represents mean values for most recent 3 years of available data with the exceptions of percent urban which reflects data from 2010 only, number served which reports the total number served over the last 3 years, and early/late which reports data from 2014 only. For early/late data, 0 = early, 1 = late.

Table 3. *Summary of Employment Outcomes by State*

<i>State</i>	<i>Percent Employed</i>	<i>Hours Worked</i>	<i>Wages Earned</i>	<i>Cost of Services</i>
Alabama	35	24	195.69	3,594.63
Alaska	50	19	184.77	4,704.15
Arizona	27	26	207.27	3,802.78
Arkansas	17	27	236.16	1,615.08
California	31	25	209.28	3,097.94
Colorado	37	23	206.05	1,183.94
Connecticut	36	27	240.62	4,540.14
Delaware	53	24	202.33	3,767.29
Florida	22	22	185.06	2,417.11
Georgia	27	25	220.66	2,460.72
Hawaii	29	22	220.75	1,984.03
Idaho	34	21	184.03	1,492.74
Illinois	28	21	183.78	2,527.38
Indiana	32	21	170.87	3,499.43
Iowa	36	25	218.49	1,807.94
Kansas	25	19	164.66	1,981.02
Kentucky	35	20	168.82	3,411.89
Louisiana	23	23	176.61	2,030.42
Maine	20	18	166.48	2,138.16
Maryland	36	22	197.08	2,019.02
Massachusetts	36	21	224.08	1,083.72
Michigan	28	23	191.34	3,512.68
Minnesota	32	27	236.51	1,808.62
Mississippi	29	24	194.77	308.41
Missouri	30	22	176.20	3,671.29
Montana	31	18	146.04	2,646.85
Nebraska	49	27	225.34	2,585.31
Nevada	21	26	243.41	1,105.48
New Hampshire	44	19	213.79	1,903.84
New Jersey	32	22	160.04	2,092.91
New Mexico	29	21	193.66	2,078.21
New York	31	23	207.39	3,308.68
North Carolina	37	23	161.37	3,270.99
North Dakota	36	28	229.00	2,165.79
Ohio	30	24	201.30	4,157.08
Oklahoma	29	24	196.86	3,789.32
Oregon	28	22	184.45	2,074.15
Pennsylvania	31	25	228.35	3,074.21
Rhode Island	29	23	197.55	4,177.58
South Carolina	29	26	214.79	1,063.17
South Dakota	37	23	189.78	2,709.54
Tennessee	20	25	219.53	2,870.37
Texas	32	22	185.98	3,919.32

Utah	51	24	206.79	2,996.97
Vermont	59	20	165.39	4,217.63
Virginia	37	24	208.88	2,230.83
Washington	34	18	181.13	3,493.69
West Virginia	39	21	180.86	3,704.36
Wisconsin	33	21	184.82	3,547.48
Wyoming	42	21	207.79	2,979.03
Total Mean	33	23	197.93	2,732.47

percent of highly qualified teachers, the number of transition-aged students with ASD served, and whether transition services were addressed early (at age 14) or late (at age 16). Previous studies have identified variability in employment outcomes for transition-aged adults with ASD served by VR agencies among states, and individual and VR service provision factors that may predict more and less positive employment outcomes. This study served as an initial step in identifying environmental factors that may be related to employment outcomes for this group. The results of this study highlight variability in state and special education factors among states and suggest that state factors may be more strongly related to employment outcomes for transition-aged adults with ASD served by VR agencies than special education factors.

The state factors, unemployment rate, per capita income, per student instructional spending, and student to teacher ratio were all related to and/or predicted the percent of transition-aged adults with ASD who achieved competitive employment. Per capita income and percent urban were also related to weekly wages earned. Per capita income and unemployment rates are frequently cited indicators of the fiscal health of states. The results of this study suggest that similar to individuals without disabilities, transition-aged adults with ASD fare better in states with stronger fiscal

health in terms of finding employment and earning higher wages. This is a positive finding, although overall adults with disabilities continue to be employed at much lower rates than adults without disabilities; 68.2% compared to 19.6% according to the United States department of labor (2015).

Per student instructional spending and student to teacher ratio were hypothesized to reflect states' investment in education generally and the results of this study suggest that they may be important factors in terms of supporting more positive outcomes for individuals with ASD upon exiting school. Perhaps increased spending on instruction and the receipt of increased adult attention/interaction that can occur in classrooms with lower student to teacher ratios results in the provision of a greater number and intensity of services that better prepare individuals with disabilities for employment once they exit school. Lower student to teacher ratios have been identified as providing benefit to younger children with ASD when they are in school (Irvin et al., 2013).

Similar to non-disabled adults, transition-aged adults with ASD earned higher wages in states that were more urban. Data from the Bureau of Labor Statistics indicate that income in urban households is nearly 33% higher than that in rural households (US Department of Labor, 2013). It may also be

that this finding is related to the types of jobs that are available in more urban versus rural settings. Although employed in a variety of job types, some of the higher paying jobs that individuals with disabilities obtain after exiting high school including healthcare support; computer, mathematical, architecture, engineering and science; and education, training and library (Newman et al., 2011) are often found in higher numbers in urban than rural settings. It was hypothesized that general state factors would be related to hours worked and cost of services, but this was not the case. It is possible that the findings of no relation between general factors and hours worked was due to limited variability on this factors among states. The explanation for the lack of relationship between state factors and cost of services is unclear.

Contrary to our expectations, very few relationships were found between special education factors and employment outcomes. The percent of transition-aged students with ASD who spent 80% or more of each day in general education classrooms and the percent of highly qualified were found to be related to hours worked. It is possible that students with ASD who spent more time in inclusive settings developed greater tolerance for socially demanding contexts and/or better social skills that allowed them to more appropriately interact with others for longer periods of time in the work setting. One of the frequently cited benefits of inclusive placements for individuals with ASD are the potential social benefits and preparing for existing in typical adult communities (Autism Speaks, 2013). It is also possible that more capable students were included more frequently; that the degree to which students were included related to symptom severity, and that individuals with less severe symptoms were able to work for longer hours. Being a

highly qualified teacher indicates that the teacher possesses specific content knowledge and expertise. It is possible that the finding of a relationship between the percent of high qualified teachers and hours works reflects a better match between the specific content transition-aged students with ASD were exposed to and that content and their subsequent jobs. Perhaps highly qualified teachers were better able to target their instruction to content that corresponded to that required by the types of jobs their students would be likely to pursue.

Although we hypothesized that we would find relationships between the percent of students with ASD included 80% or more of the day and employment outcomes, we were not entirely surprised that we did not. Although there is a strong legislative (e.g., IDEA, 2004) and professional (e.g., Council for Exceptional Children, 1997) emphasis on the importance of inclusive practices in the education of individuals with varying disabilities including ASD, there is little research evidence to date that they result in more positive adult outcomes. Recently, Bouck and Joshi (2014), in their study comparing employment outcomes of 4,995 adolescents and young adults with ASD who were exposed to functional versus non-functional (i.e., academic, basic academic, study skills) curriculum while in school, found no differences in whether participants had ever been employed, were currently employed, earned above minimum wage wages, or worked full time. Although not specifically addressing “inclusiveness” it would be presumed that the non-functional curriculum would be delivered in a more inclusive setting than the functional curriculum. Another recent study comparing employment outcomes for young adults with intellectual disabilities who participated in integrated versus specialized Post Secondary Education (PSE) programs found that the

groups had similar rates of ever being employed, but individuals from integrated programs worked fewer hours and had lower employment rates at the time of the study (73% versus 91%) (Moore and Schelling, 2014). This study did not include only individuals with ASD, but does add to our understanding of differences in outcomes from participation in more and less integrated environments. It is unknown if it greater participation in integrated environments supports other employment outcomes such as keeping a job once hired.

We are unaware of any other studies that have looked at the relationship between instruction from highly qualified teachers or the number of transition-aged students with ASD served and employment outcomes. We hypothesized that states with a higher percentage of highly qualified teachers and that served greater numbers of transition-aged students with ASD would have more positive employment outcomes but this was not the case. The designation of “highly qualified” refers to expertise in content knowledge. Perhaps instruction in specific content does not transfer well to the types of jobs that transition-aged adults with ASD are more frequently employed in (e.g., food prep, janitorial/custodial, office support, sales) (Newman et al., 2011) accounting for the finding of a lack of relation between this factor and employment outcomes.

We did not find differences in employment outcomes for transition-aged adults with ASD served by VR agencies in relation to whether transition was begun early (age 14) or late (age 16). This result was different than that reported for by Cimera and colleagues, 2014, also utilizing VR data. It is likely that the difference is explained by the inclusion of a greater number of states in the present study; data on age of transition was not available for all states in the previous

study. It will be important for future research to look at this variable more closely. It would seem likely that there are special education factors that are related to some employment outcomes. There is growing evidence that service provision factors during are important in predicting employment outcomes in adulthood (Holwerda et al., 2012; Migliore et al., 2012). Additional research will be needed to identify such factors, perhaps with an emphasis on specific skills that are addressed and what instructional strategies are utilized.

Limitations

There are a couple of limitations that must be addressed with this study. First because one purpose of this study was to evaluate differences in factors among states, data was aggregated so individual variability was lost. It is possible that individual data would provide us with additional and/or different information that could be helpful in understanding the relationships between state, special education, and employment outcome variables. Second, it is possible that we did not include state and special education factors that would have provided greater insight into environmental factors related to employment outcomes of transition-aged adults with ASD. We did our best to identify factors that have been previously been hypothesized to be related to, or might be expected to be related to employment outcomes for this group. Third in terms of our participant group we did not have access to certain information such as ASD symptom severity or intellectual skills of participants that may have influenced our results. For example it is possible that the VR data reported includes more severely disabled individuals with ASD who were not able to obtain employment on their own or with the help of family members and does not represent the population as a whole. It is

also possible that some of the participants could have been misidentified or miscoded although there is not reason to believe that this would differentially affect individuals with ASD and data are cross-checked for errors (Rehabilitation Services Administration, 2004). Finally, we did not evaluate the relationships between individual and VR service provision variables and employment outcomes. Such factors have been previously identified as important in predicting employment outcomes for adults with varying disabilities served by VR agencies, and if included might have provided a more comprehensive evaluation of related and/or predictive factors.

Conclusions and Future Study

Employment status is a frequently cited indicator of quality of life of individuals with and without disabilities. Only a relatively small percentage of transition-aged adults with ASD become employed in competitive jobs earning livable wages. It is imperative that we come to better understand the individual and environmental support variables that result in more positive employment outcomes for this group both to enhance quality of life of affected individuals, but also to ensure that resources are utilized efficiently and effectively. This study found that state factors may be important in understanding variability in

employment outcomes for transition-aged adults with ASD served by VR agencies, however, there is still much to be learned about the relationships between special education factors and employment outcomes. The ultimate objective of special education is to prepare students for adulthood, including employment. This study suggests that perhaps some of our current legislative initiatives aimed at providing students with disabilities similar opportunities for academic content instruction as non-disabled peers may not prepare them adequately for employment. Perhaps the increased focus on academic content instruction has allowed for less focus on other employment specific skill instruction or opportunities that may be important for young adults with ASD to secure employment after exiting school. Additionally, because a relatively small percentage of young adults with ASD participate in post secondary educational experiences, they are potentially entering the work force at earlier ages than their non-disabled peers and may lack the maturity and skills to have obtain and maintain employment in a profession that allows them to earn livable wages. Additional research will be needed to identify the range of factors related to the provision of special education services that lead to improved employment outcomes for young adults with ASD.

References

- Anderson, D. K., Liang, J. W., & Lord, C. (2014). Predicting young adult outcome among more and less cognitively able individuals with autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 55, 485-494.
- Autism Speaks (2013). *Inclusion: Leading the way in access for everyone*. Retrieved from https://www.autismspeaks.org/sites/default/files/afyo_inclusion.pdf
- Billstedt, E., Gillberg, C., & Gillberg, C. (2005). Autism after adolescence: Population-based 13- to 22- year follow-up study of 120 individuals with autism diagnosed in childhood. *Journal of Autism and Developmental Disorders*, 34, 351-360.

- Bouck, E. C., & Joshi, G. S. (2014). Does curriculum matter for secondary students with autism spectrum disorders: Analyzing the NTLS2. *Journal of Autism and Developmental Disorders, 45*, 1204-1212. doi 10.1007/s10803-014-2281-9
- 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.
- Cimera, R. E., Burgess, S., & Wiley, A. (2013). Does providing transition services early enable students with ASD to achieve better vocational outcomes as adults? *Research and Practice for Persons with Severe Disabilities, 38*, 88-93.
- Cimera, R. E., & Cowan R. (2009). The cost of services and employment outcomes achieved by adults with autism in the US. *Autism, 13*, 285-302.
- Council for Exceptional Children (1997). *Special education in the schools*. Retrieved from <http://www.cec.sped.org/Policy-and-Advocacy/CEC-Professional-Policies/Special-Education-in-the-Schools>
- Eaves, L. C., & Ho, H. H. (2008). Young adult outcomes of autism spectrum disorders. *Journal of Autism and Developmental Disabilities, 38*, 739-747.
- Engström, I., Ekström, L., & Emilsson B. (2003). Psychosocial functioning in a group of Swedish adults with Asperger syndrome or high-functioning autism. *Autism, 7*, 99-110.
- Hestenes, L., Cassidy, D., Shim, J., & Hegde, A. (2008). The quality of inclusive preschool classrooms. *Early Education and Development, 19*, 519-540.
- Holwerda, A., van der Klink, J. J. L., Groothoff, J. W., & Brouwer, S. (2012). Predictors for work participation in individuals with autism spectrum disorder: A systematic review. *Journal of Occupational Rehabilitation, 22*, 333-352.
- Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcome for children with autism. *Journal of Child Psychology and Psychiatry, 45*, 212-229.
- Individuals With Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- Irvin, D. W., Hume, K., Boyd, B. A., McBee, M. T., & Odom, S. L. (2013). Child and classroom characteristics associated with language provided to preschoolers with autism spectrum disorder. *Research in Autism Spectrum Disorders, 7*, 947-955.
- Lawer, L., Brusilovskiy, E., Salzer, M. S., & Mandell, D. S. (2009). Use of vocational rehabilitative services among adults with autism. *Journal of Autism and Developmental Disorders, 39*, 487-494.
- Levin, H. M., & McEwan, P. J. (2000). *Cost-effectiveness analysis: Methods and applications*. Thousand Oaks, CA: Sage.
- Levy, A., & Perry, A. (2011). Outcomes of adolescents and adults with autism: A review of the literature. *Research in Autism Spectrum Disorders, 5*, 1271-1282.
- Lin, L., Yu, S., & Yu, Y. (2012). A study of activities of daily living and employment in adults with autism spectrum disorders in Taiwan. *International Journal of Rehabilitation Research, 35*, 109-115.
- Lindsay, S., McDougal, C., Menna-Dack, D., Sanford, R., & Adams, T. (2014). An ecological approach to understanding barriers to employment for youth with disabilities compared to their typically developing peers: Views of youth, employers, and job counselors. *Disability and Rehabilitation*. Advance online publication. Retrieved from <http://informahealthcare.com/doi/abs/10.3109/09638288.2014.939775>
- Migliore, A., Timmons, J., Butterworth, J., & Lugas, J. (2012). Predictors of employment and

- postsecondary education of youth with autism. *Rehabilitation Counseling Bulletin*, 55, 176-184.
- Moore, E. J. & Schelling, A. (2015). Postsecondary inclusion for individuals with an intellectual disability and its effect on employment. *Journal of Intellectual Disabilities*, 19, 130-148. doi: 10.1177/174462954564448
- Newman, L., Wagner, M., Knokey, A.-M., Marder, C., Nagle, K., Shaver, D., ... Swarting, M. (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.
- Nicholas, D. B., Attridge, M, Zwaigenbaum, L., & Clarke, M. (2015). Vocational support approaches in autism spectrum disorder: A synthesis review of the literature. *Autism*, 19, 235-245.
- No Child Left Behind Act of 2001, P.L. 107-110, 20 U.S.C. § 6319 (2002).
- Rehabilitation Services Administration (2014). Unpublished data.
- Rehabilitation Services Administration (2004). *Reporting manual for the Case Service Report (RSA-911)*. (Report No. RSA-PD-04-04). Retrieved from, <http://www.ed.gov/policy/speced/guid/rsa/pd-04-04.pdf>
- Schall, C., Wehman, P., & McDonough, J. L. (2012). Transition from school to work for students with autism spectrum disorders: Understanding the process and achieving better outcomes. *Pediatric Clinics of North America*, 59, 189-202.
- Schaller, J., & Yang, N. K. (2005). Competitive employment for people with autism: Correlates of successful closure in competitive and supported employment. *Rehabilitation Counseling Bulletin*, 49, 4-16.
- 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, F. A. & Lugas, J. (2010). Vocational rehabilitation employment outcomes for transition-age youth with autism and other disabilities. *DataNote Series, Data Note XXVI*. Boston, MA: Institute for Community Inclusion.
- Taylor, J. L., & Mailick, M. R. (2014). A longitudinal examination of 10-year change in vocational and educational activities for adults with autism spectrum disorders. *Developmental Psychology*, 50, 699-708.
- Taylor, J. L., & Seltzer, M. M. (2011). Employment and post-secondary activities for young adults with autism spectrum disorder during the transition to adulthood. *Journal of Autism and Developmental Disorders*, 41, 566-574.
- United States Census Bureau (2014). Retrieved from <http://www.census.gov/>.
- United States Bureau of Labor Statistics (2014). Unemployment rates for states: Annual average rankings 2000-2013. Retrieved from <http://www.dlt.ri.gov/lmi/laus/us/annavg.htm>.
- United States Department of Commerce: Bureau of Economic Analysis (2014). *Per Capita personal income by state*. Retrieved from <http://bber.unm.edu/econ/us-pci.htm>
- United States Department of Education, IDEA Data Center (2014). Retrieved from <https://www.ideadata.org/>
- United States Department of Education, National Center for Education Statistics (2014). Retrieved from <http://nces.ed.gov/>
- United States Department of Education (2015). *No Child Left Behind: Elementary and Secondary Education Act*. Retrieved from <http://www2.ed.gov/nclb/landing.jhtml>

United States Department of Labor: Bureau of Labor Statistics (2014). *Expenditures of rural and urban households in 2011*. Retrieved from <http://www.bls.gov/opub/btn/volume-2/expenditures-of-urban-and-rural-households-in-2011.htm>.

United States Department of Labor: Bureau of Labor Statistics (2014). *Local area unemployment statistics*. Retrieved from <http://www.bls.gov/lau/>

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Disparities in Diagnoses and Access to Services for African American Children with Autism Spectrum Disorder

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Abstract: In recent years, significant increases in the prevalence of autism spectrum disorder (ASD) among children in the United States have been noted. African American children however, often go undiagnosed, misdiagnosed, or diagnosed at ages later than European American children. Therefore, the purpose of this literature review was to explore what is known about the diagnosis and accessibility of services for African American children with ASD, and furthermore, to assess the factors that impact disparate access to services for this underrepresented population. The findings provide implications that support the need for future research in this domain. Findings also suggest a need for the development of parent education programs, as well as training initiatives for primary care practitioners to better address the needs of African American children with ASD and their families.

Before the 1980s, autism spectrum disorders (ASD) were thought to be rare, affecting only one in every 2,000 children (Centers for Disease Control and Prevention [CDC], 2012). Since then, ASD has become the fastest growing diagnosis of all childhood disorders and diseases (Oller & Oller, 2010). The most recent report from the CDC indicates that the prevalence rate of ASD in the United States has risen to one in every 68 children (CDC, 2014).

Previous research around ASD has highlighted the importance of early diagnosis and early intervention in addressing the needs of children with ASD (Boyd et al., 2010). For children with disabilities, including ASD, the early childhood years are critical because early identification increases the likelihood that the child will benefit from interventions and services designed to address his or her needs (Bruder, 2010; Irvin, McBee, Boyd, Hume, & Odom, 2012). In fact, the likelihood of identifying children with ASD during the first two years of life has become more

promising than in previous years (Boyd et al., 2010). The probability of early ASD diagnoses, however, has not generalized across racial and ethnic groups. African American children are often diagnosed years after the onset of symptoms, and in some cases remain undiagnosed well into their elementary school years (Hilton et al., 2010; Mandell et al., 2009). Therefore, African American children are not as likely to receive and benefit from the early intervention services that many of their European American peers with ASD benefit from as toddlers.

Although it is evident that ASD is prevalent among African American children (CDC, 2012), few studies have addressed the disparities in the diagnosis and access to services for these children to date (Mandell et al., 2002). The purpose of this literature review was twofold: (a) to explore those factors that contribute to disparate diagnoses and access to services for African American children with ASD and (b) to highlight the experiences of African American families

when trying to obtain a diagnosis and seeking access to services for children with ASD. The review was guided by the following questions:

1. Given the existing literature, what is known about diagnoses and access to services for African American children with ASD?
2. What are the barriers that impede adequate and timely diagnoses and access to services for this population?
3. What is known about family experiences in gaining access to services for African American children with ASD?

Method

Selection Criteria

To better understand African American parents' experiences with obtaining diagnoses and gaining access to services for children with ASD, both electronic and manual searches were employed and there were no limitations on the year of publication. The search began with a broad exploration of the literature using the keywords *autism and African Americans*. Secondly, a more detailed search was conducted through three online databases (i.e., EBSCO, ERIC, and Scopus) using several keywords and phrases to describe the population of interest (e.g., *autism and African Americans, autism in children of color, disabilities in children of color*) and the variables of interest (e.g., *rate of autism diagnoses, barriers to access, disparities*). Finally, a manual search of reference lists from previously reviewed studies in this area was conducted.

The initial search yielded relatively little research around ASD in African American children; therefore, the criteria for inclusion were generally broad. The criteria used to determine inclusion in this review were that the publications must: (a) have a sample

population that included African American families of children with ASD or other developmental disabilities, (b) discuss or measure some component of access to services or disparities in access to services, (c) discuss or measure some component of diagnoses or disparities in diagnoses, and (d) have been published in a scholarly, peer-reviewed journal. To gather as much information as possible, there were no exclusion criteria implemented related to the age of participants, year that the article was published, or number of participants included.

After the researcher carefully reviewed the articles and the inclusion criteria, 15 articles were included in this review. These articles were comprised of 12 empirical studies and three literature reviews that were published between 1996 and 2013. A graduate student (i.e., second rater) in special education reviewed 17 articles, 15 of which were included in this review. The second rater evaluated if each of the 17 articles met the stated inclusion criteria. Overall, there were two disagreements between the first author and the second rater. One article was identified as having met criteria by the first author, but not by the second rater. Moreover, a second article was identified as having not met criteria by the first author, however the second rater identified it as having met criteria. Interrater reliability was 88%.

Of the 12 empirical studies included in this review, researchers in 10 studies employed quantitative analyses (Bishop, Richler, Cain, & Lord, 2007; Cuccaro, Wright, Rownd, & Abramson, 1996; Hilton et al., 2010; Liptak et al., 2007; Mandell et al., 2002; Mandell, Novak, & Zubritsky, 2005; Mandell, Ittenbach, Levy, & Pinto-Martin, 2007; Tek & Landa, 2012; Thomas, Ellis, McLaurin, Daniels, & Morrissey, 2007; Zuckerman et

al., 2013). Researchers in one of the 12 empirical studies included in this review employed a mixed methods approach consisting of both scaled survey questions and semi-structured interviews of parents of children with ASD (Sansosti, Lavik, & Sansosti, 2012), and one study was a qualitative case study (Gourdine et al., 2011). Across the ten quantitative studies, researchers collected survey data from pediatricians (Zuckerman et al., 2013), speech language pathologists, psychologists, physicians (Cuccaro et al., 1996), and parents of children with ASD (Bishop et al., 2007; Hilton, 2010; Tek & Landa, 2012; Thomas et al., 2007). The researchers in the remaining quantitative studies analyzed existing data and mental health claims records (Liptak et al., 2007; Mandell et al., 2002; Mandell et al., 2005; Mandell et al., 2007).

In addition to data from physicians and speech and language pathologists, the analyses included in this review reflect data from 36 African American parents or caregivers (Bishop et al., 2007; Cuccaro et al., 1996; Mandell et al., 2002; Mandell et al., 2007; Sansosti et al., 2012; Zuckerman et al., 2013). The literature included in this review addressed disparities in access to services, differences in diagnoses of ASD based on ethnicity, the impact of healthcare providers' (e.g., pediatrician and primary care practitioners [PCP]) knowledge and perceptions of ASD in families of color, and African American parents' experiences with accessing services.

Results

In a few studies (e.g., Mandell et al., 2002; Thomas, et al., 2007), experiences such as delayed diagnoses, low socioeconomic status, and cultural divergence have been described as factors that impede access to timely and adequate services for African

American families of children with ASD (i.e., barriers). Other studies (e.g., Sansosti et al., 2012) describe experiences that are in many cases, unique to the African American family. Given these findings, the results for this review have been organized into two sections; the first section discusses barriers to diagnosis and initial services for African American children with ASD, and the second section highlights family experiences with accessing services for African American children with ASD. Finally, gaps and limitations in the current literature are addressed.

Barriers to Diagnoses and Initial Services

In the current review of literature the author has identified and defined three primary themes that contribute to the disparate access to diagnoses and services among African American children with ASD. These themes include: *differential diagnoses*, *socioeconomic status*, and *cultural divergence* (see Figure 1). Differential diagnoses are defined as rates and timing of diagnoses of ASD in African American children that are less than or more delayed than those of European American children. The second barrier, socioeconomic status (SES), highlights the degree to which financial resources inhibit access to services for this population. It should be noted here however, that low SES alone, does not account for the under diagnosis and misdiagnosis of ASD in African American children (e.g., Gourdine et al., 2011). Finally, cultural divergence is the idea that there exists a disconnection between parents of color, and the healthcare providers who treat their children.

Other researchers have constructed similar categories of barriers and challenges related to the disparities in diagnoses, treatment, and services among families of color. For example, Tek and Landa (2012) suggested

that the reasons for the disparities in the age of diagnosis among minority children in general, include factors such as financial and educational resources, and cultural and language barriers. Furthermore, Blanchett, Klingner, and Harry (2009) highlighted a number of challenges that families of children with disabilities from diverse backgrounds face. These challenges include cultural perspectives on disability, limited access to service delivery options, and service providers' misunderstanding of the impact of the role of families' sociocultural background.

Differential diagnoses. Findings from three studies (Gourdine et al., 2011; Mandell et al., 2002; Thomas, et al., 2007) suggest that one common barrier to accessing services for African American parents of children with ASD, is gaining accurate and timely diagnoses. In their quantitative analysis of a dataset of Medicaid eligible children in Philadelphia, Mandell et al. (2002) found that on average, African American children were 7.9 years old when they received their first diagnosis. In addition, they found that 50% of the European American children in their sample received an ASD diagnosis by the age of 5.5 while only 28% of African American children received a diagnosis of ASD by age 5.5. Moreover, 72% of the European American children in this sample received a diagnosis of ASD on their first visit to a referred specialist, compared to only 57% of African American children. The literature indicates that the delay in the diagnosis of ASD for African American children could be due, in large part, to the limited knowledge that general practitioners (e.g., pediatricians) have about ASD. For example, when PCPs were asked about the difficulty of recognizing signs and

symptoms of ASD in African American, European American, and Latino children, most PCPs had more difficulty identifying signs and symptoms of ASD in Latino children and African American children than in European American children (Zuckerman et al., 2013). The authors, however, did not indicate why this phenomenon persisted. Mandell et al. (2007) suggest that the misdiagnosing of ASD in African American children may be related to PCP's unfamiliarity with the disorder, PCP's perceptions of the manifestation of behaviors in African American children, or due to underutilization of standard clinical measures.

In an analysis of the same data set, Mandell et al. (2007) aimed to further investigate disparities in diagnoses of ASD among African American children by examining diagnostic patterns after these children gained access to healthcare (i.e., Medicaid). The findings revealed that African American children who were ultimately diagnosed with ASD were nearly three times more likely than European American children to receive a different diagnosis first. In addition, of those children who received a different diagnosis first, African American children were more likely than European American children to receive an initial diagnosis of conduct disorder. Mandell and colleagues suggest that because African American children with ASD were more likely than children of other ethnicities to receive a diagnosis of conduct disorder, this could be related to the way African American parents describe their children's symptoms. For example, it might be that the parents emphasize their children's disruptive behaviors, but they may not discuss other symptoms. In addition, these misdiagnoses

Figure 1. *Primary Themes*

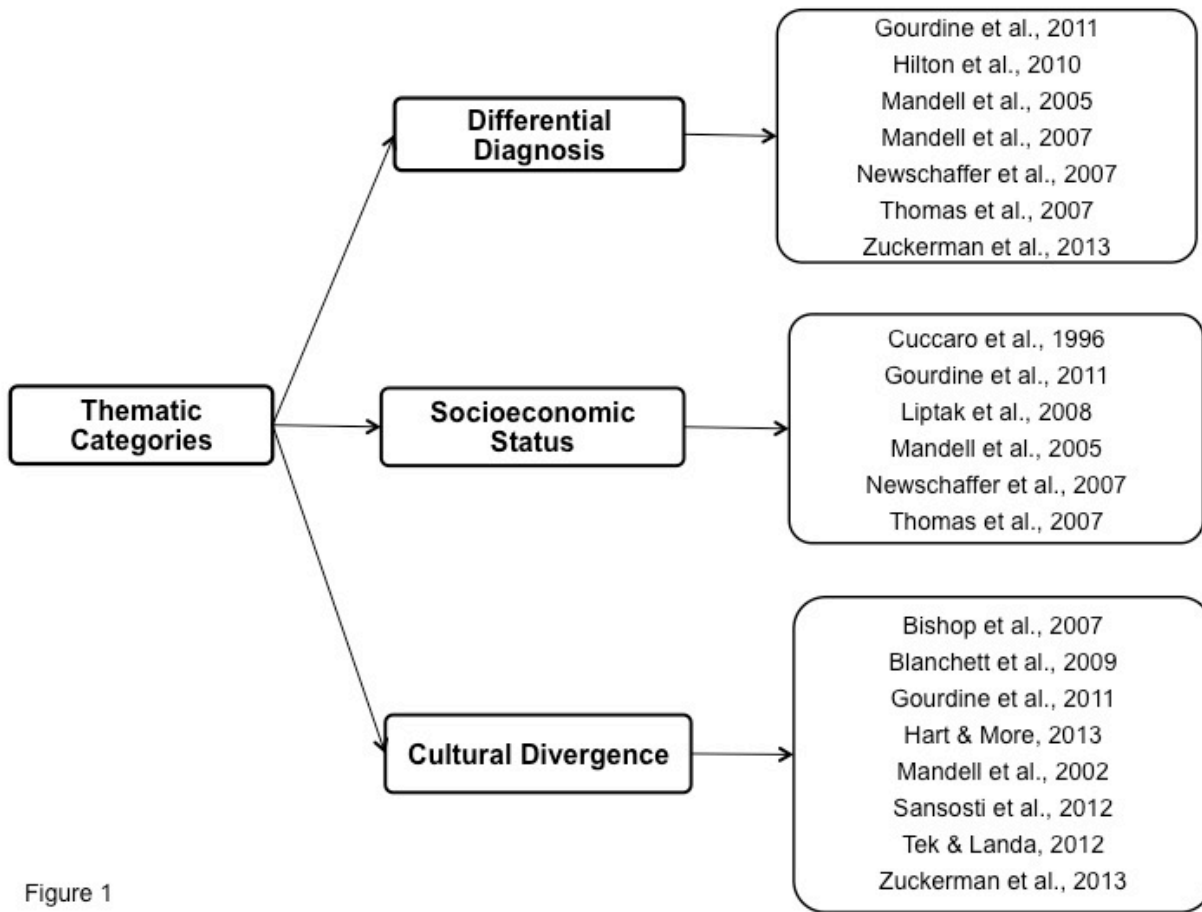


Figure 1

could be due to the fact that clinicians have limited understanding and familiarity with the disorder or the culture. Furthermore, some theories support the notion that practitioners hold general prejudices (Mandell et al., 2009) and biases (Boyd & Correa, 2005) about health-related behaviors that could impact their decisions and diagnoses of ASD in African American children. Based on the findings of their study, Mandell and colleagues argue that there is a need for further education among specialty practitioners around the symptoms of ASD, increased cultural competency and cultural sensitivity, and more education and

clarification regarding their personal beliefs about the prevalence of ASD in ethnic minorities (Mandell et al., 2007).

Socioeconomic status. The second theme around ASD in African American children suggests that socioeconomic status is also a barrier for obtaining diagnoses, and access to services. It should be noted that low socioeconomic status is a barrier that impacts families across racial and ethnic backgrounds (Irvin et al., 2011). However, among an ethnic population (i.e., African American) in which more than one third of the children under age 18 live in poverty

(U.S. Census Bureau, 2010), it is believed that low socioeconomic status further exacerbates delayed diagnoses and access to services among a population that is already underserved.

Krauss, Gulley, Sciegaj, and Wells (2003) assert that more than 12 million children with special healthcare needs live with developmental, behavioral, physical, or emotional conditions that require them to use more healthcare and specialty services than typical children of the same age. Because of their needs for more specialized care and a range of therapeutic services, children with special needs are oftentimes viewed as a challenge to health insurers and providers. Moreover, estimates suggest that children with ASD have nine times the healthcare expenditures of other Medicaid-eligible children. In addition, the average lifetime public expenditures for an individual with ASD are estimated to be nearly \$4.7 million. Given that special healthcare services are costly in general, access to services for individuals with disabilities may be compounded by low socioeconomic status (Newschaffer et al., 2007).

Among a sample population of 969 caregivers of children with ASD in Pennsylvania, Mandell et al. (2005) found that children who lived in poverty or were close to poverty received a diagnosis nearly 11 months later than children from wealthier families. Similarly, Liptak et al. (2008) found that among the 495 families included in their study, those families who lived in poverty had decreased access in all five categories that were measured (i.e., getting care from a specialist, having a personal physician, accessing telephone advice, getting acute care, and receiving preventative care). According to the U.S. Census Bureau (2010), 38.2 percent of

African American children under the age of 18 were living in poverty in 2010. Therefore, these findings have particular implications for families who come from disadvantaged backgrounds. Moreover, findings indicate that even among African American children who do not come from socioeconomically disadvantaged backgrounds, disparities in access still persist (King & Bearman, 2011). This finding is consistent with the experiences of one African American family who, despite their economic resources, still experienced difficulties gaining access to services (Gourdine et al., 2011). Recognizing that poverty is not unique to African Americans, these findings have important implications for families of children with ASD across all racial and ethnic backgrounds, but have particular importance for African American children with ASD who, unlike their European American peers, oftentimes go undiagnosed or misdiagnosed well into their elementary school years.

Cultural divergence. The third theme suggests that cultural divergence is also a barrier to accessing services for African American children with ASD. In other words, there are cultural phenomena that have an impact on access to services for African American families of children with ASD. Blanchett et al. (2009) suggest that when families of color seek services for children with developmental disabilities, they are likely to face systems and structures (e.g., human and community services, special education system) that are not adequately prepared to help them navigate services. In many cases, this results in families of color receiving culturally unresponsive and inappropriate services and interventions.

One example of a cultural phenomenon from the family perspective is that families from

different cultures oftentimes have differences in the way they view symptoms of ASD. It could be that they view difficulties with social interactions, communication, and behavior through a cultural lens that might delay referral for evaluation (Hart & More, 2013). For example, some families may value the practice of sitting quietly and not speaking over others, more than other families from different backgrounds (Dyches, 2011). Moreover, African Americans are less likely to view certain treatment methods as helpful for their children because of the history of stereotyping, discrimination, and racism that many individuals within this underrepresented population have experienced when seeking mental health services in the past (Gourdine et al., 2011). These types of cultural norms could contribute to this idea of cultural divergence from a family perspective.

Cultural divergence can also be viewed based on the perceptions of primary care practitioners. For example, in their case study of one African American family, Gourdine et al. (2011) found that this family, despite being comprised of two college educated parents whose family SES was classified as middle class, faced many challenges with getting an initial diagnosis and subsequent access to services. During their first clinical visit, professionals immediately recommended insensitive, pessimistic alternatives such as placing their son in an institution. In their analysis of the case study, Gourdine et al. (2011) suggested that the experiences of the African American family included in their case study are typical of the experiences that many African American families of children with ASD face in mainstream health and mental health settings.

One of the most striking outcomes related to culture was the systematic exclusion of a large majority of African American families from genetic registries (Hilton et al., 2010). In their study that was aimed to recruit African American families and enroll them in ASD genetic registries, Hilton et al. (2010) found that 67% of the families they reached were not eligible for enrollment in the registries based on exclusionary criteria that required two biological parents. Understanding that genetic research relies on the biological parents for further exploration is rational. The challenge, however, is that according to a report from the US Census Bureau on unmarried women, more than 67.8 percent of African American women who gave birth to children in the year preceding the data collection (2011), were single-mothers (Shattuck & Kreider, 2013). This finding suggests that a large majority of African American families would be considered ineligible to enroll in these types of registries aimed to conduct research on ASD, based on the single-parent composition of their families. Although these findings do not indicate a causal relation between genetic research inclusion and access to services, they do suggest that research practices that have the potential to influence services in this domain, are not culturally responsive.

Furthermore, embedded within this theme of cultural divergence exists the notion that primary care practitioners' (PCP) knowledge and perceptions of African American families can impede diagnoses and access to services for these children (Gourdine et al., 2011; Liptak et al., 2008; Mandell et al., 2002; Thomas et al., 2007). For example, Reichard, Sacco, and Turnbull (2004) found that many families of children with developmental disabilities from minority backgrounds reported difficulties finding

competent and trustworthy practitioners and wanted them to show more concern.

Cuccaro et al. (1996) and Zuckerman et al. (2013) assessed the impact of professionals' perceptions on the treatment and diagnosis of Latino and African American children with ASD, based on ethnicity. In their study, Cuccaro et al. (1996) surveyed 185 speech language pathologists, school psychologists, and physicians to assess the degree to which their clinical decisions were a function of patients' ethnicity, race, socioeconomic status, or a combination of variables. Interestingly, the researchers found that within this group of participants, the professionals' perceptions were not influenced by the race or ethnicity of the child. One limitation to be noted here, however, is that this self-report survey method may have introduced biases on the part of the clinicians.

Cuccaro et al. (1996) found that professional perceptions did not appear to be influenced by ethnicity, however, more recent findings from Zuckerman et al. (2013) have identified disparate diagnoses and referrals for Latino and African American children with ASD based on the cultural perceptions of the medical professionals who treat them. For example, most of the 267 pediatricians included in the study offered some type of developmental screening, however, only 40% of those pediatricians offered screenings for ASD in general (Zuckerman et al, 2013). The pediatricians' perceptions of families of children with ASD revealed that they believed that parents of Latino and African American children had lower levels of knowledge of ASD than parents of European American children. In addition, the PCPs said it was more difficult to recognize the signs and symptoms of ASD in Latino and African American children, as compared to European American children.

Finally, Zuckerman et al. (2013) found that PCPs who had a Latino provider in their practice (i.e., a provider of the same ethnic background as the patient) had Latino patients who faced fewer difficulties based on practitioner reports.

In their analysis of the race differences in the age at diagnosis for Medicaid eligible children in Philadelphia, Mandell et al., (2002) found that even after African American children had access to medical services (i.e., regular check-ups), they still required three times the number of visits over a period three times as long as European American children before receiving a diagnosis of ASD. According to Mandell et al. (2002), these findings imply that there were significant time delays among African American children, as compared to European American children, before PCPs made referrals for children who were later found to have ASD or developmental disabilities. In fact, Shevell, Majnemer, Rosenbaum, and Abrahamowicz (2001) found that pediatricians who primarily treated children of color waited, on average, 15.5 months after parents initially voiced concerns before making referrals for children who were later found to have significant developmental delays. Mandell et al. (2002) suggest that primary care practitioners have limited knowledge and incentive for further evaluation to explore the possibility of ASD in the largely minority population of children whom they treat. Mandell and colleagues also purport that practitioners have different expectations about treatment and service needs for African American families. Thus, they do not screen for ASD in African American families as soon as they do for European American families (Mandel et al., 2002).

Family Experiences

Both Bishop et al. (2007) and Sansosti et al. (2012) focused on the experiences of families of children with ASD. In their follow-up assessment with 110 mothers of children with ASD in Chicago and North Carolina, Bishop et al. (2007) explored the relations between ethnicity and the families' perceived negative impact. The participants in this study, however, were part of a larger, longitudinal study, the Early Diagnosis Study. Bishop and colleagues found that ethnicity was the strongest predictor of perceived negative impact, but not for African American mothers. Interestingly, African American mothers had significantly lower levels of perceived negative impact influenced by their children with ASD than did European American mothers. Bishop and colleagues suggest two explanations for this finding (a) it could be that African American mothers have more effective strategies for coping with ASD because they are exposed to more frequent and stressful life events or (b) African American mothers experience more stress in general, thus they did not attribute it to their child's diagnosis of ASD.

In their study, Sansosti et al. (2012) added to the growing literature on the diagnostic processes of families of children with ASD by identifying parent perceptions of early-intervention services for children with ASD. Consistent with previous findings (Hilton et al., 2010; Mandell et al., 2002), Sansosti and colleagues found that African American children received a diagnosis of ASD on average, six months later than European American children, based on parent reports. The researchers found that the parents of children who received delayed diagnoses were more likely to become frustrated with the diagnostic process. Interestingly, none of the participants in this study were from a low-income family, noting that the lowest

household income range reported was \$45,000 to \$54,999. In fact, the mean range of income was \$85,000 to \$95,000. That is, despite financial stability, African American families of children with ASD in this study still faced barriers to access and timely diagnoses (Sansosti et al., 2012). This finding is reflected in the aforementioned case study of two, college educated, African American parents of a young son with ASD, who, despite their resources, still struggled to gain access to services (Gourdine et al., 2011).

Overall, there is no current evidence to suggest that the prevalence rate of ASD among African American children is lower than European American children; however, African American children continue to be less likely to receive a diagnosis of ASD and less likely to gain access to early intervention services (Kipke & Kubicek, 2014). Moreover, these circumstances are further exacerbated by factors such as low socioeconomic status and limited practitioner knowledge of ASD (King & Bearman, 2009; Liptak et al., 2008; Mandell et al., 2005).

Discussion and Implications

The purpose of this review of literature was to (a) explore what is known about diagnoses and access to services for African American children with ASD and their families; (b) highlight the barriers that impede adequate and timely diagnoses and access to services for African American children with ASD, and (c) highlight what is known about family experiences in gaining access to services for African American children with ASD. The early childhood years are critical for children with ASD because early identification is associated with earlier access to interventions and services designed to address their needs (Bruder, 2010; Irvin et al., 2012).

This review of literature indicates that African American children are often diagnosed years after the onset of symptoms, and in some cases remain undiagnosed well into their elementary school years (Hilton et al., 2010; Mandell et al., 2009). For example, Mandell et al. (2002) found that on average, African American children were 7.9 years old at the time of diagnosis, while 50% of European American children in their sample were 5.5 years old at the time of diagnosis. Additional findings revealed that some of the common barriers to accessing services for African American parents of children with ASD include gaining accurate and timely diagnoses (Gourdine et al., 2011; Mandell et al., 2002; Thomas et al., 2007), low socioeconomic status (Newschaffer et al., 2007), and culturally unresponsive and inappropriate services and providers (e.g., Blanchett et al., 2009; Gourdine et al., 2011; Liptak et al., 2008).

Moreover, the literature included in this review indicates that relatively little is known about African American families' experiences obtaining diagnoses and gaining access to services for children with ASD. Only two studies have measured qualitatively, the experiences of African American families of children with ASD, to date (Gourdine et al., 2011; Sansosti et al., 2012). Their findings suggest that despite having access to financial resources, African American families of children with ASD still struggled to gain access to services (Gourdine et al., 2011) and were often frustrated with the diagnostic process (Sansosti et al., 2012).

Finally, due to delays in diagnoses and access to services (Hilton et al., 2010; Mandell et al., 2009), African American children are not as likely to receive and

benefit from the early intervention services that many European American children with ASD benefit from as toddlers. That is, European American children are 30% more likely than African American children to be diagnosed with ASD (CDC, 2014). In fact, 72% of European American children and 58% of African American children received a diagnosis of ASD on their first visit to a specialty mental health setting (Mandell et al., 2002). These statistics indicate that, despite the accessibility of diagnostic tools and early intervention services, and despite access to financial resources (Gourdine et al., 2011; Sansosti et al., 2012), there are a number of disparities related to diagnoses and access to services for African American children with ASD that have yet to be explained.

Limitations

Nearly all of the 12 empirical studies included in this review used quantitative research methods (Bishop et al., 2007; Cuccaro et al., 1996; Hilton et al., 2010; Liptak et al., 2008; Mandell et al., 2002; Mandell et al., 2005; Mandell et al., 2007; Tek & Landa 2012; Thomas et al., 2007; Zuckerman et al., 2013). Aside from the semi-structured interviews of mothers conducted by Sansosti et al. (2012), and the case study of one family by Gourdine et al. (2011) no other studies employed qualitative methodology. The three literature reviews that were included focused on the epidemiology of ASD across racial and ethnic groups, culturally responsive practices for educators of racially diverse children with ASD, and the intersection of race, culture, and disability in urban education settings.

Moreover, only nine studies were identified that aimed specifically, to address the experiences of African American families of children with ASD (Bishop et al., 2007;

Gourdine et al., 2011; Hilton et al., 2010; Liptak et al., 2008; Mandell et al., 2002; Mandell et al., 2005; Reichard et al., 2004; Sansosti et al., 2012; Thomas et al., 2007). Even fewer studies however, have highlighted the impact that differential diagnoses have on African American families of children with ASD (Bishop et al., 2007; Mandell et al., 2002; Mandell et al., 2007; Sansosti et al., 2012; Zuckerman et al., 2013). While several studies included in this review addressed disparities in health care, Sansosti et al. (2012) were the only researchers who explicitly identified primary care practitioners as barriers to accessing services for African American children with ASD and their families. Finally, several quantitative studies included in this review highlighted differences in the rates and timing of diagnoses of ASD in African American children compared to European American children with ASD (e.g., Liptak et al., 2008; Mandell et al., 2002; Mandell et al., 2005). Only one study, however, has investigated qualitatively, African American parents' experiences gaining diagnoses and access to services (Gourdine et al., 2011).

There are a number of limitations that should also be noted about the current review. This review of literature was intended to be exhaustive of those studies that met criteria, however, it is possible that the author overlooked additional studies that met criteria for inclusion in the current review. In addition, the author did not evaluate the rigor of the studies included in this review; therefore, these factors should be taken into consideration.

Recommendations for Future Research

It is plausible that the findings from this review are influenced by factors that have not yet been explored in previous research. The gap in this area of research warrants immediate attention to address a number of issues related to both research and practice. Additional research is needed to explore the factors that are inhibiting access to early diagnoses and early intervention services for African American children with ASD and their families. First, there is a need for more experimental research that includes representative samples of African American children with ASD. Second, there is a particular need for qualitative research that will explore the factors that contribute to the disparities in diagnoses and access to services among African American families of children with ASD — research that will give a voice to people who have been historically marginalized (Brantlinger, Jimenez, Klingner, Pugach, and Richardson 2005). Third, future research should draw comparisons across demographics to better explore the disparities in ASD diagnoses and access to services.

Finally, to support the improvement of diagnostic practices and the accessibility of services for African American families of children with ASD, there is a need for additional ASD diagnostic training among primary care practitioners, a need for professional development to enhance culturally responsive service delivery, and a need for parent education programs that will help African American parents in particular, feel knowledgeable and empowered to make informed decisions about services that will address the needs of their children with ASD.

References

- *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.
- *Blanchett, W. J., Klingner, J. K., & Harry, B. (2009). The Intersection of Race, Culture, Language, and Disability Implications for Urban Education. *Urban Education, 44*, 389-409.
- Boyd, B. A., & Correa, V. I. (2005). Developing a framework for reducing the cultural clash between African American parents and the special education system. *Multicultural Perspectives, 7*, 3-11.
- Boyd, B. A., Odom, S. L., Humphreys, B. P., & Sam, A. M. (2010). Infants and toddlers with autism spectrum disorder: Early identification and early intervention. *Journal of Early Intervention, 32*, 75-98.
- Brantlinger, E., Jimenez, R., Pugach, M., & Richardson, V. (2005). Qualitative studies in special education. *Exceptional Children, 71*, 195-207.
- Bruder, M.B. (2010). Early childhood intervention: A promise to children and families for their future. *Exceptional Children, 76*, 339-355.
- Centers for Disease Control and Prevention. (2012). Prevalence of autism spectrum disorders — autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity and Mortality Weekly Report, 61*(3), 1-19.
- Centers for Disease Control and Prevention. (2014). Prevalence of autism spectrum disorders among children aged 8 years old — Autism and developmental disabilities monitoring network, 11, United States, 2010 sites *Morbidity and Mortality Weekly Report, 63*, 1-21.
- *Cuccaro, M. L., Wright, H. H., Rownd, C. V., Abramson, R. K., Waller, J., & Fender, D. (1996). Brief report: Professional perceptions of children with developmental difficulties: The influence of race and socioeconomic status. *Journal of Autism and Developmental Disorders, 26*, 461-469.
- Dyches, T. T. (2011). Assessing diverse students with autism spectrum disorders. *The ASHA Leader*. Retrieved from: <http://www.asha.org/Publications/leader/2011/110118Assessing-Diverse-Students-With-Autism-Spectrum-Disorders.htm#2>
- *Gourdine, R., Baffour, T., & Teasley, M. (2011). Autism and the African American community. *Social Work in Public Health, 26*, 454-470. doi:10.1080/19371918.2011.579499
- *Hart, J. E., & More, C. M. (2013). Strategies for addressing the disproportionate representation of diverse students with autism spectrum disorder. *Intervention in School and Clinic 48*, 167-173.
- *Hilton, C. L., Fitzgerald, R. T., Jackson, K. M., Maxim, R. A., Bosworth, C. C., Shattuck, P. T., Geschwind, D. H., . . . Constatino, J. N. (2010). Brief report: Under-representation of African Americans in autism genetic research: A rationale for inclusion of subjects representing diverse family structures. *Journal of Autism and Developmental Disorders, 40*, 633-639. doi:10.1007/s10803-009-0905-2
- Irvin, D. W., McBee, M., Boyd, B. A., Hume, K., & Odom, S. L. (2012). Child and family

- factors associated with the use of services for preschoolers with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 6, 565-572.
- King, M., Bearman, P. (2009). Diagnostic change and the increased prevalence of autism. *International Journal of Epidemiology*, 38, 1224-1234. doi: 10.1093/ije/dyp261
- Krauss, M. W., Gulley, S., Sciegaj, M., & Wells, N. (2003). Access to specialty medical care for children with mental retardation, autism, and other special health care needs. *Mental Retardation*, 41, 329-339.
- Kipke M., & Kubicek, K. (2014). Addressing Racial Disparities in Autism Care. Retrieved from http://www.autismspeaks.org/science/science-news/addressing-racial-disparities-autism-care?utm_source=email&utm_medium=text-link&utm_campaign=sciencedigest
- *Liptak, G., Benzoni, L. B., Mruzek, D. W., Nolan, K. W., Thingvoll, M. A., Wade, C. M., Fryer, G. E. (2008). Disparities in diagnosis and access to health services for children with autism: Data from the National Survey of Children's Health. *Journal of Developmental and Behavioral Pediatrics*, 29, 152-160.
- *Mandell, D. S., Ittenbach, R. F., Levy, S. E., & Pinto-Martin, J. (2007). Disparities in diagnoses received prior to a diagnosis of autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 37, 1795-1802. doi:10.1007/s10803-006-0314-8
- *Mandell, D. S., Listerud, J., Levy, S. E., & Pinto-Martin, J. A. (2002). Race differences in the age at diagnosis among Medicaid-eligible children with autism. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 1447-1453. doi: 10.1097/01.CHI.0000024863.60748.53
- *Mandell, D. S., Novak, M., & Zubritsky, C. (2005). Factors associated with the age of diagnosis among children with autism spectrum disorders. *Pediatrics*, 116, 1480-1486. doi:10.1542/peds.2005-0185
- *Newschaffer, C., Croen, L., Daniels, J., Giarelli, E., Grether, J., Levy, S., ... & Windham, G. (2007). The Epidemiology of Autism Spectrum Disorders. *The Annual Review of Public Health*, 28, 21.1-21.24. doi: 10.1146/annurev.publhealth.28.021406.144007
- Oller, J., Oller, S. (2010). *Autism: The Diagnosis, Treatment, & Etiology of the Undeniable Epidemic*. Sudbury, MA: Jones and Bartlett Publishers.
- Reichard, A., Sacco, T. M., & Turnbull, H. R. (2004). Access to health care for individuals with developmental disabilities from minority backgrounds. *Mental Retardation: A Journal of Practices, Policy and Perspectives*, 42, 459-470.
- Sansosti, F. J., Lavik, K. B., & Sansosti, J. M. (2012). Family experiences through the autism diagnostic process. *Focus on Autism and Other Developmental Disabilities*, 27, 81-92.
- Shattuck, R. M., & Kreider, R. M. (2013). Social and economic characteristics of currently unmarried women with a recent birth: 2011. American Community Survey Reports. Retrieved from <http://www.census.gov/prod/2013pubs/acs-21.pdf>
- Shevell, M., Majnemer, A., Rosenbaum, P., & Abrahamowicz, M. (2001). Profile of referrals for early childhood developmental delay to ambulatory subspecialty clinics. *Journal of Child Neurology*, 16, 645-650.
- Tek, S. & Landa, R. J. (2012). Differences in autism symptoms between minority and non-minority toddlers. *Journal of Autism and Developmental Disabilities*, 42, 1967-1973.
- Thomas, K. C., Ellis, A. R., McLaurin, C., Daniels, J., & Morrissey, J. P. (2007). Access to care for autism-related services. *Journal of Autism and Developmental Disorders*, 37, 1902-1912. doi: 10.1007/s10803-006-0323-7

United States Census Bureau. (2010). *Income, Poverty, and Health Insurance Coverage in the United States: 2010*. Retrieved from <http://www.census.gov/prod/2011pubs/p60-239.pdf>

United States Census Bureau. (2013). *State & County Quick Facts*. Retrieved from <http://quickfacts.census.gov/qfd/states/00000.html>

Zuckerman, K. E., Mattox, K., Donelan, K., Batbayar, O., Baghaee, A., & Bethell, C. (2013). Pediatrician identification of Latino children at risk for autism spectrum disorder. *Pediatrics*, *132*, 445-453. doi: 10.1542/peds.2013-0383

* denotes articles that met criteria for the current review

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Cross-Cultural Experience in Special Education: The Impact of a Study Abroad Program for Special Education Pre-Service Teacher Candidates

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Abstract: Global competence has been cited as an important developmental aspect of training special educators today. Unfortunately, opportunities to study abroad, one potential opportunity to gain global competence, for pre-service special education teacher candidates are not frequent. This paper provides an overview of a study abroad experience to Denmark for pre-service special education teacher candidates. A pilot study investigated the changes in perspectives and the development of global competence before and after a study abroad experience for pre-service special education teacher candidates in severe disabilities. Qualitative methods were used to examine the change in cultural perceptions among 14 pre-service special education teacher candidates. Themes emerged on inclusion, professional role, curriculum and instruction, and disability. Findings suggest the study abroad experience provides an opportunity for program participants to expand cultural perspectives and begin to develop a deeper global competence. Implications for teacher education and directions for future research will be discussed.

Teacher education preparation programs increasingly face challenges in preparing candidates for a globalized world (Merryfield, 2000; Sobel, Gutierrez, Zion, & Blanchett, 2011; Zhao, 2010). Special education experienced similar challenges as the education of students with disabilities has become a topic of international importance (e.g., Anastasiou & Keller, 2014; Forlin, 2012; Judge & Oreshkina, 2004). In the United States (US), national professional organizations and subsequent teacher standards have responded to the emerging needs of an increasingly diverse and connected world through emphasis on promoting global and diverse perspectives through teacher preparation programs (e.g., the Council for the Accreditation of Educator Preparation (CAEP), the Council for Exceptional Children). This emphasis is

centered on the desire to prepare teacher candidates with a global perspective for their future classrooms as they will be required to teach students with different cultures, languages, abilities, learning needs, and many other characteristics (Keengwe, 2010). Research suggests, however, that many special educators experience challenges when teaching students whose backgrounds differ from their own (Sadker, Sadker, & Zittleton, 2008).

Teaching students with disabilities can be a complex job requiring first year teachers to immediately employ the knowledge and multiple skills in instruction and collaboration acquired in training (Jones, Youngs, & Frank, 2013; Mastropieri, 2001; Wasburn-Moses, 2009). Oftentimes novice teachers have difficulty transferring the

content from their preparation program to the classroom due to a shallow learning of the content (Lava, Recchia, & Giovacco-Johnson, 2004; MacDonald & Speece, 2001). There is a need in teacher preparation for experiential (e.g., Santos, Ruppert, & Jeans, 2012) and reflective (e.g., Etscheidt, Curran, & Sawyer, 2011) learning in which candidates are forced to deeply consider the multiple underpinnings and various aspects of educational issues and practices. Such perspective serves to create knowledge that can be described as flexible, or adaptable to whatever context in which the teacher may be employed (Etscheidt et al., 2011; Sayeski & Higgins, 2013). Research on special education teacher retention, for example, relates feelings of professional isolation to high rates of burnout (Jones et al., 2013; Schlichte, Yssel, & Merbler, 2005). New special education teachers, who often have a thin grasp on the complex knowledge and skills required to successfully navigate their profession, can feel a level of dissonance with the general education-oriented culture within their school (Billingsley, 2004). Such tension and isolation can negatively affect the ability of teachers to provide the high quality services and advocacy necessary for student success (Tyler & Brunner, 2014).

One such way in which teacher preparation programs can help teacher candidates improve their capacity to teach students of various abilities and backgrounds and to, overall, navigate the complexity of the position is through incorporation of global competence into the programs of training. Global competence has been described as “the knowledge and skills needed to function successfully in the globalized world” (Zhao, 2010, p. 427). Teachers trained in global competence have a grasp of the international nature of education perspectives and services and are committed to broadening the perspectives of their

students through globally oriented content and activities (Longview Foundation, 2008). Special education teachers with such a perspective understand and appreciate the multiple lenses that a particular issue could be viewed from due to cultural difference. Such a globally-sensitive approach is critical in classrooms with students from culturally diverse backgrounds (Keengwe, 2010). Gaining an international perspective of special education-related knowledge and skills can help to deepen the understanding of relevant issues related to educating and advocating for students with disabilities by recognizing various perspectives of how students attempt to comprehend and approach a potential issue in the classroom (e.g., Johnson & Battalio, 2008). For example, teachers who understand the potential effects of culture on desired transition outcomes for students with disabilities will be more cognizant of family input and the potential for unconventional desires and approaches to life after school.

The focus on encouraging pre-service special education teacher candidates to develop global competence and engage in culturally responsive practice is critical. Literature indicates that pre-service teacher candidates often hold misconceptions, false beliefs, stereotypes, and erroneous attitudes about students with culturally diverse backgrounds (Keengwe, 2010; Vaughn, 2005). If the abovementioned beliefs and attitudes are left unchecked, it is quite possible that pre-service special education teacher candidates will be prepared without skills and perspectives in cultural diversity and global perspectives. The impact of such oversight in preparation can result in a negative impact on student outcomes (Jussim & Harber, 2005; Keengwe, 2010; Sadker et al., 2008). Intervention is needed at the teacher preparation level. If the various misconceptions, false beliefs,

stereotypes, and erroneous attitudes held by pre-service special education teacher candidates are challenged and their thinking transformed, teacher preparation programs may have a better chance of developing future special educators who have a globally-sensitive approach, and are cognizant of varying cultures, sensitive to student needs and possess the knowledge and skills to work effectively with students from culturally diverse backgrounds (Keengwe, 2010; Vaughn, 2005).

Gaining Global Competence through Study Abroad Experience

One option for developing pre-service special education teacher candidates' global competence is engaging in a short-term immersion study abroad program (Marx & Moss, 2011). Study abroad programs that immerse students in special education settings internationally are a promising way to develop global competence (Johnson & Battalio, 2008). A cross-cultural experience, such as one that occurs within a study abroad program, could help pre-service special education teacher candidates interact more effectively with students from diverse backgrounds and enhance the students' academic achievement (Keengwe, 2010). To date, little research has been conducted that shows the relationship between pre-service special education teacher candidates' study abroad experiences and changes in cultural perceptions and ideas of special education (including inclusion of students with disabilities, impact of culture on education, and special education philosophy) (Trent, Kea, & Oh, 2008). One study (see Johnson & Battalio, 2008), took pre-service special education teacher candidates to a study abroad program in Scotland. While in Scotland, pre-service special education teacher candidates lived with host families and observed in Scottish schools that offered services to students with special needs. Pre-

service special education teacher candidates were required to engage in reflective journaling throughout the trip and were administered the Intercultural Development Inventory (IDI) pre- and post-trip. Findings from the IDI and journal reflections suggest that after the study abroad program approximately one-third of pre-service special education teacher candidates moved to a more culturally sensitive view of cultures while the remaining pre-service special education teacher candidates maintained the same level of intercultural sensitivity (Johnson & Battalio, 2008). Although this study provides support for the use of study abroad programs to increase cultural competence and shifts toward global competence among pre-service special educators, more research is needed. Thus, this study sought to expand the literature-base on the impact of study abroad programs for pre-service special education teacher candidates and to provide strategies for focusing on the development of global competence in pre-service special education teacher candidates. Specifically, we sought to explore how a study abroad experience in Denmark impacted the cultural perceptions and development of global competence among pre-service special education teacher candidates.

Method

Participants

The participants included 14 pre-service special education teacher candidates specializing in cognitive impairment (i.e., intellectual disability) and emotional impairment (i.e., emotional-behavioral disorders) (Table 1). All participants were junior and senior-level undergraduates attending a mid-sized public university located in the Midwest.

Table 1. *Participant Demographics*

<i>Participant</i>	<i>Gender</i>	<i>Native Language</i>	<i>Second Language(s) Studied</i>	<i>Ethnicity</i>	<i>Age</i>	<i>Travel outside US</i>	<i>Special Education Specialization</i>
A	F	English	Spanish	White	22	None	CI
B	F	English	Spanish	White	22	None	CI
C	F	English	N/A	White	23	Canada	CI
D	M	English	N/A	White	23	Czech Republic, Ireland, Hungary, Austria, Netherlands, Germany, Mexico, Canada	CI
E	F	English	Spanish	White	22	Sweden	CI
F	F	English	Spanish, ASL	White	21	Canada	CI
G	F	English	Spanish	White	22	Canada	CI
H	M	English	N/A	White	21	Bahamas, Mexico	EI
I	F	English	N/A	White	21	Ireland, United Kingdom, France, Switzerland, Italy, China, Canada	CI
J	F	English	ASL	White	21	None	CI
K	F	English	Spanish	White	22	Chile, Switzerland, Netherlands, Czech Republic, Germany, Canada	CI
L	F	English	French	White	22	Canada	CI
M	F	English	ASL	White	23	Kenya, Mexico	CI
N	F	English	Spanish	White	23	Brazil, Mexico, Kenya	CI

Note: F = female; M = Male; ASL = American Sign Language; CI = Cognitive Impairment; EI = Emotional Impairment

Prior to the study abroad experience, participants completed a survey that asked questions such as, “What are you expecting to gain from this trip?”, “What are some of the challenges you expect from this trip?”, “Why did you choose to enroll in this program?”, and “How do you foresee this experience fitting into your future career?”. Participants responded they expected to gain “different perspectives,” “think outside of comfort zone,” and “to expand...knowledge about systems of special education and teaching students with severe disabilities.” Participants expressed concerns about challenges they might face, such as encountering a different and unfamiliar language and culture, as well as concerns about traveling with a group of unfamiliar peers. In response to the question about enrolling in the program, participants expressed a desire to learn about different cultures and enthusiasm for participating in the first special education specific study abroad experience offered at their university. Participants responded they expected the experience to fit into their future careers as special educators by providing a different view on educating students with disabilities. One participant explained that she foresaw the experience as “giving me the helpful hand to be more open and more knowledgeable in situations in the classroom.” Another explained, “I will understand the importance of diversity ... in the classroom,” an idea that was repeated from several other participants.

The researchers’ relationships with the participants were instructor-student. The first two authors co-led the study abroad experience to Denmark. Participant inclusion in the study procedures was voluntary and did not result in extra credit. In order to provide anonymity to those participating in the study, all students who participated in the study abroad experience

received study materials. The materials provided by those who had not consented to participate in the study were destroyed. In addition, participants received a numerical code to include on all study materials to provide additional anonymity. The link to the participants’ names and codes was kept on a password-protected computer in a file separate from study materials.

Ethical Considerations

All study procedures were approved by the Institutional Review Board at Central Michigan University.

Study Abroad Program

Historically, study abroad programs were not available for pre-service special education teacher candidates at this university. This study abroad program presented the first opportunity for students studying special education to participate in a study abroad program designed specifically for their major in special education. The program itself consisted of two core courses in the special education program- including one course on characteristics of students with intellectual disability and one on methods of teaching students with intellectual disability. Prior to the start of the core courses, the program group completed a one-day orientation including team building exercises and an introduction to Denmark, including discussion of current issues, culture, education, monarchy, as well as a video conference with two Danes for a brief primer on Danish language and cultural norms. Each of the two courses began on campus, lasted for one week, and were delivered in the traditional manner focusing on the US context of the content. The program in Denmark lasted 12 days and consisted of various pre-planned content and context-related field trips in Copenhagen and Aarhus. The content-related visits included a disability-related museum tour,

presentations from the Ministry of Education and a national disability advocacy organization, as well as presentations, discussions, and collaborations with a teacher education institution and a special school for students with intellectual disability. The context-related visits included exploring the cities and the culture through food, using public transportation, visiting museums, and spending time with Danes.

Data Collection and Analysis

Data were collected through Journal Reflections, Class Reflections, and Mind Maps. *Journal Reflections* comprised seven open-ended writing prompts adapted from Johnson & Battalio (2008) and were intended to allow the participants to reflect on their experiences while studying abroad. The questions included in the journal can be seen in Table 2. *Class Reflections* were two open-ended reflections that were required as part of the courses (a course on the characteristics of students with intellectual disability and a course on instructional methods for students with intellectual disability) associated with the study abroad

trip. *Mind Maps* (or concept maps) are graphic organizers that allow for a visual representation of ideas about a central topic and can represent relationships between concepts and important details. The central topic of the mind maps for this study was “inclusion.” Mind maps were incorporated into the data collection as a means of further examining participants’ ideas about “inclusion” before and after the study abroad experience (i.e., pre and post). Participants were given a sheet of paper with the word “inclusion” encircled in the middle and asked to map out their ideas and knowledge on inclusion. *Mind Maps* were used to contribute to the qualitative analysis by providing a visual representation of the ways in which participants conceptualized issues specifically related to inclusion.

After data were collected, the research team met as a group using open coding to code participants’ comments within the journal and class reflections. Then, each team member read journal reflections and class reflections independently and developed a list of possible codes based on their reading (Miles & Huberman, 1994). Following the

Table 2. *Journal Reflection Writing Prompts*

Writing Prompt	
1	What differences have you seen in culture or the educational system between the United States and Denmark?
2	How are you reflecting on your ideas about the inclusion of students with severe disabilities in the United States?
3	How are your experiences affecting how you view your own culture?
4	How are your experiences affecting how you express your special education philosophy?
5	How will your special education practice be affected when you return to the United States?
6	Do you have any specific stories about any of the things that have happened in Denmark?
7	Other thoughts, ideas, challenges, experiences you would like to share?

independent reading, the team met and discussed the codes and agreed upon a final set of codes. Team members then individually re-coded the journal and class reflections. Following the re-coding, the team met again to discuss codes and determine potential themes. Team members then discussed all disagreements in coding and eventually came to a consensus regarding codes. The team discussed the processes used by participants and looked for themes across the data.

Mind Maps were analyzed using a combination of methods described by Correa and colleagues (Correa, Hudson, & Hayes, 2004) and Miller and colleagues (Miller, Koury, Fitzgerald, Hollingshead, Mitchem, Tsai, & Park, 2009) and a visual analysis of the pre- and post-mind maps to evaluate differences and identify ideas expressed in the maps. The research team discussed similarities and differences both between and across pre- and post-mind maps, focusing specifically on the theme of inclusion. Because only a few Mind Maps were returned post-trip, the data for Mind Maps were used only to confirm findings for the “Inclusion” theme.

A constant comparative method of analysis (Miles & Huberman, 1994) was utilized to describe themes and processes emerging from the data. The research team coded re-typed and de-identified journals and class reflections using an open coding system. The team used low-inference descriptors on paper in order to capture what was emerging in the data. The team then met to discuss concepts and ideas that emerged from the low-inference codes and developed new codes. The team then examined all coded excerpts, looking for themes and categories using a “cutting and sorting” technique where each participant’s data was printed onto paper. Next, important excerpts were

manually cut into strips by team members and the strips were placed into piles of similar excerpts. Then each pile was named – representing the final themes. Data were triangulated across journals, class reflections, and mind maps.

Results

A total of three completed journals, 28 reflections, 14 pre-trip mind maps, and four post-trip mind maps were collected. Mind maps were used primarily as a confirmation of themes found under “Inclusion.” Four major themes emerged from the data for this study: Inclusion, Curriculum and Instruction, Professional Role, and Disability. Within each theme, participants engaged in different processes including revealing insights into the theme, examining cultural differences and similarities, applying ideas and themes toward the special education profession, and expressing points of conflict or concern. A description of each theme, along with sub-themes that emerged, is found in the following section.

Theme 1: Inclusion

While inclusion was a focus for the Mind Map and was a specific question in the Journal Reflections, the theme of inclusion was discussed in multiple sources and was a strong theme across participants. Participants focused highly on two specific content-related visits: a site-visit to a special school for students with disabilities and a visit with a local university campus. Within the theme of inclusion, specific sub-themes emerged. These sub-themes included inclusion and social interaction, inclusion and its interpretations, and inclusion and aspirations for the future.

Social interaction. Participants struggled with the idea that someone could express support of inclusion and yet also support the individual needs of students with disabilities.

These reflections focused mainly on the content-related site-visit to a special school for students with disabilities. During this visit, we visited the school during the day and during after-school activities, including an evening dance.

Something we talked about...after visiting [the school and afterschool club] was the fact that [the] only people we saw at the school were the students and staff members. There were no people there that weren't paid to be there with the students... I personally think the club was an amazing thing for these students because as much as social interaction and good role models are important for our student, they also need to be with their peers that have similarities with them.

This struggle between seeing the need for inclusion and wanting to meet the needs of individual students with disabilities was repeated throughout the journal and class reflections. One participant reflected on this dissonance by stating while we might have a disagreement with the segregated placement, "we also have to recognize that the students did seem to be happy and thriving in that environment." Others sought to resolve the dissonance by reflecting on their desire to start a similar program in the future careers that would include peers without disabilities. One participant reflected on a particular aspect of the evening dance:

Later in the evening we got to witness the [school] nightclub for the older students...The students danced the night away to their choice of hit electronic music songs. The concessions served things such as popcorn and pop, and beer. Seeing students with special needs drink beer and dance around a nightclub environment was a very foreign idea

to me, but an idea that I really like. [The school] focuses on letting these students with disabilities live their life the way they want to and giving them every opportunity to do the things that anybody else does.

Interpretations. This sub-theme emerged as participants discussed visits and conversations that developed over defining inclusion and ways individuals (and countries) appear to interpret "inclusion." The reflections came from content-related visits with other university students at the local university. Within these visits, participants interacted with students from Denmark as well as other international students studying in Denmark from countries such as Ghana, Turkey, India, and the Philippines. One participant reflected:

When we got into small groups to discuss...it was really awesome to be able to talk with other students from other countries and get their perspectives...What stood out the most in my mind from that activity was how different everyone [sic] interpretation of Inclusion is.

Another participant, following the activity described above, sought to bring together a more universal interpretation and definition of inclusion.

I think across the entire globe we who work with individuals with special needs, aim to reach the goal of inclusion. Despite using the word inclusion too loosely, I think that it means to be interacting and participating with typically developing peers in social and academic settings.

Aspirations. As participants reflected on inclusion, many described a hope for building a more inclusive society.

[Inclusion] begins at a young age in the classroom. If students are accustomed to having peers with disabilities in their everyday lives, they will know how to respond and interact with them...Students with disabilities will also have the same opportunities as very other student.

Another participant described how society could provide “reasonable adjustment[s]” and inclusion could become more universal. The participant went on to support the idea of providing these accommodations as being simple to employ and reflected on her experiences with her peers training to be general education teachers in her classes.

I feel that, as special educators, most of us become easily frustrated when students of general education in our classroom do not believe that they will be working with students with disabilities...[Strategies] are easy to learn and would most likely assist all students in their classrooms, not just those with disabilities.

Overall, participants reflected on inclusion through views of inclusion by way of social

interactions, differences and similarities of the idea of inclusion around the world, and recognition of the universality of the goal of inclusion.

Since the Mind Maps utilized the central concept of inclusion, the mind maps were used as confirmatory support for the theme of inclusion. Prior to the study abroad experience, participants’ Mind Maps reflected sparseness in the development of concepts and ideas related to inclusion (Figures 1 and 2). Participants’ concepts and ideas of inclusion related generally to concepts found in IDEA (Individuals with Disabilities Education Act) such as free and appropriate public education (FAPE), least restrictive environment (LRE), and accommodations (IDEA, 2004). Other concepts and ideas reflected in pre-trip Mind Maps were “acceptance of everybody,” “integrating,” “no one left out,” “different learning styles,” and “collaboration.” Overall, pre-trip Mind Maps reflected concepts and ideas on inclusion that were US-based.

In the post-trip Mind Maps, a deeper reflection of concepts and ideas related to

Figure 1. *Pre-trip Mind Map*

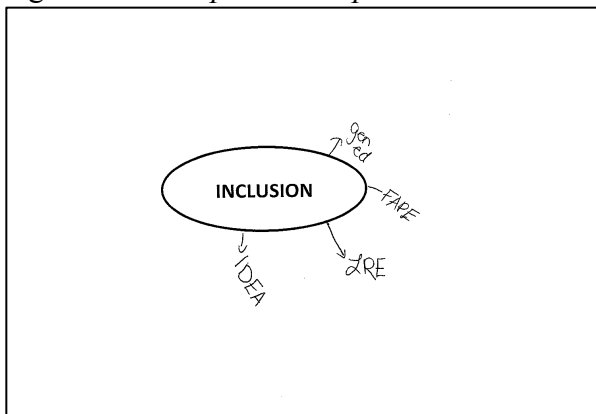
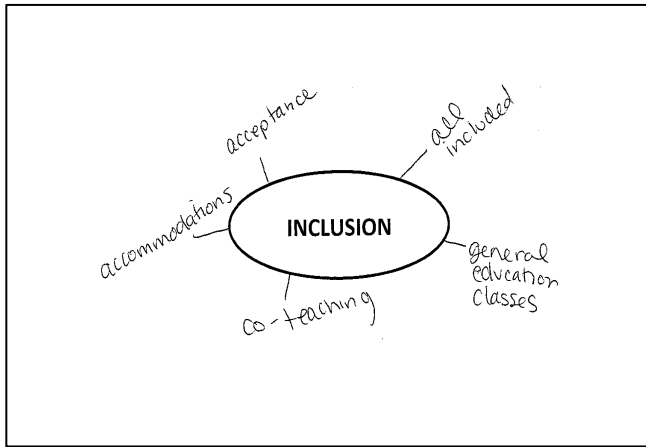


Figure 2. Pre-trip Mind Map



inclusion was evident in not only the visual analysis (i.e., an analysis of the number of nodes present in the Mind Maps) but in the comparisons and contrasts drawn between the US and Denmark. In Figure 3, comparisons between the countries occur within concepts and ideas reflected on

specific nodes (e.g., the concept of “mainstream”). In another example, Figure 4 shows a Mind Map in which both countries are represented by individual nodes with comparisons and contrasts made through the development of concepts and ideas.

Figure 3. Post-trip Mind Map

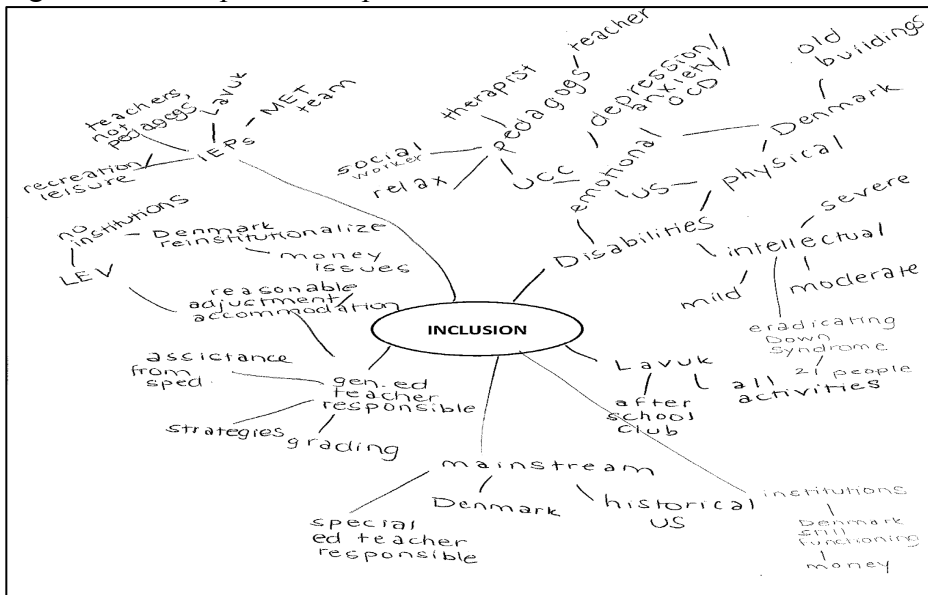
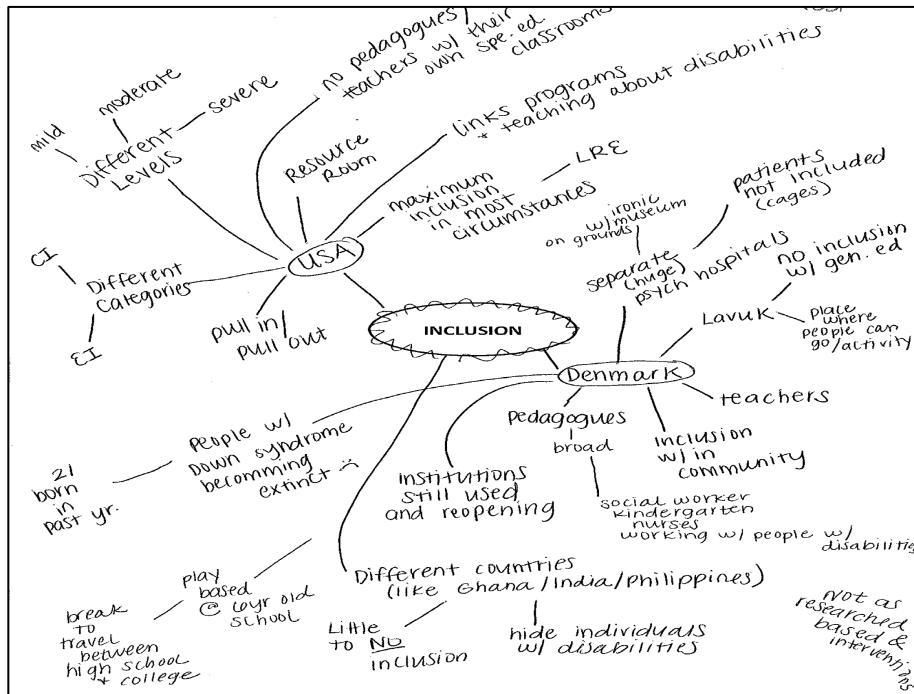


Figure 4. Post-trip Mind Map



Overall, there is a difference between pre-trip and post-trip Mind Maps, demonstrating an expansion of global-mindedness of concepts and ideas related to inclusion.

Theme 2: Professional Role

Participants reflected on their changing perspectives toward the professional role of special educators throughout the study abroad experience. As they encountered a variety of opportunities, such as meetings with the Ministry of Education (Undervisnings Ministeriet), administrators and pedagogues at a special school, and a disability advocate as well as interactions with Danish and other international students, participants' views toward their role as a special educator underwent adjustments and transformations. Sub-themes emerged that included advocacy, the Danish pedagogue profession, cultural sensitivity, and

aspirations for their future role as special educators.

Advocacy. As participants gained experiences over the course of the study abroad program, many began to reflect on the depth and breadth of knowledge needed to be an effective special educator as well as the need to be an advocate for their students with disabilities. One reflected on a goal of special educators being “to improve the lives of those with disabilities and give them a place to feel comfortable and valuable in society.” Others described their need to be advocates for including students with disabilities in their future schools and districts, stating:

I will be an advocate for including students with disabilities in every way possible. I want this to be an ideal in the school I will work in. It is crucial that we are raising children

to understand differences among people and show respect to everyone. I want to create a culture of equality...Teaching everyone about disabilities and how to respond will create a culture of compassion, respect and equality. I want to have this within my classroom. I want to raise the generation to accept all disabilities.

Pedagogue profession. One topic that received much discussion and reflection was the profession of the *social pedagogue*, a profession in Denmark that involves a wide span of possible occupations, from working with children and youth with disabilities in schools to working in nursery schools with young children to working with the elderly. In the US, we do not have an exact match to this profession, though it can be compared to the work found in the field of social work. Participants reflected on learning about this profession, demonstrating a struggle with finding a comparison with the US and reflecting on how a profession such as the social pedagogue might be of value in the US.

I believe a challenge I had at the beginning of the trip was understanding the idea, concept and definition of a pedagogue. It was difficult to understand and relate to because there is no such profession in the United States.

Others continued to reflect as their understanding deepened after visits with social pedagogue students and professionals and began to make connections between their role as a special educator and the work of social pedagogues. One participant reflected, “I think looking at the Pedagogue career has opened my eyes to different things I can work on in my classroom.”

Aspirations. Participants reflected on how they might apply their new knowledge to their profession of special education. Specifically, participants described how they would infuse the Danish perspective of the importance of social instruction and development into their curriculum. One participant reflected, “My new goal is to supplement or enhance the academic content with more social activities/experiences.”

Theme 3: Curriculum and Instruction

The theme of curriculum and instruction emerged from participants’ descriptions of perspectives in the areas of educational experiences (i.e., curriculum) and various instructional practices, specifically as it affects the theories and practices of specialized instruction. Similarities and differences in the area of instruction between the two countries were considered in terms of content (i.e., what is taught) and context (i.e., where and by whom the instruction occurs). Specific sub-themes emerged that described participants’ grappling with a focus on functional life skills versus academics, participants’ identification of specific instructional strategies being used in content-related site visits, and participants’ reflection on behavior management strategies.

Functional life skills vs. academics.

Program participants began to contrast the US educational system’s focus on academics with the curricular focus on functional life skills seen in their program content-related visits. While some participants expressed this observation may be an artifact of the specific site visits, they still reflected on their observations. One participant reflected:

I am not sure if that [sic] is the case, but I have learned that the school systems in Denmark are a bit different from the U.S. because they have more emphasis on functional

life skills more so rather than academics. In the U.S. there is a ton more focus on academics. The U.S. stresses the students as well as the teachers out with the amount of academics that they expect us to teach and the students to learn. I find that Denmark's system is more relaxed and I think this is a good thing because I believe that when you are stressed you don't learn as much as when you are relaxed learning.

Another program participant noticed the order in which curricular focus was discussed at a presentation by the special school visited during a content-related site visit.

Something that I noticed during the [presentation] was the slide that featured what students are taught during school, and academics such as math and science were at the bottom of the list, underneath items much more practical for these students that focus on their well-being and life skills. I couldn't stop myself from thinking that if we were visiting a school in the United States, that list would look much different.

Other participants noted the more holistic approach to teaching students presented at the school site visit, as well as at a university presentation, that involved teaching free time skills as well as the considerations for post-secondary quality of life.

I particularly liked when we talked about teaching these students how to use their free time. I believe that this is something we should consider in the United States... it seems that our students in the United States really struggle with finding activities that they enjoy and living on their own.

Instructional strategies. As participants began to interact with professionals and with students with disabilities in their content-related site visits, they began to describe specific instructional strategies they observed and to describe ways in which strategies they have learned about in course could be applied in different ways. For example, after a visit to a Friday night dance for the club members from the special school, one participant noted:

When a boy asked to dance with me at the dance it triggered me to think about how beneficial a task analysis sheet could be done [sic] for the process of asking someone to dance. It would be quite simple to make and follow. It is also a skill that could transfer across settings, so it would be helpful to have a task analysis for it.

Participants began to imagine their future classrooms and in their reflections demonstrated a shift in thinking toward their future students with disabilities. One participant noted, "In my future classroom, I want to do my best to give my students a choice when appropriate... I want to cater more to student interest." Another participant, after observing students at the special school engaging in recreation and leisure activities, noted the variety of activities available to meet different needs:

After watching the [scooter] races for a while, I was able to see some students in a more laid back environment. I went into the art room, and students were relaxed and working on individual projects. Some students were drawing, some were making jewelry, and some were listening to music and singing. Everyone was very content and didn't need to be in the commotion that was going on in the gym.

Behavior management. Several participants held discussions with pedagogues at the school site visit regarding the ways in which the pedagogues manage behavioral issues at the school. One participant described feelings of solidarity when discussing behavioral issues with a professional at the school:

Although we saw the students at their best, dancing and playing games, one of the [pedagogues] there did mention how [the students] do get meltdowns and [the pedagogues] do have to deal with behavioral issues...It was cool to see that although they are in another country, these [pedagogues] are dealing with the same things we are in the classroom.

The program participants also reflected on discussions with pedagogues regarding how behavior is managed in their school. In some cases, participants contrasted the descriptions the pedagogues gave with their impression of behavior management in the US.

I spent quite a bit of time talking with a pedagogue... She said that they rarely use physical force, even if students are not cooperating with going to another classroom or activity. They would prefer to clear the room, if the student may harm themselves or another student, and they rationally talk about why it would be a better choice to go somewhere else. From my observations in the United States, we use physical force quite quickly if students are not making the choice we want them to, which is not necessarily teaching them how to succeed.

Theme 4: Disability

Participants reflected on their understanding or conception of disability and how that understanding impacted their expectations for individuals with disabilities as well as their understanding of societal expectations for individuals with disabilities. Participants encountered a variety of experiences, such as a site-visit to a special school for students with disabilities and a visit with a local university campus, which challenged their notions of what individuals with disabilities are “expected” to do in the US compared to Denmark. Specifically, participants expressed surprise or disbelief at some of the activities and behaviors that individuals with disabilities in Denmark engaged in; however, these reflections seem to indicate a generally positive attitude. Within the theme of disability, specific sub-themes emerged. These sub-themes included global/cultural conception of disability, sexuality, disability expectations, Down syndrome, and institutions. Within the Down syndrome and institutions sub-themes, a subtle inclusion discussion was also apparent.

Global and cultural conception of disability. Many participants discussed their experiences learning about special education in other countries as they had an opportunity to engage in conversation with other students from around the world (i.e., Denmark, India, Ghana, Turkey, and the Philippines) who were studying to work with individuals with disabilities. One participant noted, “It was really awesome to have the experience to talk with students in other countries about how their schooling and how students with disabilities are treated.” As a result of this discussion, participants noted some significant differences in the ways students with special needs were treated in other countries. One participant stated:

During our session we got to meet with people from all over the world. This was probably my favorite part. I found it so interesting to not only learn about the Danish education system and culture but also about Ghana, India, and the Philippines. In my session there was a student named [name redacted] from Ghana. She spoke about what their education system is like in Ghana. She said that there is really no special needs teacher there in Ghana. They have a few teachers who are trained to recognize disabilities such as dyslexia, a student who might be visually impaired, blind or deaf. Other than that they do not really provide any extra support [other] than realizing that a student has a disability. After hearing about that we asked, well what do you do with your students who are more severely impaired such as students with intellectual disabilities? She told us that those students usually just stay home. They are hidden away because they are a shame to their family.

Participants also reflected on their conception of disability and how their view and understanding of disability was narrow and limited; however, for some participants, this view was broadened after a visit with educators at a local university campus. For example, one participant stated:

It really surprised me that the Danish view people with ADHD, OCD, anxiety, and depression as a disability. It was hard for me to look at those disorders as disabilities. I can understand the disorders hindering their learning, but I do not see it as our responsibility to help treat them. I have a narrow-minded perspective that doctors and

therapists should be responsible for those disorders... I now have a more open perspective on how we can support people with special needs. I have been so focused on disabilities that effect cognitive function that I did not consider other disorders as impairments.

Sexuality. Students at a local university in Denmark gave a presentation on sexuality issues and needs for individuals with disabilities that was of interest to most of the participants and received much attention in their reflections. What seemed to be most reflected in participant statements was the fact that they were unsure if individuals with disabilities had the same sexual needs as those without disabilities. Many participants indicated that although sexuality is a taboo subject, they believe individuals with disabilities should have the right to develop and participate in intimate relationships. One participant reflected:

I was really excited to hear their presentation for two reasons: 1) I know sexuality can be a taboo topic and I'm glad we would be able to talk and learn about it and 2) I wanted to see the opinions and perspectives of the Danish students on the topic, rather than only hearing from a biased American perspective. The students made a really creative video including drawings and simple statements about students' right to have sexuality [sic], treating it as a basic need. The students even compared a person's sexuality to the basic need for eating and drinking. Just as you wouldn't take away water from a person who is thirsty, the video explained that a person with sexual desires should not be taken away the chance to fulfill those desires... Students with disabilities

have desires, emotions, attractions, and needs to fulfill just like any other person. They also deserve the freedom and independence to choose to act on those emotions and desires just like any other person. I think this topic can be very taboo because we as educators either assume persons with disabilities don't have those same feelings, or we decide it is just easier to ignore the feelings and not get too involved with personal issues. Unfortunately, these actions may mean that we tend to treat persons with disabilities less as persons and more as children who do not have the independence they ought to have... I think our discussion became very honest and it was really neat to see that although we live in different cultures, the issues and "taboo" topics are still the same, and -more importantly- they need to be brought up and worked through.

Disability expectations. Participants had the opportunity to visit a special school for individuals with disabilities that also served as a social club for the students on the weekends. During this visit, participants indicated that they observed behaviors and activities that were not typical for students with disabilities in the US. They grappled with whether students with disabilities should be given opportunities to engage in these activities in the US. For instance, participants reflected on the dance club that allowed students with disabilities to engage in activities that were similar to those that would be engaged in by students without disabilities. One participant noted:

On Friday nights, the facility puts on a dance "club," where the members can come to dance, play games, and just have a great time. This was by far my favorite part of the visit,

watching these individuals dance and have fun with one another was such a rewarding experience. Not only does this provide them with the opportunity to partake in social activities, but it gives them a chance to act like any other young adult. While I was there, everyone was dancing and having a great time, and it did not matter if you had a disability or not. An activity like this has the power to bring people together, no matter the circumstances, and for that short amount of time, everyone is the same in some way. We were all there to be social, dance, play games, and have fun with one another.

Many participants shared similar thoughts and indicated that students with disabilities should be allowed to engage in activities and behaviors similar to those of their peers without disabilities. However, several participants discussed that as future special educators they will need to "find a balance." As one participant reflected:

Teachers and parents are always caught between letting their students/children win and giving them opportunities to feel successful and proud, verses giving them times to feel as if they need to work hard for what they want rather than assuming anything they want will be given to them simply because of their disability.

Consequently, a few participants indicated that students with disabilities who choose to engage in those activities and behaviors should also face similar consequences (e.g., experiencing joy, success, failure, or harm). One participant noted:

These situations can be great for the students with special needs because

it makes them feel good, yet I believe teachers must give students opportunities to try really hard and still fail. If teachers and schools are pushing for inclusion that should mean persons with special needs should experience similar triumphs and struggles typically functioning persons experience.

Down syndrome. One major area of concern for participants was the focus on Down syndrome. In Denmark, and similarly in the US, attempts have been made to decrease the population of individuals with Down syndrome by encouraging women to consider terminating pregnancies with fetuses identified with Down syndrome (Crombag, Bensing, Iedema-Kuiper, Schielen, & Visser, 2013; Natoli, Ackerman, McDermott, & Edwards, 2012). After a visit to a local university where there was a discussion of Down syndrome, several participants noted, “Only 21 individuals with Down syndrome were born in Denmark in the past year.” Participants seemed to grapple with the idea that the country of Denmark was pro-inclusion, yet was at the same time “getting rid” of individuals with Down syndrome. As one participant reflected, “In my mind, I think that is terrible, but it's hard to place judgment when you're an outsider to the culture and country. Despite hearing that Denmark is all for inclusion, this is the complete opposite.” Similarly, many participants expressed disbelief and discomfort with the idea that attempts were made to decrease the population of individuals with Down syndrome. One participant reflected:

When the topic of Down syndrome came up in conversation, I was in shock. That may have been one instance where I felt a little uncomfortable based on my personal beliefs. The thought of people with

Down syndrome becoming “extinct” is scary and is something I do not agree with. Although most of the students and lecturers there seemed to be against the issue, the Danish culture seemed to be more accepting of terminating births of babies with Down Syndrome overall.

This quote is representative of the majority of the participants’ feelings on this issue. This issue represented a topic of significant conversation throughout the program. While the issue of genetic testing and abortion rates was introduced in the context of Denmark, group reflection extended the conversation to include comparison of the issue in the US.

Institutions. Within their reflections, participants gave attention to a presentation they heard on the history and treatment of individuals with disabilities in Denmark and compared that to their knowledge in the US. One topic that received much attention was the current use of institutions in Denmark as one participant noted, “I was somewhat shocked to see that institutions seem to be well off and running in Denmark.” In addition, several participants noted a number of similarities based on their understanding of the treatment of individuals with disabilities in the US compared to Denmark. For instance, many participants discussed issues such as sterilization, segregation, institutions and the Eugenics Movement. One participant reflected:

The presentation went on with a woman describing and explaining the history of people with disabilities. I am pretty sure I was nodding my head in agreement the entire time because it was so closely related to the history of people with disabilities in the United States- basically everything we had talked about

during class...two weeks before we left for Denmark. She mentioned that at one point only women with mild intellectual disabilities were placed on an island. I found it extremely interesting that it was women with mild intellectual disabilities and not people with more severe disabilities. She said that they did that because they wanted to keep women separate so there would be no reproduction. The presentation also mentioned sterilization and eugenics, which matched the history from the U.S. As the presentation went on, it continued to get better, as in seclusion and sterilization were ending and more inclusion seemed to come into place. This also reminded me of how the United States began to make laws that in turn helped produce and construct inclusion even more.

Discussion

In this pilot study, we sought to examine the perceptions of pre-service special education teacher candidates as they participated in a special education-focused study abroad experience. We were particularly interested in the impact on cultural perceptions and the development of global competence among pre-service special education teacher candidates participating in a study abroad experience in Denmark. We were also interested in expanding the literature on study abroad experiences specifically designed for pre-service teacher candidates in special education.

Cultural Perceptions and Global Competence

The variety of content-related and context-related sites visited provided participants with an opportunity for a comprehensive study abroad program. Indeed, the variety of

experiences participants had in this study abroad program was identified as essential to expanding their understanding and perceptions, “I don’t think we would have been able to get as clear of a picture of the educational system if we didn’t get a chance to visit such a variety of environments and types of support systems.” While there are limitations based on the amount of time and depth of experiences afforded, the overall experience of this program provided an opportunity for participants to expand their cultural perceptions and begin to develop global competence. Consistent with the literature, exploring typical course content in an unfamiliar context, Denmark in this case, proved to deepen the critical analysis and overall understanding for participants (e.g., Brindley, Quinn, & Morton, 2009; Mapp, McFarland, & Newell, 2007).

Participants frequently noted differences between the US and Denmark, both in comparisons of the educational system and in culture. Some participants noted differences in the social norms of both cultures and ways these norms might impact views toward education. One participant observed the “competitive” nature of US academics in contrast to a “hands-on and play-based” focus in Denmark. Participants also reflected on their shifts in perspectives following discussions with university students from other countries. Through these discussions, program participants began to recognize similarities and differences in perspectives toward disability, inclusion, and professional roles in special education. One participant noted:

This experience showed me the strong views of different cultures. This could help me when dealing with parents from different cultures. Though I may not agree with their way of thinking, this experience will help to at least understand their point

of view more. I was never aware before this program how much cultural beliefs played a role in the education system.

Another participant more strongly emphasized the importance of the study abroad experience in her future role as a special educator through not only the impact on her future classroom but also the impact on her future as an advocate.

I will use this in the classroom because I will emphasize the importance of understanding different perspectives. It is easy to say that something is not right or judge how a culture views a topic. Understanding their history and culture allows one to shape their own viewpoint... I will be a strong advocate for equality and inclusion for people with disabilities because I have a greater understanding of someone else's culture and viewpoint. I do not have to agree with their norms, but it is important for me to listen and respect them. This is an overarching ideal that I want to convey in my classroom and within the Special Education field.

Some program participants demonstrated an evolving global competence, particularly in the theme of curriculum and instruction. One participant noted the realization that their experiences with students with disabilities mirror those of professionals in Denmark, demonstrating a global perspective on education and services for students with disabilities. Indeed, it is apparent through participant reflections of conversations with other professionals in special education that the participants expanded their view of special education from a US-centered viewpoint to a more global viewpoint.

As participants began to reconcile differences and notice similarities, they noted ways in which their experiences would impact their future classrooms. Ultimately, the goal of a study abroad experience for pre-service teacher candidates is to do just that – impact their instruction and, therefore, the learning environment for their future students. While most program participants focused on shifts in perspectives related specifically to disability and did not take the step toward applying this new lens to cultural differences (i.e., reflecting on ways in which they might use this new perspective to view cultural differences for students in their future classrooms), it is possible that the comprehensive experience of the study abroad program will provide a critical point in their training for them to use to make such applications.

Implications and Future Research Directions

Specific topics arose that participants identified as being areas of weakness in their teacher training program. While in some cases it may be that a topic was addressed in their teacher training program but the study abroad experience served as an opportunity to provide the information in a new way, this can serve as guidance for teacher training curriculum in the area of special education. One topic in particular described as an area of weakness by participants was in sexuality education. Participants described needing more information on sexuality education in their pre-service teacher training. Pre-service teachers who will be responsible for educating students with disabilities can be fearful or, at the very least, uncomfortable with discussing this taboo topic with students and their families. Indeed, some participants even expressed surprise at the idea their students with

disabilities would be sexual beings. Teacher educators should become responsible for making this topic less taboo by engaging in productive and informative discourse.

Another implication for teacher educators is a charge for incorporating a more global-minded approach to instructing pre-service teacher candidates. Specifically, incorporating a practice of examining disability through various cultural lenses. In this way, even without the opportunity for a study abroad experience, pre-service teacher candidates might have the opportunity to examine the constructs of disability through various viewpoints and through examination of a different educational system, leading to a greater understanding of similarities and differences between and among cultures. As participants in this study reflected on their experiences abroad, they experienced instances of cognitive dissonance as well as revelations of there being a wider world of special education and disability they had not considered.

Overall, for teacher educators, the implication of the results of this study is an examination of the curriculum for teacher training in special education. As participants reflected, they contrasted focus on academics with focus on functional life skills. For teacher educators, does this mean teacher training in special education should shift to a holistic or quality-of-life approach that focuses on academics as well as functional life skills? Or, are teacher educators responsible only for a focus on education-focused (i.e., academic) topics?

Researchers, who may also be teacher educators, might consider ways to incorporate study abroad experiences into their teaching and research agendas to further investigate the impact of short- and long-term study abroad experiences for pre-

service special education teacher candidates. These investigations can lead to further understanding of the ways in which cultural perceptions and global competence can be developed in future special educators.

To truly understand the link between study abroad experiences during teacher training and the effects on classroom teaching, researchers might consider ways to investigate the ways in which study abroad experiences impact classroom practices. By linking the practices of special educators who have participated in study abroad experiences, we might be able to draw conclusions about the long-term effects of participating in study abroad experiences for pre-service teacher candidates.

Limitations

While this pilot study has provided evidence of the impact of a short-term study abroad experience on the cultural perceptions and development of global competence for pre-service special education teacher candidates, there are limitations. The low return-rate has reduced the strength of the results and conclusions that can be drawn from the data. Future research might consider ways to better incorporate data collection with course requirements for study abroad experiences, reducing the work and time commitment for participants. In addition, results should be interpreted with caution due to the limited amount of time participants spent in-country. For instance, some of the perceptions of the participants may reflect a shallow understanding of the circumstances in the country due to the structure of the study abroad experience (i.e., traveling as a group, being led by university faculty, short period of time in-country).

Conclusion

This pilot study has provided additional information on the impact of a study abroad

experience for pre-service special education teacher candidates. It seems fitting to conclude with a quote from a participant

reflecting on the impact this experience, “I think that this experience has altered my view on special education in a global sense.”

References

- Anastasiou, D., & Keller, C. E. (2014). Cross-national differences in special education coverage: An empirical analysis. *Exceptional Children, 80*, 353-367.
- Billingsley, B. S. (2004). Special education teacher retention and attrition a critical analysis of the research literature. *The Journal of Special Education, 38*, 39-55.
- Brindley, R., Quinn, S., & Morton, M. L. (2009). Consonance and dissonance in a study abroad program as a catalyst for professional development of pre-service teachers. *Teaching and Teacher Education, 25*, 525-532.
- Correa, V. I., Hudson, R. F., & Hayes, M. T. (2004). Preparing early childhood special educators to serve culturally and linguistically diverse children and families: Can a multicultural education course make a difference? *Teacher Education and Special Education, 27*, 323-341.
- Crombag, N. M., Bensing, J. M., Iedema-Kuiper, R., Schielen, P. C., & Visser, G. H. (2013). Determinants affecting pregnant women's utilization of prenatal screening for Down syndrome: a review of the literature. *The Journal of Maternal-Fetal & Neonatal Medicine, 26*, 1676-1681.
- Etscheidt, S., Curran, C. M., & Sawyer, C. M. (2011). Promoting reflection in teacher preparation programs: A multilevel model. *Teacher Education and Special Education, 35*, 7-26. doi:10.1177/0888406411420887
- Forlin, C. (Ed.). (2012). *Future directions for inclusive teacher education: An international perspective*. New York, NY: Routledge.
- Individuals with Disabilities Education Act (IDEA), 20 U.S.C. § 1400 (2004).
- Johnson, L. E., & Battalio, R. (2008). Expanding the boundaries of special education preservice teachers: The impact of a six-week special education study abroad program. *International Journal of Special Education, 23*, 90-100.
- Jones, N. D., Youngs, P., & Frank, K. A. (2013). The role of school-based colleagues in shaping the commitment of novice special and general education teachers. *Exceptional Children, 79*, 365-383.
- Judge, S., & Oreshkina, M. (2004). Special education teacher preparation in Belgium, Russia, and United States: A comparative study. *Teacher Education and Special Education, 27*, 240-250.
- Jussim, L., & Harber, K. D. (2005). Teacher expectations and self-fulfilling prophecies: Knowns and unknowns, resolved and unresolved controversies. *Personality and Social Psychology Review, 9*, 131-155. doi: 10.1207/s15327957pspr0902_3
- Keengwe, J. (2010). Fostering cross cultural competence in preservice teachers through multicultural education experiences. *Early Childhood Education Journal, 38*, 197-204. doi: 10.1007/s10643-010-0401-5
- Lava, V. F., Recchia, S. L., & Giovacco-Johnson, T. (2004). Early childhood special educators reflect on their preparation and practice. *Teacher Education and Special Education, 27*, 190-201.

- Longview Foundation. (2008). Teacher preparation for the global age: The imperative for change. Retrieved from [http://www .longviewfdn.org/files/44.pdf](http://www.longviewfdn.org/files/44.pdf)
- MacDonald, V., & Speece, D. L. (2001). Making time: A teacher's report on her first year of teaching children with emotional disabilities. *Journal of Special Education, 35*, 84-91.
- Mapp, S. C., McFarland, P., & Newell, E. A. (2007). The effect of a short-term study abroad class on students' cross-cultural awareness. *The Journal of Baccalaureate Social Work, 13*, 39-51.
- Marx, H., & Moss, D. M. (2011). Please mind the culture gap: Intercultural development during a teacher education study abroad program. *Journal of Teacher Education, 62*, 35-47. doi: 10.1177/0022487110381998
- Mastropieri, M. A. (2001). Is the glass half full or half empty? Challenges encountered by first-year special education teachers. *Journal of Special Education, 35*, 66-74.
- Merryfield, M. M. (2000). Why aren't teachers being prepared to teach for diversity, equity, and global interconnectedness? A study of lived experiences in the making of multicultural and global educators. *Teaching and Teacher Education, 16*, 429-443.
- Miles, M. B., & Huberman, A. M., (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Miller, K. J., Koury, K. A., Fitzgerald, G. E., Hollingshead, C., Mitchem, K. J., Tsai, H. H., & Park, M. K. (2009). Concept mapping as a research tool to evaluate conceptual change related to instructional methods. *Teacher Education and Special Education, 32*, 365-378.
- Natoli, J. L., Ackerman, D. L., McDermott, S., & Edwards, J. G. (2012). Prenatal diagnosis of Down syndrome: a systematic review of termination rates (1995–2011). *Prenatal diagnosis, 32*, 142-153.
- Sadker, M., Sadker, D., & Zittleman, K. (2008). *Teachers, schools, and society* (8th ed.). New York, NY: McGraw-Hill.
- Santos, R. M., Ruppard, A. L., & Jeans, L. M. (2012). Immersing students in the culture of disability through service learning. *Teacher Education and Special Education, 35*, 49-63. doi: 10.1177/0888406411413143
- Sayeski, K. L., & Higgins, K. (2013). Redesigning special education teacher preparation programs with a focus on outcomes. *Teacher Education and Special Education, 37*, 91-105. doi: 10.1177/0888406413513274
- Schlichte, J., Yssel, N., & Merbler, J. (2005). Pathways to burnout: Case studies in teacher isolation and alienation. *Preventing School Failure: Alternative Education for Children and Youth, 50*, 35-40.
- Sobel, D. M., Gutierrez, C., Zion, S., & Blanchett, W. (2011). Deepening culturally responsive understandings within a teacher preparation program: It's a process. *Teacher Development, 15*, 435-452.
- Trent, S. C., Kea, C., & Oh, K. (2008). Preparing preservice educators for cultural diversity: How far have we come? *Exceptional Children, 74*, 328-350.
- Tyler, T. A., & Brunner, C. C. (2014). The case for increasing workplace decision-making: Proposing a model for special educator attrition research. *Teacher Education and Special Education, 37*, 283-308. doi: 10.1177/0888406414527118
- Vaughn, W. (2005). Educating for diversity, social responsibility and action: Preservice teachers engage in immersion experiences. *Journal of Cultural Diversity, 12*, 26–30.
- Wasburn-Moses, L. (2009). An exploration of pre-service teachers' expectations for their future roles. *Teacher Education and Special Education, 32*, 5-16.

Zhao, Y. (2010). Preparing globally competent teachers: A new imperative for teacher education. *Journal of Teacher Education*, 61, 422-431.

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Effectiveness of Using Video Modeling Booster Sessions to Maintain Vocational Skills

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Abstract: Improving independent completion of vocational skills is critical for individuals with autism spectrum disorders (ASD) and/or intellectual disabilities (ID) to obtain and sustain employment; however, another consideration is maintenance of those skills, particularly when there are interruptions in work schedules. The purpose of this study was to investigate the effectiveness of using video modeling “booster” sessions to maintain vocational skills of students with ASD/ID following a 12-week summer break. Six young adults participated and each was assigned two vocational tasks at his or her employment settings. Their independence with each task was measured prior to and following break and evaluated using a nonequivalent dependent variables design. One task was assigned to a control condition (no video) and the other was assigned to a video modeling booster condition (watching video model three times before going to work). Vocational tasks were counter-balanced across participants and order of conditions was randomized across employment sites. Results indicated that 5/6 participants increased independence following the video modeling procedure and 5/6 participants decreased performance with the control condition. A large effect was observed for one group ($d=2.12$) and a medium effect size was identified for second group when comparing treatment and control conditions ($d=0.54$) across order of conditions.

Employment rates for individuals with Autism Spectrum Disorders (ASD) and intellectual and developmental disabilities (IDD) are consistently lower than that of the general population (U.S. Department of Labor Statistics, 2015). Several studies document that young adults with low incidence disabilities tend to have even less than desirable employment outcomes than their peers with high incidence disabilities (Baer, Daviso, Flexer, Queen, & Meindl, 2011; Carter, Austin, & Trainor, 2012; Newman, Wagner, Cameto, & Knokey, 2009; Sanford, Newman, Wagner, Cameto,

Knokey, & Shaver, 2011; Wagner, Newman Cameto, Garza, & Levine, 2005). In a National Longitudinal Transition Study (NLTS-2), Sanford et al., (2011) found that young adults with IDD had an employment rate of 46% and young adults with ASD had an employment rate of 45.2% as compared to 70.7% of youth with learning disabilities. Unfortunately, employment trends for adults with ASD and IDD continue to lag behind their peers with milder disabilities and the general population (Cameto, Marder, Wagner, & Cardoso, 2003).

Although employment outcomes are less than optimal for young adults with ASD and IDD, research indicates that if these individuals are provided with adequate vocational training and support, they can be productively employed (Wehman, Inge, Revell, & Brooke, 2007; Wehman, Targett, & Young, 2007). Furthermore, if they have paid vocational experiences prior to graduation, young adults with ASD and IDD will be more likely to achieve better post-school employment outcomes (Carter, et al., 2012; Hasazi et al., 2005; Wehman, 2006). Due to the increased likelihood of improved employment outcomes, several researchers recommend that vocational programming and employment supports be provided before, during, and beyond high school (Carter et al., 2012; Lee & Carter, 2012).

One of the primary goals of vocational programming is to assist learners with performing their job-related tasks as independently as possible so that they can become competitively employed and sustain their employment while limiting their reliance on other personnel (Agran, 1997; Lancioni & O'Reilly, 2001). Several researchers have demonstrated the effectiveness of using technology-based interventions to increase independent participation and to support self-management of individuals with ASD and IDD while on the job. For example, several researchers have demonstrated the effectiveness of using picture and/or auditory supports presented on mobile devices for teaching job-related skills such as gathering carts, stocking, vacuuming, food preparation and cleaning (Cihak, Kessler, & Alberto, 2007; Lancioni, O'Reilly, Speedhouse, Furniss, & Cunha, 2000), pizza box assembly and software packaging (Davies, Stock, & Wehmeyer, 2002a), table setting, rolling silverware, and laundry (Riffel et al., 2005), hanging

slippers in a department store (Spence-Cochran & Pearl, 2009), and transitioning between job tasks (Cihak, Kessler, & Alberto, 2008; Davies, Stock, & Wehmeyer, 2002b). Other researchers have investigated the effectiveness of using technology-based interventions such as covert audio coaching (CAC) with the use of two-way radios to introduce antecedent prompts and feedback to employees with ASD who were learning skills such as sweeping, washing windows, collecting trash, and stacking crates (Bennett, Brady, Scott, Dukes, & Frain, 2010), performing in air-inflated mascots (Allen, Burke, Howard, Wallace, & Bowen, 2012), making photocopies (Bennett, Rangasamy, & Honsberger, 2013a), and folding t-shirts for display (Bennett, Rangasamy, & Honsberger, 2013b). All of these interventions resulted in improvements of employment-related skills for young adults and adults with ASD and IDD, which suggests that technology-based interventions may be effective for improving vocational skills.

Another technology-based intervention involves the use of video-based instructional procedures. Recently, several researchers have investigated the effectiveness of using video-based instruction to support and improve vocational outcomes of individuals with ASD and IDD in school and community-based employment settings. Video-based instruction is emerging as an effective instructional technique for teaching individuals with disabilities various skills. In the last decade or so, several researchers have conducted literature reviews (Ayres & Langone, 2005; Banda, Dogoe, & Matuszny, 2011; Delano, 2007; Hitchcock, Dowrick, & Prater, 2003; Mechling, 2005; Shukla-Mehta, Miller, & Callahan, 2010) and meta-analyses (Bellini & Akullian, 2007) demonstrating its effectiveness for improving the skill level of individuals with

disabilities across a wide range of skills and instructional domains.

One video-based instructional procedure that is frequently used to teach a broad range of skills is video modeling. Video modeling involves presenting a video of a skill sequence in its entirety and having learners watch the video prior to engaging in the task. Several researchers have used video modeling procedures to teach employment-related skills to individuals with ASD and IDD in both school-based and community-based settings (Alexander, Ayres, Smith, Shepley, & Mataras, 2013; Allen, Wallace, Greene, Bowen, & Burke, 2010; Allen, Wallace, Renes, Bowen, & Burke, 2010; Cihak & Schrader, 2008; Van Laarhoven, Winiarski, Blood, & Chan, 2012). Others have investigated the effectiveness of using a combination of video modeling and error correction feedback (e.g., reviewing video following repeated errors) (Van Laarhoven, Van Laarhoven-Myers, & Zurita, 2007), video self-modeling and instructor feedback and practice (Goh & Bambara, 2013), or by comparing video modeling and self-evaluation video feedback (e.g., recording and having employees review and evaluate their own performance) (Van Laarhoven, Kos, Weichle, Johnson, & Burgin, 2014). Some vocational tasks taught through video modeling in the above research studies included skills such as preparing family packs and first aid kits or making photocopies or sending a fax (Cihak & Schrader, 2008), performing in walk-around mascot costumes at department stores (Allen, Wallace, Greene et al., 2010; Allen, Wallace, Renes et al., 2010), mail sorting (Alexander et al., 2013), food portioning, preparation, and cleanup (Van Laarhoven et al., 2007; 2012), recycling, washing laundry, using a dishwasher (Van Laarhoven et al., 2012), rolling and sanitizing silverware (Van Laarhoven et al., 2007), delivering school

passes and using embedded social skills (Van Laarhoven et al., 2014), cleaning and sorting shoes, organizing book and fitting rooms, computer usage, and completing office tasks such as preparing conference packets, shredding paper, and photocopying (Goh & Bambara, 2013) with the majority of participants improving their independent performance when video modeling procedures were used.

Other researchers have investigated the effectiveness of teaching vocational skills to individuals with ASD and IDD using video prompting, which involves having learners watch short segments of the skill sequence to prompt responses during task engagement (e.g., watch a segment, perform the step(s), watch next segment, perform next step, and so on until the task is complete) (Bennett, Gutierrez, & Honsberger, 2013; Berezna, Ayres, Mechling, & Alexander, 2012). Others have taught vocational skills through a combination of video modeling and video prompting (Burke, Allen, Howard, Downey, Matz, & Bowen, 2013), video modeling and video/auditory prompting (Kellems & Morningstar, 2012), video prompting and error correction video feedback (Van Laarhoven, Johnson, Van Laarhoven-Myers, Grider, & Grider, 2009), or by embedding a video prompt within the context of a system of least prompts procedure (Smith, Ayres, Mechling, Alexander, Mataras, & Shepley, 2015). Some of the vocational skills taught through these video prompting studies included clerical skills such as photocopying (Bennett et al., 2013; Berezna et al., 2012), collating and stapling papers, organizing a binder, and preparing a letter (Smith et al., 2015), cleaning (Kellems & Morningstar, 2012; Van Laarhoven et al., 2009), stocking inventory, recycling, and polishing (Kellems & Morningstar, 2012), mopping and emptying trash (Van Laarhoven et al., 2009), and completing complex shipping

tasks (Burke et al., 2013). As was the case with the studies conducted using video modeling, the majority of research participants who participated in the video prompting studies, or a combination of video prompting and other procedures, improved their performance with their vocational tasks.

Based on available research, it appears that video-based instruction is an effective strategy for supporting employees in school and community-based environments. Although increasing independence with vocational skills is critical for gaining and keeping employment, another important consideration is the maintenance of those skills. This is particularly important when learners have interruptions in work schedules due to vacations, extended absences, or seasonal work schedules. Such interruptions have the potential to result in deterioration of performance if employees are unable to practice skills on a consistent basis. Deterioration in skill performance could result in the need for retraining, or increased support from job coaches or coworkers. These additional supports are expensive for employers and in some instances, may even lead to termination of an employee. It is critical for vocational coordinators, job coaches, practitioners, and employers to not only identify research-based strategies that will support and improve vocational skills for individuals with disabilities, but to also identify methods for maintaining and supporting these skills over time. In one research study, Van Laarhoven and colleagues (2012) investigated the effectiveness of using video modeling to maintain vocational skills of six high school students with ASD and/or DD over a two-week winter break. Each participant was assigned two tasks from their employment setting; one task was assigned to a video modeling condition and

the other was assigned to a control condition (no video). All participants reviewed a video of one of their job-related tasks at home during winter break (i.e., viewing the video a minimum of five times per week over a two-week period of time) and both tasks were measured prior to and following their break. Their level of performance was evaluated using a modified pretest post-test design, otherwise known as a nonequivalent dependent variables design (Coryn & Hobson, 2011). Results indicated that all participants increased their independence with both tasks following the video modeling procedure and that tasks assigned to the video modeling condition demonstrated a larger increase than the control tasks. The authors hypothesized that video modeling not only assisted with the maintenance of the task assigned to the video modeling condition, but also resulted in improved performance and response generalization of the control task.

The present study differs from the Van Laarhoven et al. (2012) study in several ways. In this study, data were collected on two different job-related tasks for each participant and her/his level of independence with each task was measured at the end of the school year and then again after a 12-week period of time or when she/he returned to school in the fall. Rather than reviewing their videos during break, when students returned after summer break, they were asked to watch videos of only one of their tasks at least three times (video modeling booster sessions) prior to going to work to determine if that would help them to maintain their skill level after an extended period of time not practicing it. In addition, the order of conditions was counterbalanced and randomly assigned to each employment site. Three participants at one site practiced the control task first (and did not watch the video task prior to engaging in it) and then

watched the video for their video task and their performance was measured following the viewing. The other three participants practiced their treatment/video task first and watched that video prior to engaging in both of their tasks (as we wanted to determine if it would promote generalization to the control task as it did in the original study). In addition, students in the present study were not given gift cards as a result of participation.

The purpose of this study was to investigate the effectiveness of using video modeling “booster” sessions to maintain vocational skills of students with ASD/ID following a 12-week summer break and to answer the following questions:

1. Will watching video modeling booster sessions following a summer break assist students in maintaining or improving their skill with tasks assigned to the video condition?
2. Will a 12-week break without practicing a skill result in deterioration of performance for control tasks?
3. Will the order in which videos are watched result in differentiated performance for the control tasks (e.g., will watching a video of their first treatment/video task result in improved performance or generalization to the second control task)?
4. Will participants perform better with the treatment/video task vs. the control task?

Method

Participants

Participants included six high school students with ASD and/or IDD who were participating in vocational training through their local public high school. The high school teachers, the second and third

authors, identified students for participation based on their difficulty with maintaining skills over time, particularly over extended vacations, absences, or long weekends. Permission slips were sent home to identified students, and those who returned informed consent and assent forms participated in the study. As a result, three males and three females participated in the study. Participants ranged from 15 to 19 years old and had a diagnosis of ASD, IDD, or a combination of those or other diagnoses (See Table 1). All participants received instruction in self-contained classrooms along with instruction in integrated general education classes, and were involved in either school-based vocational training, and/or participated in community-based vocational experiences at local area businesses. Three attended school at a large high school in the suburbs of Chicago and three attended a large semi-rural/suburban high school in northern Illinois.

Mick. Mick was a 15-year-old male with intellectual disabilities. According to Mick’s teacher, Mick did not read, but could auditorily comprehend language at around a 1st to 2nd grade level, and could complete single digit addition and subtraction problems with a calculator, or by using touch math. Mick required the assistance of a job coach to complete vocational jobs; however, he was able to independently stay on task for the majority of his classwork.

Nancy. Nancy was a 15-year-old female with a diagnosis of Autism. According to her teacher, she read at a Kindergarten level, and could complete basic addition and subtraction problems with use of a calculator. Nancy needed constant supervision for safety reasons as she had a tendency to wander when out in the community with a group, and was considered to be flight risk at home.

Table 1. *Demographic Information and Task Assignment for Participants*

Participant	Gender	Age	Diagnosis	Video Task	Control Task
Mick	Male	15	IDD	Counters	Mirrors
Nancy	Female	15	ASD	Mirrors	Counters
Nate	Male	19	ASD, Down Syndrome	Counters	Mirrors
Gary	Male	17	ASD	Staff Room	Conference Room
Elsa	Female	15	IDD, Seizure disorder	Conference Room	Staff Room
Anna	Female	17	ASD, ADD, Bi-polar disorder, and OCD	Staff Room	Conference Room

Nate. Nate was a 19-year-old male with a diagnosis of Autism and Down syndrome. Nate's teacher reported that Nate did not read, but could recognize pictures. Nate was non-verbal and used devices and strategies such as iChat, sign language, PECS, gestures, and reading of facial cues to communicate. Nate could successfully complete sort and match activities for math, and required one-on-one attention due to his severe challenging behavior.

Gary. Gary was a 17-year-old male with a diagnosis of Autism. According to his teacher, Gary experienced significant academic delays and benefited from an adapted curriculum. Gary demonstrated a higher level of independence when he was presented with visual materials and given a schedule of events. He experienced social delays, and struggled to engage in appropriate interactions with peers. Gary often relied on adult guidance to assist him with social interactions and assist him with independent skills across all types of environments.

Elsa. Elsa was a 15-year-old female with intellectual disabilities and a seizure disorder. According to Elsa's teacher, her educational performance was significantly impacted due to her intellectual and adaptive skill delays. Elsa's teacher also reported that Elsa had difficulty taking care of her personal needs, and required a high degree of structure and adult support to complete academic and vocational tasks.

Anna. Anna was a 17-year-old female with a diagnosis of Autism, Attention Deficit Disorder (ADD), Bi-polar disorder, and Obsessive Compulsive Disorder (OCD). Anna's teacher reported that she performed in the low to below average range in all academic areas, and that Anna demonstrated an inability to fully engage with her surroundings and to understand the consequences of her actions.

Setting

Three students, Mick, Nancy, and Nate, had vocational experiences in their vocational classroom at a large suburban high school

located in the western suburbs of Chicago. Mick and Nancy also had community-based jobs and Nancy also performed two additional in-school jobs; however, this study was conducted within the context of their vocational class and the cleaning mirrors and cleaning counter tasks were completed in the bathrooms located off the classroom and in the classroom kitchen, respectively. Three additional students, Gary, Elsa, and Anna, had vocational experiences within a large high school located in Northern Illinois. They all also had community-based jobs; however, this study was conducted within the conference room and staff room at their high school. The conference room contained several long rectangular tables and approximately 25 chairs that needed to be configured according to the types of meetings that were to be held there on any given day. One wall had a large white board, the back of the room had several windows, and the front of the room had a counter and cabinets containing supplies. The staff lounge was made up of two rooms. The front room had several counters and cabinets and was used primarily as a work space for faculty and staff. The back room, where the study was conducted, had approximately six round tables with five chairs around each, a kitchen area at the front of the room (with sink, counter, and cabinets, etc.), and windows along one wall.

Design

A nonequivalent dependent variables design (Coryn & Hobson, 2011) (also referred to as a modified pre/posttest control group design) was used, with one of the tasks serving as the control. Each student was assigned two vocational tasks at their employment settings and their independence with each task was measured prior to and following break. One task was assigned to the video modeling booster condition, while

the other task served as the control (no video) for each participant. With the nonequivalent dependent variables design, there is only one group of participants but two or more dependent variables. In the simplest variation, there is one dependent variable that is expected to be affected by the experimental condition and a second dependent variable, the control variable, which is not expected to be affected by the experimental condition. The control variable should be somewhat similar to the experimental variable in that it will be affected in the same manner by internal threats to validity such as history, maturation, and other threats inherent in single group pretest-posttest designs, which protects against threats to internal validity.

Task Selection and Assignment

Once students were identified for participation, the first, second, and third authors reviewed tasks the students currently performed at their respective work sites. Tasks that were already taught using video prompting procedures and that were similar in terms of complexity, number of steps, difficulty, and duration were selected as targeted skills. Pretest scores were calculated and used to measure the students' degree of independence with each task and to assign students' tasks to the different conditions for counterbalancing purposes. Three students were required to clean mirrors in bathrooms located off their classroom and to clean the kitchen counter in the kitchen area in their classroom. These tasks involved gathering cleaning supplies, moving items from the counter if necessary, spraying and cleaning surfaces, throwing away garbage, and returning cleaning supplies to their original location. Two participants working at the large suburban high school (i.e., Mick and Nancy) performed best with the cleaning mirror task. To assign tasks to the video versus no

video/control conditions, Mick and Nancy, who had the most disparate scores between tasks, had their tasks assigned so that one student had their highest scoring task assigned to the video condition, while the other had their highest scoring task assigned to the no video condition. This was done to reduce the influence of task difficulty on the outcome. The other student, Nate, had somewhat similar scores on both pretests and his tasks were randomly assigned to one of the conditions (Please see Table 1). Students performing in-school jobs at the other semi-rural high school (i.e., Gary, Elsa, and Anna) were required to prepare a conference room for meetings and to clean and restock supplies in the staff lounge. For the conference room task, participants were required to configure tables according to the type of meeting to be held the following day (i.e., IEP or staff meeting), cleaning tables, moving and adjusting chairs, cleaning white board, throwing away trash, and moving items to lost and found if necessary. In the staff lounge, participants were required to check and restock silverware, refill salt and pepper shakers, clean tables, throw away trash, and tidy up the area. All of these students performed similarly well with both the conference room and staff room tasks and their tasks were randomly assigned and counterbalanced across conditions.

Order of Conditions

Due to the fact that participants in the Van Laarhoven et al. (2012) study appeared to demonstrate generalization to the control task as a result of watching the video model of their video task, it was decided to have half of the participants engage in the control task prior to watching video models for the video/treatment task. This was done to negate the possibility of generalized responding and this group will now be referred to as group one. However, to determine if generalization could be

replicated as a result of reviewing the video model of the video/treatment task prior to the control task, the other participants engaged in the treatment/video task prior to the control task. This group will now be referred to as group two. The two different employment sites/groups were randomly assigned to the different order of conditions.

Instructional Materials

Videos were filmed in the employment environments where tasks were performed. The first author, an adult female, served as the model in the cleaning counters and cleaning mirror videos. She described her actions while performing the tasks, thus providing narration for the videos. An adult male (a teaching assistant at the school) served as the model for the conference room and staff room tasks. For these videos, voiceover narration was added during editing. All skill sequences were filmed in short segments using a combination of wide angle and zoom shots to display salient features of the task. For example, when the step of the task involved moving about the environment or engaging in larger movements, wide angle shots were used. When the step required detailed or smaller movements (e.g., refilling salt and pepper shakers in the staff room), zoom shots were used. As a result, the videos incorporated the use of other and subjective/first person point of view models (filmed from the perspective of the individual completing the task).

Video files were captured from a digital video camera and edited using Windows Movie Maker. They were then converted to MP4 format using Any Video Converter so that they could be placed on an iPad or HP Slate for viewing. A narrated title screen was placed at the front of each video describing the task being performed. Transition swipes were placed between picture and video segments and between

edited chunks to make the video run smoothly and to reduce the length of the video files for each step. For example, in the segment that displayed video for “washing hands,” several video chunks were edited and sequenced together. Rather than showing the entire process of rubbing hands together with soap, which takes too much time, only the beginning portion of rubbing hands together was shown, followed by a segment showing the model rinsing hands, and then drying hands. The transition swipes were placed between photos and edited segments to make them less choppy.

Procedure

Once two target skills were identified, data were collected on both skills to obtain present levels of performance for each task across all participants at the end of the school year. Each task was then assigned to the treatment/video condition or the control/no video condition using counterbalancing and randomization procedures. Due to the fact that all participants learned the identified tasks using video prompting procedures during the spring, no additional video files were created. When the students returned the following fall, and after 12 weeks had elapsed, they were required to review the entire skill sequence three times prior to engaging in the treatment/video task, thus viewing a video model. As was stated previously, Mick, Nancy, and Nate (group one) engaged in their control task first and then viewed the video model of their treatment/video task three times prior to engaging in that task. Gary, Elsa, and Anna, (group two) engaged in the treatment/video task first, followed by the control task. Data were again collected on student performance on both tasks when they returned to work in the fall.

Data Collection Procedures

All vocational tasks were task analyzed and event recording data were collected on independent correct and incorrect responses for each step in the skill sequence. Participants engaged in all steps of both tasks and were given a “+” for a correct response and a “-“ for an incorrect response for both skill sequences during pretests and posttests. The number of independent correct responses within the skill sequences were added and divided by the total number of steps and multiplied by 100 to obtain a percentage score. In the event that participants made an error, they were asked to turn around while the researchers completed that step for them. Pretests and posttests were conducted in the same manner for both conditions and no visual supports were provided during testing.

Data Analysis

Data were analyzed by computing the mean growth from pre- to posttest scores for the video and control conditions and comparing them. In addition, effect sizes were computed using Cohen’s d (Cohen, 1988) which represents the difference between the pretest and posttest scores, divided by the pooled standard deviations. The following scale is generally used to interpret the magnitude of an effect based on d : Small effect- $0 < d < .2$; moderate effect- $.2 < d < .8$; large effect- $d > .8$.

Interobserver Agreement and Procedural Reliability

Reliability sessions were conducted by the first and third author and a job coach for 67% of all sessions. The percentage agreement index (i.e., number of agreements divided by number of agreements plus disagreements and multiplied by 100) was used to calculate interobserver agreement. Agreement for independent correct responses across sessions resulted in a mean

score of 98% (range = 94-100). In addition, the second observer collected procedural reliability data (Billingsley, White, & Munson, 1980). These measures included the following: a) checking to ensure that the correct condition was applied to the intended task for each participant, b) that the order of conditions were presented correctly, c) that the error correction procedure was delivered as intended, and d) that a wait time of 5 sec was implemented between steps in the skills sequence to allow participants enough time to initiate the next step. Procedural reliability was calculated by dividing number of correct measures by total number of assessed variables and multiplying by 100. Procedural reliability agreement averaged 100%.

Social Validity

Informal interviews/surveys were conducted with the participants and their teacher following intervention. During their interviews, students were asked 1) if they liked watching the videos before working, 2) if they thought the videos helped them to remember how to perform their work-related tasks, and 3) if they would like to watch additional videos in the future. All students indicated positive responses to the questions; however, two participants, Mick and Gary, indicated that they did not like watching the videos that many times prior to going to work. They implied that watching the video once would be enough. All participants indicated that they liked watching the videos, that the videos helped them to remember how to do their tasks, and that they would like to participate in future investigations. In addition, both teachers felt that the intervention was very effective and that the intervention was easily implemented and should be used with all vocational tasks in the future. They also indicated that they

would probably use this type of intervention in the future.

Results

The purpose of this study was to measure the effectiveness of video modeling booster sessions on the maintenance of vocational tasks for six students with ASD and/or IDD. Each student was assigned two vocational tasks at their employment setting and their independence with each task was measured prior to and following a 12-week summer break. One task was assigned to the video modeling booster condition, while the other task served as the control for each participant. Participants reviewed videos of one of their tasks three times prior to going to work following their summer break (video modeling booster session) to determine if watching videos would improve maintenance of their vocational task.

For research question one, will watching video modeling booster sessions following a summer break assist students in maintaining or improving their skill with tasks assigned to the video condition, results indicated that five out of six students increased their independence with treatment/video tasks following the video modeling booster procedure, which suggests that the video modeling booster sessions not only assisted in the maintenance of the tasks, but also resulted in improved performance. When the second research question was considered, will a 12-week break without practicing a skill result in deterioration of performance for control tasks, results indicated that five of the six participants demonstrated deterioration in performance with their control tasks, which suggests that, without any type of maintenance intervention, performance declined. A visual display of individual student performance across tasks can be found in Figures 1 and 2.

Figure 1. Results for participants who engaged in control task prior to watching video models for treatment task

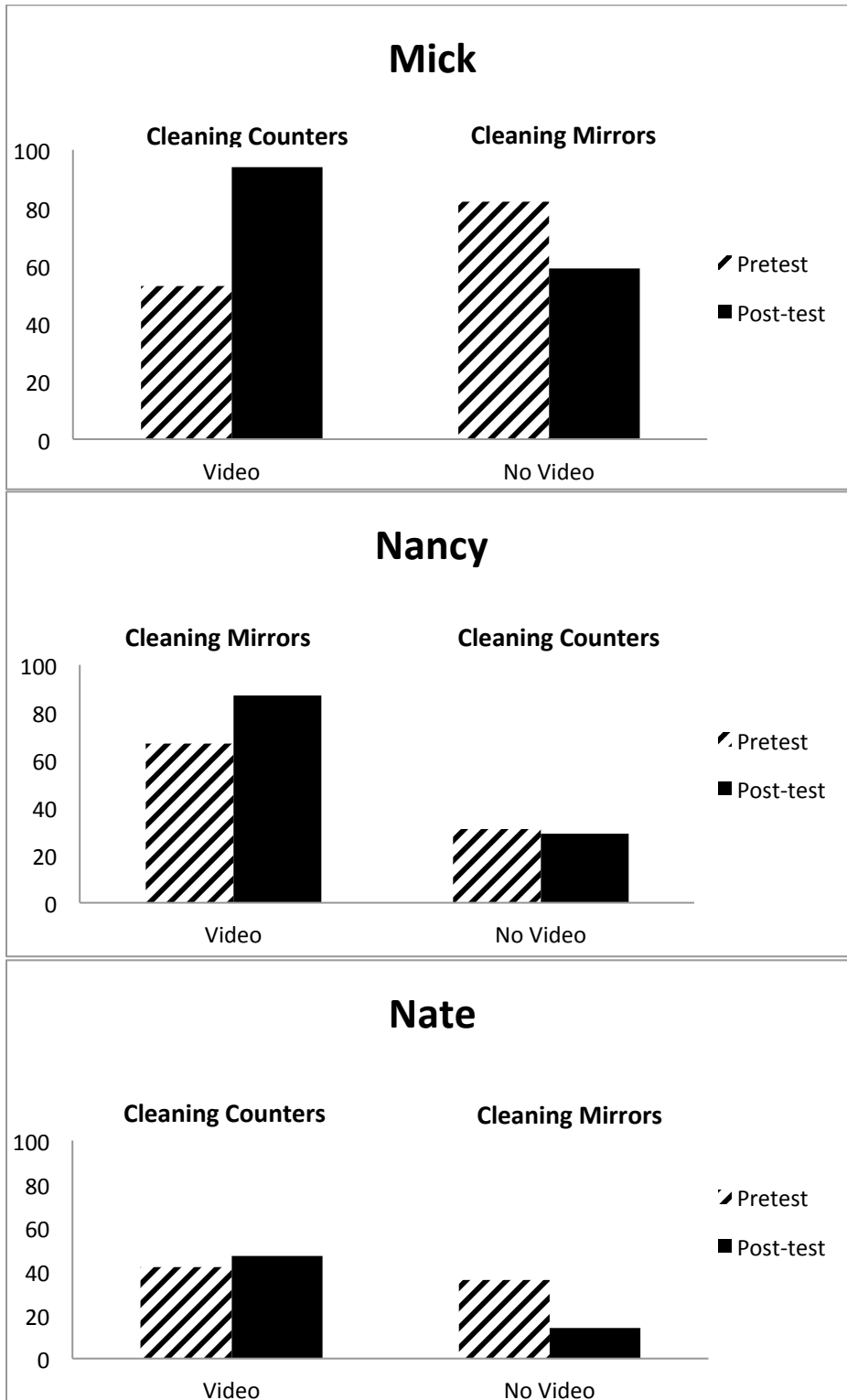
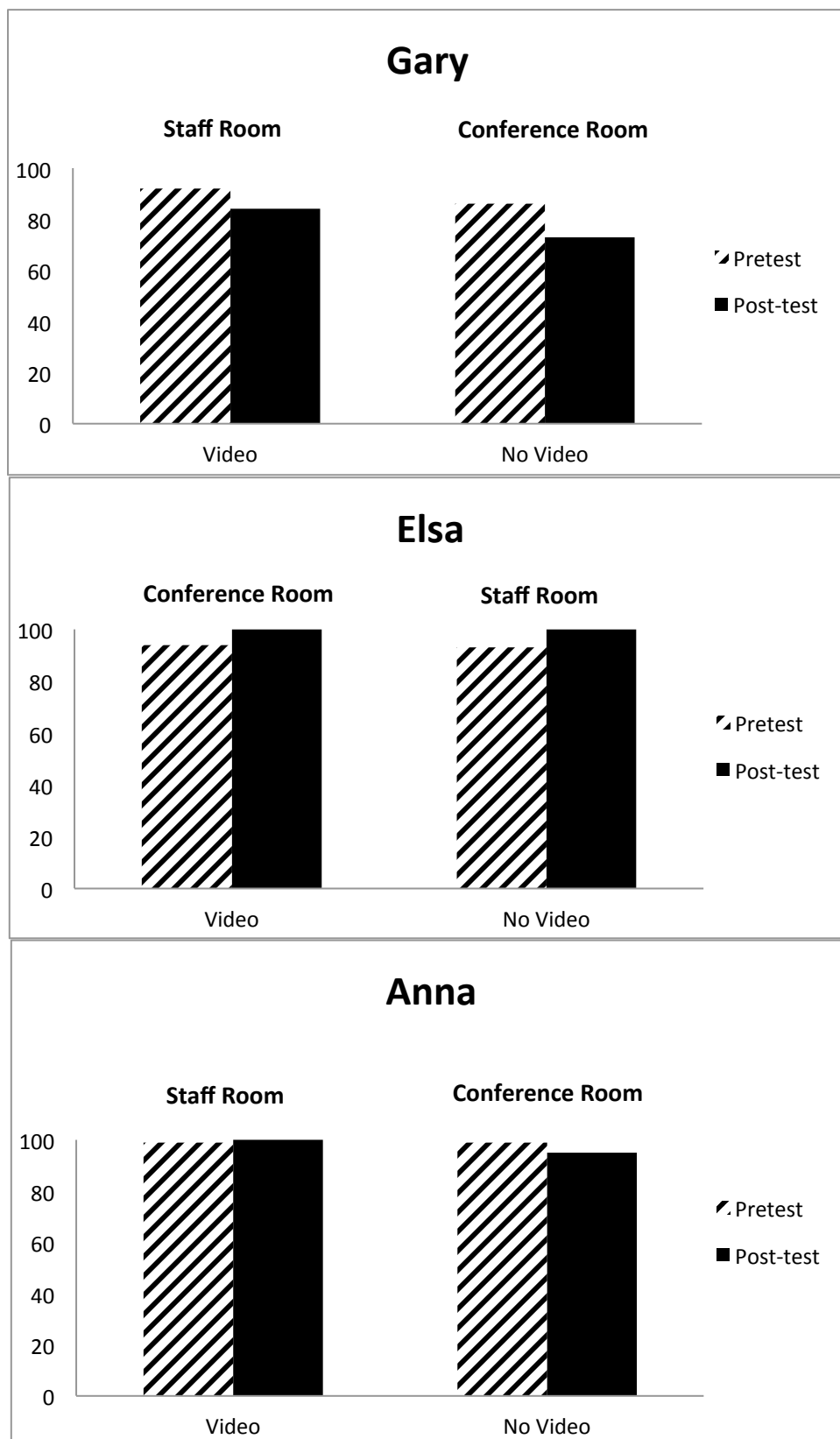


Figure 2. Results for participants who engaged in treatment/video task prior to control task



When the order of conditions were considered for the third research question, will the order in which videos are watched result in differentiated performance for the control tasks (e.g., will watching a video of their first treatment/video task result in improved performance or generalization to the second control task), participants in group 1, who engaged in their control task first, all demonstrated improvement with their treatment/video task with a mean increase of 22% in their independent correct performance with the treatment/video tasks. They all decreased in their independent correct performance with the control task, with a mean decrease of 16%. Two of the three participants in group two, who engaged in their treatment/video task first, demonstrated improvement with their treatment/video task; however, due to a ceiling effect and deterioration in performance by Gary, there was a mean decrease of .34% in their independent correct performance with the treatment/video tasks. Although Elsa improved her performance with the control task, Gary and Anna demonstrated a decrease in performance with a resulting mean decrease of 5.34% for the control tasks. When comparing groups, group 1 had a mean decrease of 16% and group 2 had a mean decrease of 5.34% for their control tasks which may suggest that the order of conditions may have an impact on performance and that watching the video task prior to engaging in the control task may improve performance.

When calculating effect size using Cohen's d , a large effect size was observed for group 1 for tasks using video ($d = 1.22$) and no video ($d = 1.32$). A small effect size was observed for group 2 for tasks using video ($d = .04$) and no video ($d = .33$). In addition, Cohen's d effect size was calculated to determine the difference between groups. A

large effect size was observed for group 1 when comparing video and no video tasks ($d = 2.12$) and a medium effect size was identified for group 2 when comparing video and no video tasks ($d = 0.54$). Comparing post scores for both groups, it is observed that the intervention of using video booster sessions impacted both groups of participants in a positive direction than when they did not use video for their control tasks, which relates to research question 4, will participants perform better with the treatment/video task vs. the control task.

Discussion

The purpose of this study was to determine if watching video modeling booster sessions of a work-related task would assist students with maintaining or improving vocational skills following a 12-week summer break. Participants reviewed a work video for one of their targeted vocational tasks and not the other (control). The intent of this study was to extend the research of Van Laarhoven et al. (2012) to determine if watching video modeling booster sessions (rather than watching video models over the break) would result in maintenance or improvement of the targeted video skill. The reason this instructional method was selected was because it may not always be feasible to require employees to watch videos of their job-related skills when they are on vacation, ill, or incapacitated in some way. Compliance could definitely be a problem with requiring employees to view videos over breaks and using video modeling booster sessions might be a suitable alternative for employees who have difficulty maintaining skills.

This study also differed from the Van Laarhoven et al. study in that participants were away from work for 12 weeks versus two. Five of six participants improved their performance with the treatment/video task when video modeling booster sessions were

in place; however, five of six participants also demonstrated deterioration in performance with the control task. In the Van Laarhoven et al. study, all participants improved both tasks, which was a surprising outcome; however, in the present study, three of the six participants (group 1) engaged in the control task first and it is not surprising that they would demonstrate a decrease in independent correct responding, particularly following a 12-week break. The only participant who improved performance with the control task was Elsa; she was in group 2 and watched the video booster sessions prior to engaging in both tasks and some generalization may have occurred. Future research may be aimed at comparing video modeling booster sessions with over break video modeling sessions when the time away is the same across conditions and when the order of conditions are the same. In addition, future research may focus on using video modeling as a maintenance tool that could be applied to non-vocational behaviors such as domestic, community, or social skills. Further research is warranted.

Limitations

Although results of this study suggest that using video modeling booster sessions may be effective for maintaining work-related skills of individuals with ASD and IDD, the findings are not generalizable due to the small number of participants. In addition, the nonequivalent dependent variables design does not allow for repeated measures of targeted skills to obtain a more accurate measure of performance. For example, it may be possible that Gary did not perform as well on his posttests due to the fact that he rushed through the tasks to get to a pep assembly and his score could be related to having a “bad test day”. However, due to the nature of the research, adding repeated measures could also introduce confounds due to practice effects. Increasing the

sample size and possibly using a randomized pretest posttest control group design might be helpful in obtaining more generalizable results in future studies.

Conclusion and Implications

Overall, there are several benefits to using video-based supports to promote independence in employment settings. Most importantly, video-based supports often result in increased independence, generalization, and maintenance of job-related skills for employees and less reliance on job coaches or coworkers, all of which are critical for sustaining competitive or integrated employment. In addition, video-based instruction may also be a cost effective way for employers and vocational rehabilitation agencies to support employees if they do not need to rely as heavily on paid job coaches. Also, having video supports available to employees allows them to repeatedly review modeled tasks if more support is required and can provide learners with the ability to rehearse their tasks prior to going to work and can also serve as refreshers for employees who have memory problems or for employees who have been away from work for an extended period of time due to vacation, illness, or seasonal work. This is an attractive feature because repeated modeling might not be feasible or desirable for coworkers or supervisors to deliver in a work setting when they are also responsible for completing their own job-related tasks. Employers can also benefit from the use of video-based supports because they can use them to train new employees, which may result in cost effective and streamlined training of new hires.

Findings from this study were somewhat similar to those in the Van Laarhoven et al. (2012) study. The majority of participants not only maintained their skills as a result of

video modeling sessions, but actually improved their performance with the targeted video task. Using video modeling booster sessions may provide a relevant and practical strategy for a wide range of stakeholders who are interested in not only increasing the independence of learners in

employment settings, but also for promoting maintenance and generalization of skills. Reviewing video modeling booster sessions following an extended absence may be an efficient way to improve, maintain, and generalize skills in vocational settings.

References

- Agran, M. (1997). *Student-directed learning: Teaching self-determination skills*. Pacific Grove, CA: Brookes/Cole.
- Alexander, J. L., Ayres, K. M., Smith, K. A., Shepley, S. B., & Mataras, T. K. (2013). Using video modeling on an iPad to teach generalized matching on a sorting mail task to adolescents with autism. *Research in Autism Spectrum Disorders, 7*, 1346-1357.
- Allen, K. D., Burke, R., Howard, M., Wallace, D., & Bowen, S. (2012). Use of audio cuing to expand employment opportunities for adolescents with autism spectrum disorders and intellectual disabilities. *Journal of Autism & Developmental Disorders, 42*, 2410-2419.
- Allen, K. D., Wallace, D. P., Greene, D. J., Bowen, S. L., & Burke, R. V. (2010). Community-based vocational instruction using videotaped modeling for young adults with autism spectrum disorders performing in air-inflated mascots. *Focus on Autism and Other Developmental Disabilities, 25*, 186-192.
- Allen, K., Wallace, D. P., Renes, D., Bowen, S. L., & Burke, R. V. (2010). Use of video modeling to teach vocational skills to adolescents and young adults with autism spectrum disorders. *Education and Treatment of Children, 33*, 339-349.
- Ayres, K. M., & Langone, J. (2005). Using video for instruction of students with autism: A review of the literature. *Education and Training in Developmental Disabilities, 40*, 183-196.
- Baer, R. W., Daviso, A. W., Flexer, R. W., Queen, R. M., & Meindl, R. S. (2011). Students with intellectual disabilities: Predictors of transition outcomes. *Career Development for Exceptional Individuals, 34*, 132-141.
- Banda, D. R., Dogoe, M. S., & Matuszny, R. M. (2011). Review of video prompting studies with persons with developmental disabilities. *Education and Training in Autism and Developmental Disabilities, 46*, 514-527.
- Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents for autism spectrum disorders. *Exceptional Children, 73*, 264-287.
- Bennett, K., Brady, M. P., Scott, J., Dukes, C., & Frain, M. (2010). The effects of covert audio coaching on the job performance of supported employees. *Focus on Autism and Other Developmental Disabilities, 25*, 173-185.
- Bennett, K. D., Gutierrez, A., & Honsberger, T. (2013). A comparison of video prompting with and without voice-over narration on the clerical skills of adolescents with autism. *Research in Autism Spectrum Disorders, 7*, 1273-1281.
- Bennett, K., Ramasamy, R., & Honsberger, T. (2013a). Further examination of covert audio coaching on improving employment skills among secondary students with autism. *Journal of Behavioral Education, 22*, 103-119.

- Bennett, K., Ramasamy, R., & Honsberger, T. (2013b). The effects of covert audio coaching on teaching clerical skills to adolescents with autism spectrum disorder. *Journal of Autism & Developmental Disorders, 43*, 585-593.
- Bereznak, S., Ayres, K., Mechling, L., & Alexander, J. (2012). Video self-prompting and mobile technology to increase daily living and vocational independence for students with autism spectrum disorders. *Journal of Developmental & Physical Disabilities, 24*, 269-285.
- Burke, R. V., Allen, K. D., Howard, M. R., Downey, D., Matz, G. M., & Bowen, S. L. (2013). Tablet-based video modeling and prompting in the workplace for individuals with autism. *Journal of Vocational Rehabilitation, 38*, 1-14.
- Billingsley, F. F., White, O. R., & Munson, R. (1980). Procedural reliability: A rationale and an example. *Behavioral Assessment, 2*, 229-241.
- Cameto, R., Marder, C., Wagner, M., & Cardoso, D. (2003). Youth employment. *NLTS2 Data Brief, 2*(2), 1-6.
- Carter, E. W., Austin, D., & Trainor, A. A. (2012). Predictors of postschool employment outcomes for young adults with severe disabilities. *Journal of Disability Policy Studies, 23*, 1-14.
- Cihak, D. F., Kessler, K. B., & Alberto, P. A. (2007). Generalized use of a handheld prompting system. *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., & Schrader, L. (2008). Does the model matter? Comparing video self-modeling and video adult-modeling for task acquisition and maintenance of adolescents with autism spectrum disorders. *Journal of Special Education Technology, 23*(3), 9-20.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Coryn, C. L. S., & Hobson, K. A. (2011). Using nonequivalent dependent variables to reduce internal validity threats in quasi-experiments: Rationale, history, and examples from practice. In S. Mathison (Ed.), *Really new directions in evaluation: Young evaluators' perspectives. New Directions for Evaluation, 131*, 31-39.
- Davies, D. M., Stock, S., & Wehmeyer, M. L. (2002a). Enhancing independent task performance for individuals with mental retardation through use of a handheld self-directed visual and audio prompting system. *Education and Training in Mental Retardation and Developmental Disabilities, 37*, 209-218.
- Davies, D. M., Stock, S., & Wehmeyer, M. L. (2002b). Enhancing independent time management and personal scheduling for individuals with mental retardation through use of a palmtop visual and audio prompting system. *Mental Retardation, 40*, 358-365.
- Delano, M. E. (2007). Video modeling interventions for individuals with autism. *Remedial and Special Education, 28*, 33-42.
- Goh, A. E., & Bambara, L. M. (2013). Video self-modeling: A job skills intervention with individuals with intellectual disability in employment settings. *Education and Training in Autism and Developmental Disabilities, 4*, 103-119.
- Hasazi, S., Johnson, D., Thurlow, M., Cobb, B., Trach, J., Stodden, B., . . . Grossi, T. (2005). Transition from home and school to the roles and supports of adulthood. In K. C. Lakin & A. Turnbull (Eds.), *National goals and research for people with intellectual and*

- developmental disabilities* (pp. 65-92). Washington, DC: American Association on Mental Retardation.
- 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.
- Kellems, R. O., & Morningstar, M. E. (2012). Using video modeling delivered through iPods to teach vocational tasks to young adults with autism spectrum disorders. *Career Development and Transition for Exceptional Individuals, 35*, 155-167.
- Lancioni, G. E., & O'Reilly, M. F. (2001). Self-management of instruction cues for occupation: Review of studies with people with severe and profound disabilities. *Research in Developmental Disabilities, 22*, 41-65.
- Lancioni, G. E., O'Reilly, M. F., Seedhouse, P., Furniss, F., & Cuhna, B. (2000). Promoting independent task performance by persons with severe developmental disabilities through a new computer-aided system. *Behavior Modification, 24*, 700-718.
- Lee, G. K., & Carter, E. W. (2012). Preparing transition-age students with high-functioning autism spectrum disorders for meaningful work. *Psychology in the Schools, 49*, 988-1000.
- Mechling, L. C. (2005). The effect of instructor created video programs to teach students with disabilities: A literature review. *Journal of Special Education Technology, 20*, 25-36.
- Newman, L., Wagner, M., Cameto, R., Knokey, A. M. (2009). *The post-high school outcomes of youth with disabilities up to 4 years after high school*. A Report from the National Longitudinal Transition Study-2 (NLTS2) (NCSE 2009-3017). Menlo Park, CA: SRI International.
- Riffel, L. A., Wehmeyer, M. L., Turnbull, A. P., Lattimore, J., Davies, D., Stock, S., . . . Fisher, S. (2005). Promoting independent performance of transition-related tasks using a palmtop pc-based self-directed visual and auditory prompting system. *Journal of Special Education Technology, 20*(2), 5-14.
- Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A. M., & Shaver, D. (2011). *The post-high school outcomes of young adults with disabilities up to 6 Years after high school. Key findings from the National Longitudinal Transition Study-2 (NLTS2)* (NCSE 2011-3004). Menlo Park, CA: SRI International. Retrieved from www.nlts2.org/reports/
- Shukla-Mehta, S., Miller, T., & Callahan, K. J. (2010). Evaluating the effectiveness of video instruction on social and communication skills training for children with autism spectrum disorders: A review of the literature. *Focus on Autism and Other Developmental Disabilities, 25*, 23-36.
- Smith, K. A., Ayres, K. A., Mechling, L. C., Alexander, J. L., Mataras, T. K., & Shepley, S. B. (2015). Evaluating the effects of a video prompt in a system of least prompts procedure. *Career Development and Transition for Exceptional Individuals, 38*, 39-49.
- Spence-Cochran, K., & Pearl, C. (2009). A comparison of hand-held computer and staff model supports for high school students with autism and intellectual disabilities. *Assistive Technology Outcomes and Benefits, Special Issue on Assistive Technology and Autism Spectrum Disorders: Research-Based Practice & Innovation in the Field, 26-42*.
- U. S. Department of Labor, Bureau of Labor Statistics. *Household data: Employment status of the civilian population by sex, age, and disability status, not seasonally adjusted*. 2015. Retrieved from <http://www.bls.gov/news.release/empst.t06.htm>

- Van Laarhoven, T., Johnson, J. W., Van Laarhoven-Myers, T., Grider, K. L., & Grider, K. M. (2009). The effectiveness of using a video iPod as a prompting device in employment settings. *Journal of Behavioral Education, 18*, 119-141.
- Van Laarhoven, T., Kos, D., Weichle, K., Johnson, J. W., Burgin, X. (2014). Comparison of video modeling and video feedback to increase employment-related social skills of learners with developmental disabilities. *DADD Online Journal, 1*, 69-90.
- Van Laarhoven, T., Van Laarhoven-Myers, T., & Zurita, L. M. (2007). The effectiveness of using a pocket pc as a video modeling and feedback device for individuals with developmental disabilities in vocational settings. *Assistive Technology Outcomes and Benefits, 4*(1), 28-45.
- Van Laarhoven, T., Winiarski, L., Blood, E. M., & Chan, J. M. (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.
- Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International.
- Wehman, P. (2006). *Life beyond the classroom: Transition strategies for young people with disabilities* (4th ed.). Baltimore: Paul H. Brookes.
- Wehman, P., Inge, K. J., Revell, W. G., & Brooke, V. A. (2007). *Real work for real pay: Inclusive employment for people with disabilities*. Baltimore: Paul H. Brookes.
- Wehman, P., Targett, P. S., & Young, C. (2007). Off to work for individuals with autism: A supported employment approach. *Autism Advocate, 46*, 54-58.

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Examining Preservice Teachers' Concepts and Beliefs Related to Curriculum

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Abstract: This study had two purposes. The first was to understand whether and how preservice teachers' concepts of curriculum for learners with severe disabilities changed from before to after a course in curriculum. A second purpose was to explore the use of a concept map approach as a tool for understanding preservice teachers' changes in concept and beliefs. Students drew concept maps around curriculum and wrote explanatory paragraphs on the first and last day of the course. Results were analyzed qualitatively and quantitatively and indicated statistically significant changes in concepts and beliefs related to general education, the least restrictive environment (LRE) and differentiation after the course. Under the general education and LRE category, alignment and entry and grade level curriculum had statistically significant higher entries post-course. Results suggest that an introduction to this content in meaningful and deep ways can change preservice teachers' concepts and beliefs related to their thinking of curriculum for students with severe disabilities.

Legislation in the last decade has resulted in increasing expectations for learners with severe disabilities to have access to general curriculum content (Browder et al., 2007). This necessitates that teachers of students with severe disabilities must be knowledgeable about how to create access to the general education curriculum. As an outcome of standards-based reform movements and accountability systems, teachers are now faced with increasing demands to align curriculum with Common Core State Standards (CCSS), learning goals which outline what a student should know and be able to do at the end of each grade. The development of the CCSS helps to guide curriculum for learners in the general education classroom. The challenges surrounding implementation of the CCSS, however, are formidable (Walker, 2013). Teachers must adapt their classrooms to the new standards and receive the proper

training. According to Darling-Hammond (2004), "teachers need deep understanding of subject matter, student learning approaches, and diverse teaching strategies to develop practices that will allow students to reach these new standards" (p.1078). CCSS is applicable to all students, including students with severe disabilities. Some students with the most severe disabilities will require substantial supports and accommodations to have meaningful access to certain standards in both instruction and assessment, based on their communication and academic needs. Many teachers find themselves at a loss in knowing what curriculum to select and for whom. They also struggle with how to align this curriculum with the CCSS in general education settings. Darling-Hammond (2004) suggested that one of the areas that needs major attention is "ensuring that

teachers have the knowledge and skills they need to teach to the standards” (p. 1078).

Current trends in educational reform move beyond “access” to a general education environment and emphasizes that participation should be meaningful for learners with disabilities, where they show improvement. The Individuals with Disabilities Education Improvement Act (IDEIA, 2004) identified, “Almost 30 years of research and experience has demonstrated that the education of students with disabilities can be made more effective by having high expectations for such children and ensuring their access to the general education curriculum in the regular classroom, to the maximum extent possible...” (20 U.S.C. § 1400(c)(5)(A) (2004). Research exists to support that access to the general curriculum and inclusive instruction can improve student performance across several domains (e.g., Cosier, Causton-Theoharis, & Theoharis, 2013; Kurth & Mastergeorge, 2010; Fisher & Meyer, 2002; Ryndak, Ward, Alper, Storch, & Montgomery, 2010). IDEIA 2004 specifically requires that students with disabilities be involved in and progress in the general education curriculum. The overall right to have access to the general education curriculum can, in fact, be viewed as consisting of three interrelated stages: access, involvement and progress (Hitchcock, Meyer, Rose, & Jackson, 2002). The first stage, “access,” requires that the general education curriculum be accessible to students with disabilities. The second stage, “involvement,” requires that students with disabilities participate in the general education curriculum in an on-going and meaningful way. The third stage, “progress,” requires that students with disabilities be able to demonstrate progress in the general education curriculum through improved educational performance. Access is not

enough; students with disabilities must also be actively involved in general education contexts and make progress. IDEIA requires that students with disabilities have access to the general education curriculum but does not elaborate further on the meaning of the term “general education curriculum,” leaving the details to be filled in by states and school districts.

One area that can be identified as having the potential to facilitate the involvement of students with severe disabilities in the general education curriculum is a preservice teacher training program that presents such content. Preservice teachers could benefit from an understanding of curriculum and how to best align it with the CCSS. This is an important step for special educators who will be helping students with severe disabilities to be involved in the general education curriculum. In addition, training in the use of technology is an important component that can improve the quality of teaching in the curricula and core academic subjects. The provision of training for teachers in technology is crucial in helping teachers to integrate technology into their instructional practices. Such integration can also play a significant role in helping students with disabilities have access to and participate in the general education curriculum (Rose & Meyer, 2002).

Tensions in the Field

A tension exists in the field related to curriculum around what and how to teach (Dymond & Orelve, 2001). This tension has been framed as a debate between an ecological framework for curriculum or the general education curriculum. The ecological framework for curriculum “...was structured to identify and teach the routines, activities, and skills that students needed to learn to support their full participation in home, school, work and

community settings” (Hunt, McDonnell, & Crockett, 2012, p. 139). Many different perspectives exist with scholars aligning with one position or another. As Browder (2012) suggested, “Some professionals have opposed teaching state standards to this population (Ayres, Lowery, Douglas, & Sievers, 2011), whereas others have advocated for doing so (Courtade, Spooner, Browder, & Jimenez, 2012)” (p. 157). Hunt, McDonnell and Crockett (2012) called for reconciliation where they propose that an ecological approach with a focus on quality of life outcomes be reconciled with the development and implementation of standards-based academic curriculum. Delano, Keefe and Perner (2010) identified, “The current philosophy for educating students with extensive support needs is to provide meaningful access to both general curriculum and functional curriculum” (p. 233).

The focus on access to the general curriculum should also encompass both content and context (Ryndak, Moore, Orlando, & Delano, 2008). Ryndak et al. (2008) stated, “In educational practice, it is difficult to define access to general curriculum in isolation from the general education contexts in which that curriculum is taught and the adults and students involved in that instruction” (p. 203). Some believe that the definition of the "general curriculum" needs to be broadened to extend beyond academics and state standards. Ryndak and Billingsley (2004) suggested that the general curriculum should include not only content based on the state standards but also all experiences available within general education. They define these experiences as participation in general education settings and activities and the development of skills that promote independent functioning.

It is against this landscape that we conceptualized the curriculum course and related content. There has been no research conducted with preservice teachers or teacher educators related to the curriculum debate occurring in the field of severe disabilities. According to Delano, Keefe and Perner, “Teacher training programs are obligated to prepare teachers with the knowledge, skills, and dispositions to provide students with extensive support needs meaningful learning and social experiences in general education contexts with typical grade-level classmates” (p. 233, 2010). Early career special educators are expected to know general education curriculum, the CCSS, and how to align for learners with severe disabilities. Given the generalist nature of many preservice special education teacher preparation programs, many graduates may have had little exposure to curriculum content for learners with severe disabilities. Thus, many early career special educators may be ill-equipped to know what to teach, how to teach it, and how to know if the teaching worked for these learners.

The first author has taught a curriculum course for the past seven years with preservice teachers who were focused on teaching learners with severe disabilities. Many of these preservice teachers reported that a functional curriculum should be the standard for their students with severe disabilities and some were reluctant to adopt content related to a general education curriculum aligned to state standards. Frequently, conversations ensued which raised tensions related to the standards-based reform movement and functional curriculum. The instructor continued to reflect upon the question: “What should preservice teachers be taught about curriculum for learners with severe disabilities?” This became a tension within

the teacher preparation program which historically had been built around a focus on functional skills. It is in this spirit that the instructor developed content to address the curriculum debate in the field and wanted to provide an avenue to capture the preservice teachers' growth in content and beliefs. There is a paucity of research that explores how coursework related to curriculum can influence preservice teachers' concepts and beliefs. Further, we know very little about how coursework related to curriculum might best prepare preservice teachers to be more effective in an era where they are being asked to align with standards.

We believe the teacher education program to be an ideal starting point to trace changes in preservice teachers' concepts and beliefs related to curriculum for learners with severe disabilities. It is important that teacher educators begin to examine how coursework designed to provide content related to curriculum can influence the thinking of preservice teachers. Otherwise, efforts to prepare preservice teachers to select and adapt curriculum to improve the learning of their students, may result in few changes. We relied on concept maps to measure conceptual changes in teachers' understanding of curriculum.

Concept Maps

Concept maps, a teaching and learning strategy developed by Novak and Gowin (1984) based on the work of David Ausubel (1963, 2000), have been used in education for over 25 years. Yet, the use of concept maps in adult education has been limited to date. Concept maps can be a powerful teaching and learning strategy and have potential at the preservice teacher training level. When learners create concept maps they are focusing on determining relationships between and among concepts within their cognitive structures (Ausubel,

Novak, & Hanesian, 1986). Concept maps can reveal changes in student cognitions as a result of course experiences (Trent, Pernell, Mungai, & Chimedza, 1998).

We used concept maps to trace conceptual change in preservice teachers enrolled in a course related to curriculum for learners with severe disabilities. In addition, concept mapping provided the instructor with valuable insight into the students' understanding of curriculum, pre and post course. The pre-map data allowed the instructors to focus on the students' understandings and so make more effective use of class time.

We decided to use pre and post concept maps and explanatory paragraphs to trace change in preservice teachers enrolled in a course related to curriculum for learners with severe disabilities. More specifically, our work was guided by the following research questions: 1) How did students' thinking about curriculum for learners with severe disabilities change from the beginning to the end of the course? and 2) How might we use findings to guide our future teaching of the course and identify key concepts that result in more integrated and organized thinking among students?

Method

Participants

The participants of this research were 16 preservice students in their second quarter of a two-year master's program in special education (see Table 1 for participant characteristics). This specialty leads to a Master of Education Degree (M.Ed.), with the goal of preparing teachers to work as members of educational teams to meet the individual needs of students with severe disabilities and their families. Upon graduation, candidates earn their initial resident teaching certificate (endorsed only

in special education) and an M.Ed. They were enrolled in a required graduate course titled “Curriculum for Students with Moderate to Severe Disabilities.” The majority of students were female ($n = 14$), self-identified as White ($n = 12$), and below the age of 29 ($n = 12$). Most stated that they had experience (a lot to some) with learners with disabilities ($n = 14$).

One instructor was an associate professor of special education who was a former teacher. The other instructor was a doctoral student in special education who was also a former teacher. Both instructors were female. The instructors met weekly and co-planned the content to be taught, activities, and assignments. The associate professor was the main instructor and led most sessions.

Table 1. *Participant Characteristics*

Age	Gender	Race/Ethnicity	Experience
23-29: 12	Female: 14	White: 12	A lot: 7
34-34: 3	Male: 2	Asian: 2	Some: 7
51: 1		Mixed: 2	A little: 2
			Limited to none: 0

Course Description

The 10 week (4-credit) course was taught within the College of Education - Special Education Program at a research-oriented university located in the Pacific Northwest of the United States of America. The focus of the course was on curriculum and assistive technology for learners with severe disabilities. Outcomes for students upon course completion included being able to:

- Describe the historical perspective of curriculum for students with severe disabilities
- Define the term “accessing the general education curriculum” and identify the corresponding steps and tools to facilitate access
- Explain how to assess students with severe disabilities using environmental assessment strategies to obtain meaningful information to make educational decisions

- Define the term person-centered planning and its role in curriculum development
- Use a general education lesson or unit, develop appropriate accommodations and adaptations for a student with severe disabilities
- Identify the legal requirements for assistive technology consideration and use
- Describe assistive technology services, devices and related resources
- Conduct assessments, collect data, and integrate assistive technology into the educational process

The instructor used a combination of traditional lecture, small-group discussion, case-study analysis, videos, on-line activities and reflection to teach the course content.

Students also engaged in online learning using ATSTAR modules from Knowbility, a non-profit organization to improve technology access. ATSTAR is an online curriculum designed to improve educational outcomes for students with disabilities by helping teachers learn to use assistive technology in the classroom. The core program is a series of online teacher training modules with supporting expert videos (see <http://dir1638.knowbility.org/atstar.html>).

Unique aspects of this course that were intended to have an impact on the preservice teachers thinking and beliefs related to curriculum for learners with severe disabilities included content and assignments related to:

- *Curriculum Evaluation.* Participants were required to select and evaluate curriculum from their field-work.
- *Steps and Tools for Planning Individualized Adaptations.* The purpose of this assignment was to walk participants through the process of setting up a program for an individual student which included a variety of elements aligned to a general education context.
- *Lesson Planning.* Participants designed or modified lessons in an academic content area for learners with severe disabilities that provided meaningful access to the general education curriculum.
- *Discussion Groups.* Each participant engaged in a structured reading discussion group. Each class period, members came prepared with their assigned roles to question, clarify, point out the most important ideas, and discuss the reading with their peers. This space provided the participants with an opportunity to

dialogue around the issues they found most important.

A hallmark of the course was the strong connection between conceptual learning activities (coursework) and fieldwork. We saw this coursework–fieldwork linkage as essential for acquiring the knowledge, skills, and dispositions necessary to become a highly qualified special educator (Brownell, Ross, Colon, & McCallum, 2003).

Data Collection

As a course assignment, students were asked to develop individual concept maps related to curriculum for learners with severe disabilities on the first and last days of the course. They were provided with explicit directions and were instructed in how to develop concept maps. The students were instructed to think about the ideas and terms that come to mind when they think of curriculum for learners with severe disabilities. They were then asked to think about how all of the ideas and terms could be organized into categories and subcategories. They arranged the categories, subcategories, ideas and terms around the central concept of curriculum in ways that demonstrated the relationship among concepts. See Table 2 for the concept map assignment. During the postcourse maps, students were also asked to write if their views had changed or stayed the same around curriculum.

Concept Map Analysis

Following the procedures described by Correa, Hudson, and Hayes (2004) and Johnson and La Montagne (1993), the researchers conducted a content analysis to identify common categories within the maps.

Table 2. *Preconcept Postconcept Map Assignment*

Introduction to Assignment:

“A concept map is a way of organizing ideas about a topic so that relationships among various sub-topics are displayed visually. You are being asked to develop a concept map to depict your individual ideas about elements associated with or contributing to curriculum for learners with severe disabilities.

Directions:

- On this paper jot down all of the ideas and terms that come to mind when you think of curriculum for learners with severe disabilities
 - Think about how all the ideas and terms you wrote down could be organized into categories and subcategories
 - Arrange the categories, subcategories, ideas and terms around the central concept of curriculum in a way that will demonstrate the relationships among concepts
 - Add any detail that could elaborate or further illustrate the concepts depicted. Be as specific as possible
 - On the back side of the paper write 1-2 paragraphs describing if your views have changed or stayed the same around curriculum
-

First phase. Each researcher independently reviewed the pre-concept map for each participant noting emerging categories using similarities of language, concepts, and the spatial array of the concept maps. If a word or phrase was identical, then it was written down only once, and similar words or phrases were clustered for comparison later. A process of integration of categories and subcategories was conducted until each category had subheadings based on the language used in the concept maps. The concept maps were reviewed multiple times to ensure all categories were captured. Next, each researcher reviewed the concept maps to generate frequency counts for each category and subcategory.

Second phase. During the second phase the researchers collaboratively reviewed the categories, subcategories, and frequency counts. Discussion ensued between the researchers and decisions were made for

each category and subcategory. Items either remained intact, were deleted, or collapsed with another, similar item. Categories and sub-categories were finalized and a concept map analysis form (see Table 3) was developed to assist in data analysis for the pre-course map and post-course map. The categories identified from the concepts maps include: (a) general education and least restrictive environment (LRE), (b) differentiation, (c) assessment and data, (d) personnel training and implementation, (e) collaboration, (f) assistive technology, (g) functional/adaptive, (h) content areas and (i) qualities of curriculum.

General education and LRE. This category included references to alignment of curriculum to state standards, accessing curriculum along a continuum, placement options for learners with severe disabilities, and compliance factors related to the law with reference to general education and the LRE

Table 3. *Concept Analysis Form*

CURRICULUM FOR STUDENTS WITH SEVERE DISABILITIES CONCEPT MAP ANALYSIS FORM	
PRE-COURSE MAP	POST-COURSE MAP
GENERAL EDUCATION AND LRE	GENERAL EDUCATION AND LRE
State Standards (GLEs/CCS/EALRs)	State Standards (GLEs/CCS/EALRs)
Alignment	Alignment
Placement	Placement
Continuum	Continuum
Access-Curriculum Referenced	Access-Curriculum Referenced
Entry & Grade Level-Curriculum Based	Entry & Grade Level-Curriculum Based
Compliance	Compliance
DIFFERENTIATION	DIFFERENTIATION
Modalities/Learning Styles	Modalities/Learning Styles
Adaptations/Accommodations/Modifications	Adaptations/Accommodations/Modifications
Individualized-Levels of Support/Focus on Abilities and IEP Goals	Individualized-Levels of Support/Focus on Abilities and IEP Goals
ASSESSMENT & DATA	ASSESSMENT & DATA
PERSONNEL TRAINING & IMPLEMENTATION	PERSONNEL TRAINING & IMPLEMENTATION
COLLABORATION	COLLABORATION
With Family	With Family
With General Education	With General Education
With IEP Team	With IEP Team
Tools to Facilitate-Programs at a Glance	Tools to Facilitate-Programs at a Glance
ASSISTIVE TECHNOLOGY	ASSISTIVE TECHNOLOGY
FUNCTIONAL/ADAPTIVE	FUNCTIONAL/ADAPTIVE
Meaningful Outcomes	Meaningful Outcomes
Environments: School/Home/Job/Community	Environments: School/Home/Job/Community
Life Skills/Safety	Life Skills/Safety
Independence	Independence
CONTENT AREAS	CONTENT AREAS
Social Skills	Social Skills
Functional Academics	Functional Academics
Communication	Communication
Behavior	Behavior
QUALITIES OF CURRICULUM	QUALITIES OF CURRICULUM

Commercially Made	Commercially Made
Team/Teacher Created	Team/Teacher Created
Availability: Absent/Limited/Accessible	Availability: Absent/Limited/Accessible
Related to Engagement/Motivation	Related to Engagement/Motivation
Age-Appropriate/Grade Level	Age-Appropriate/Grade Level

Differentiation. This category addressed the learners’ modalities/learning styles (i.e. visual learner), and the need for adaptations, accommodations or modifications. References to the need to individualize using different levels of support with a focus on abilities and individualized education plan (IEP) goals were placed in this category.

Assessment and data. Entries that focused on the need for assessment and data collection were coded into this category.

Personnel training and implementation. References to the need for personnel to have training related to implementation of programs were grouped together and placed into this category.

Collaboration. Participants identified collaboration at many levels: with the family and student, with general education and with the IEP team. In addition, tools to facilitate collaboration were placed into this category.

Assistive technology. Any reference to assistive technology was placed into this category.

Functional and adaptive. This category included references relating to: the use of functional and adaptive curriculum to facilitate meaningful outcomes, environments that could promote functional and adaptive skills (school, home, job, and community), the need for life skills, safety, and independence.

Content areas. All references made to specific content areas were coded into this category. Specific content areas included: social skills, communication, behavior, and functional academics.

Qualities of curriculum. Participants identified a variety of qualities related to curriculum for learners with severe disabilities. These qualities include: commercially made, team or teacher created, and age-appropriate or grade-level. Curriculum was identified to be absent, limited or accessible. In addition, qualities of curriculum were related to the need to engage and motivate learners.

Third phase. The researchers individually went through each concept map and assigned each entry on a map to the category on the concept map analysis form. After the individual analysis of each map, the researchers compared their findings. Discussions of any discrepancies in coding led to agreement on each entry on the maps. For example, a discrepancy occurred around how each researcher defined the term differentiation. The researchers discussed this term and collaboratively defined the term further for agreement.

Data from the pre- and post-test were examined using two approaches: (1) Category scores were obtained by summing up the number of sub-topics present before and after the intervention for each teacher. Change scores were then analyzed using a

paired sample *t*-test, which is appropriate to detecting the potential additive shift in scores that could be expected due to the intervention (Blair & Higgins, 1985). A McNemar's test for paired discrete data was used to determine the number and the type of concepts that changed after the intervention (Lu & Bean, 1995). A McNemar's test looks at the presence or absence of the individual topics presented in the concept maps, the presence of each subtopic were recorded, and repeated items on a teachers concept map were only counted once.

Paragraph Analysis.

We used a paragraph analysis process to continue to discover how the preservice teachers' concepts of curriculum for learners with severe disabilities changed from before to after the course. Thematic analysis involves the searching across a data set to find repeated patterns of meaning. The process we engaged in was not a linear process but a recursive process where movement occurred back and forth throughout several steps. All pre-course and post-course paragraphs from the open-ended prompts were examined. All handwritten responses were typed into one document for analysis, to compare the participants' concepts about curriculum before and after the course. The coding process was informed by a number of texts and articles, including Gibbs (2009) and Braun and Clarke's (2006) influential article, which gives clear guidelines with regard to conducting thematic analysis in an appropriate, organized and comprehensive fashion. The thematic analysis process is detailed in Table 4.

Reliability. The most popular index for describing interobserver agreement is

percent of agreement (as cited by: Berk, 1979; McDermott, 1988). Although percent agreement has benefits we acknowledge that it does contain some faults. We chose percent agreement given our small *N* and that it has a solid history of being used in behavioral research. Additional inter-rater agreement metrics, such as kappa or intraclass correlation could be used. An agreement was defined as two raters recording the same response in an identical manner. The inter-rater reliability was calculated for all pre-concept map analysis forms and post-concept map analysis using agreements divided by disagreements and disagreements then multiplying by 100. The overall IOA for the pre-course map was 82% and the overall IOA for the post-course map was 74.6% . Assistive technology accounts for most of the difference with rater 1 recording 12 and rater 2 recording 25. Upon review, assistive technology was frequently mentioned with another theme or sub-category and differences emerged with how the raters recorded this response. This explains 22.4% of disagreements, which totaled 58.

Results

Pre-course and Post-course Paragraph Themes

Several themes emerged from the pre-course and post-course written responses by the participants who were similar to the concept map findings (see Table 5). Pre-course themes centered on the need to individualize curriculum, qualities of the curriculum and the content. Post-course themes centered on general education and LRE, instructors' skills/implementation, and content. Examples of these themes are presented below for the three themes cited most often.

Table 4. *Thematic Analysis Process*

Process for Analysis	Details for Each Step
1. Familiarized ourselves with the data	Data were transcribed and both authors individually read and re-read the data, noting initial ideas.
2. Generated initial codes	Features of the data were coded in a systematic fashion across the data set. Data were collated relevant to each code.
3. Searched for themes	Codes were collated into potential themes and data were gathered relevant to each potential theme.
4. Themes were reviewed	Themes were checked to determine if they worked in relation to the coded extracts and to the entire data set. A thematic map of the analysis was generated.
5. Themes were defined and named	Generated clear definitions and names for each theme.
6. Produced the report	Selected extract examples for theme illustration.

Adapted from Braun & Clarke (2006)

Pre-course Paragraph Themes

Noteworthy is the data from the pre-concept thematic analysis which resulted in the theme *individualized* as being the most frequently cited concept at 13. This theme dropped to three citations during the post-concept assignment. During the pre-concept assignment students were thinking about how to individualize the curriculum for students with severe disabilities and didn't identify the general education or LRE contexts.

Individualized. The most dominate theme expressed by the students focused on the need to individualize the curriculum. Sub-elements of this theme were identified as students frequently used words in

conjunction with the need to individualize, such as: adapt, accessible, and adaptive technology. Gabriel stated, "The curriculum should be adapted so it can be accessed by the students. Each student will require individual adaptations." Further, Deborah identified, "Curriculum for students with severe disabilities must be accessible to the student and usually individualized. It should contain, at least partially, a student's interest and applicable to the student's life." Ethan expressed his frustration noting, "In my experience, I feel like I've seen lots of curriculum that doesn't match a student's needs/abilities. I've implemented curriculum with students that I don't believe will help them learn functional skills for the future. Therefore, it feels important to me to

Table 5. *Changes in Number of Teacher Responses on Preconcept and Postconcept Maps Per Category*

Category	No. Pre	No. Post	<i>p</i>
Gen Ed and LRE	4	8	0.29
State standards (GLEs/CCS/EALRS)	3	8	0.18
Alignment	2	9	0.04
Placement	3	5	0.63
Continuum			
Access-Curriculum referenced	2	0	0.5
Entry & Grade level-Curriculum based	0	8	0.01
Compliance	3	5	0.63
Differentiation	3	5	0.63
Modalities/Learning styles	4	0	0.13
Adaptations/Accommodations/Modifications	8	11	0.38
Individualized-levels of support/focus on abilities, IEP goals	10	13	0.45
Assessment and Data	8	11	0.38
Personnel training and Implementation	5	3	0.73
Collaboration	1	3	0.63
With family	1	3	0.63
With general education	1	2	1
With IEP team	1	2	1
Tools to facilitate-Program at a glance	0	3	0.25
Assistive technology	7	8	1
Functional/Adaptive	6	9	0.51
Meaningful outcomes	3	8	0.18
Environments: School/home/job/community	6	6	1
Life skills/Safety	6	6	1
Independence	2	0	0.5
Content Areas	2	0	0.5
Social Skills	6	1	0.13
Communication	6	1	0.13
Behavior	2	2	1
Functional academics	2	2	1
Qualities of Curriculum	1	0	1

Commercially made	1	0	1
Team/Teacher created	8	6	0.69
Availability: Absent/limited/accessible	8	6	0.69
Related to engagement/motivation	7	5	0.63
Age-appropriate/Grade level	3	6	0.45

Note. * $p < .05$

implement curriculum that aims to help a student develop skills that an individual to his/her specific needs.”

Qualities of Curriculum. Many sub-elements relating to qualities of a curriculum were noted, specifically that it be - flexible, motivating, age-appropriate, challenging, and engaging. Emma identified, “Student’s learning styles, interests, etc. should be taken into consideration.” Rosie reflected, “Curriculum is very specialized for students with severe needs. It requires teachers to create activities that are creative, adaptable and meaningful to this student population.” Olivia mentions what she has observed in the field, “.....a host of things I believe to be important regarding curriculum. Curriculum that is often not age appropriate or is over simplified.” Josie, and many others discussed the need for engaging curriculum, “Should be engaging to the student and should be easy for all people working with student to implement.”

Content. Three sub-elements emerged under the theme of content: academics, functional skills, and self-advocacy. Gabriel identified some specific content areas regarding curriculum, “exposing students to art, music, complex science, literature, all of the areas of learning. Part of the curriculum should provide students with the tools to become better self-advocates/increase self-image and feelings of empowerment.” Ethan expressed

his perspective of implementing curriculum, “.....with students that I don’t believe will help them learn functional skills for the future. Therefore, it feels important to me to implement curriculum that aims to help a student develop skills to his/her specific needs.”

Post-course Paragraph Themes

In the paragraphs describing the post-course concept maps, students presented more depth and specifics to their writing than in pre-course narratives. Post-concept thematic analysis shows the general education and LRE theme to be the most frequently cited concept at 12 with the second most frequently reported concept to be at a five. In contrast, this theme was only cited four times during the pre-concept assignment. Students shifted to reflect a greater emphasis on general education and LRE during the post-concept map. Shifts were seen in the themes of individualized and general education and LRE across the pre-course and post-course written responses.

General Education and LRE. Many sub-elements emerged under this theme. Students used specific terms in conjunction with general education and LRE. Specifically, they named inclusion, use of person-centered planning, peer supports, access related to language, entry level access, grade level access, use of assistive technology, and general and specific

adaptations. Rosie captures many of these sentiments as she reflected,

My views have changed about curriculum for students with severe disabilities as I have been challenged to think more about adapting it from a gen-ed curriculum. It's a process, taking gen-ed lessons/themes, and adapting and/or modifying them to meet a particular student's needs, so that they can access the same information as the general ed students, but in a different way."

Elijah also discussed how he continues to think about what is important to teach,

I think that my views have changed in the sense that I think I learned a lot about accessing general ed with modifications/adaptations, but I also have been thinking about what is important and why we teach students certain material. I have learned that curriculum makes up the what and not the how of teaching.

Instructors Skills/Implementation. Two sub-elements under this theme emerged related to the instructors' ability to successfully implement curriculum and, as a result, an increase in the instructors' confidence level may be seen. Emma reflected on her own growth,

I came in with very little knowledge of how to work with curriculum (minus a few commercial products). Walking away, I feel far more confident in the subject as well as how to approach the issue of inclusion and education with gen ed teachers. Although curriculum for students with severe disabilities is a tricky and underdeveloped area, I have gained knowledge in how to create, implement, adapt and individualize lessons to meet the needs of my students.

Content. One sub-area emerged under this theme and it was related to the tension between an academics approach and functional approach. Olivia discussed how her thinking changed over the course of the quarter as she grew to understand the importance of both approaches,

The categories of access/entry/grade level has helped me a lot in organizing my thoughts around curriculum as well. I've also solidified my opinions on the functional vs. academic skills and come to a more nuanced understanding that both sets are essential and critically tied to each other.

Emma echoed a similar sentiment, "Functional skills can be taught in line with IEP goals and the general education curriculum."

Concept Map Findings

The mean distribution of responses on the pre-concept and post-concept maps per teacher category is presented in Table 6. On average pre-service teachers had higher mean scores on the overall postconcept maps than their preconcept maps. In terms of statistical significance ($< .05$), more pre-service teachers listed *general education/LRE* in their posttest concept map than their pretest concept map ($t = -4.09, p = .001$). Similarly, more pre-service teachers listed *differentiation* in their posttest concept maps than before the intervention ($t = -2.59, p = .02$).

The analyses of the individual concept map categories involved coding the presence or absence of each of the sub-categories in the pre and posttest concept maps. Significant changes were determined using a McNemar's test (McNemar, 1947) by

Table 6. Mean Frequency of Responses on Preconcept and Postconcept Maps Per Teacher Per Category

Category	Precourse	SD	Postcourse	SD
Gen Ed and LRE *	0.88	1.02	4.13	2.83
Differentiation*	2.07	1.34	3.56	2.1
Assessment and data	1.25	1.65	1.75	1.69
Personnel training, implementation	0.31	0.48	0.13	0.34
Collaboration	0.56	0.81	0.81	1.22
Assistive Technology	0.38	0.5	1.56	2.63
Functional/Adaptive	1.69	2.09	2.38	2.31
Content areas	1.69	2.33	1.38	1.31
Qualities of Curriculum	2.56	1.79	1.88	1.5

Note. * $p < .05$

Table 7. Pre-course and Post-course Paragraph Themes with Frequency Counts and Ranking

Code	Theme	Pre-course	Post-course
1	Qualities of Curriculum	9(2)	2(4)
2	Individualized	13(1)	3(3)
3	Instructors Skills/Implementation	5(4)	5(2)
4	Content	8(3)	5(2)
5	General Education and LRE	4(5)	12(1)
6	Outcome Oriented	4(5)	0
7	Compliance – Legal Requirements	1(8)	2(4)
8	Belief System	3(6)	2(4)
9	Limited Knowledge/Exposure to Curriculum	3(6)	0
10	Need for Collaboration	1(8)	2(4)
11	Lack of Resources/Curriculum	1(8)	1
12	Gained Resources	2(7)	2(4)

comparing the changes between the pretest (before the intervention) and the posttest (after the intervention) for the individual sub categories. Table 7 shows the subcategories for the individual responses on all the main categories. In the previous analysis it was found that on average pre-service teachers reported a statistically significant increase in *general education/LRE* and *differentiation* after the intervention. In the general education/LRE category, *alignment* and *entry and grade level curriculum* had statistically significant higher entries after the intervention. The overall category of *differentiation* had no individual significant subcategories, although there is an overall additive effect of the intervention on the number of entries. However, none are significant ($p < .05$ level). This trend is common on all the subcategories in general. The findings from the concept maps were supported by the findings from the accompanying paragraphs.

Linking Quantitative and Qualitative Findings

The findings from the qualitative analyses of the reflective paragraphs corroborate the findings from the quantitative analyses of the concept maps. In both cases, the analyses showed an increase in focus on general education and the LRE during the post-concept assignments. In addition, the post-concept qualitative and quantitative analyses reflected greater details relating to alignment and grade level curriculum.

Discussion

As with any study, there were limitations to this inquiry. First of all, findings from the small group may be difficult to generalize to others. Second, we relied heavily on student self-report for data collection. Without performance data to support purported changes, we can only speculate as to how preservice teachers will translate their

thinking into teaching practice. Third, the instructors were known to the students which may have influenced their responses. Even with these limitations we saw significant changes in the students' precourse and postcourse concept maps and paragraphs.

The results of this study increase our confidence that an introduction to this content in meaningful and deep ways can change preservice teachers' concepts and beliefs related to their thinking of curriculum for students with severe disabilities. One carefully crafted course can indeed make a difference in how preservice teachers think about curriculum. Quantitative and qualitative results identified changes as preservice teachers cited general education and LRE and differentiation more during the postconcept map assignment, at the conclusion of the course. In addition, the two categories of alignment and entry/grade level curriculum were found to have demonstrated an increase. Unique aspects of the course related to intentional connections between coursework and fieldwork may have influenced these results. For example, participants were systematically taught how to design or modify, and implement lesson plans in academic content areas that were aligned to CCSS. Participants were provided with explicit content related to alignment and entry/grade level curriculum both within a higher education class and were supported as they implemented in the field. We see this coursework-fieldwork linkage as essential for acquiring the knowledge, skills, and dispositions necessary to become a highly qualified special educator (Brownell et al., 2003). In addition, engaging in discussion groups provided participants with a mechanism to debrief and gain additional perspectives to deepen understanding. Delano, Keefe and Perner (2010) identified

the need for content within teacher preparation programs to “...address philosophical concepts such as inclusive education so that preservice teachers can develop a philosophy for working with students with extensive support needs” (p. 233). Use of discussion groups and concept maps provided students with a space to reflect upon their concepts and beliefs related to their thinking pre and post course. These activities may have contributed to students’ growth and influenced their perspectives related to curriculum.

The results of this study also provide evidence for the use of concept maps as a method to promote an understanding of preservice teachers’ changes in concepts and beliefs. In addition, this methodology allowed students the opportunity to self-reflect on their understanding of curriculum for learners with severe disabilities. This assignment also promoted dialogue around the differing philosophies pre and post concept map related to their alignment with an ecological framework or a standards-based movement. In the midst of the ongoing debate, there is a shared underlying agreement in the field that instructional content for learners with severe disabilities should lead to increased independence, participation in valued activities and settings and result in skill development that is meaningful and functional for the student (Erickson & Davis, 2014). Many agree that work is needed to reconcile the ecological framework with a standards-based approach (Hunt, McDonnell, & Crocket, 2012; McDonnell, Hunt, Jackson, & Ryndak, 2013; Ward, Van De Mark, & Ryndak, 2006). These pre-service teachers were able

to discuss these perspectives and may be better informed to engage in dialogue related to the curriculum debate in the field as they have been provided with a space to reflect upon their own perspectives. Many identified that their view shifted from an either – or perspective to one that valued aspects of both.

Another goal of this study was to determine how we might use the findings to guide our future teaching of the course and to identify key concepts that result in more integrated and organized thinking among students. We find that our results point to the need to infuse content related to these topics during preservice teacher training programs and that by doing so, preservice teachers may attend to the topics and demonstrate changes in concepts and beliefs related to these aspects of curriculum. As these participants graduate and begin their early career as special educators, they may have more knowledge around what curriculum to select and for whom. In addition, they may have a jump-start as they have thought about how to align curriculum with the CCSS in general education settings. This may influence their ability to align curriculum during their early-careers as special educators which could have an influence on learners with severe disabilities accessing the general education curriculum in the LRE in meaningful ways. Future studies should follow graduates through their early career experiences to determine impact on actual practice. This in turn could influence pre-service training programs as we revise content and experiences to better meet early career needs.

References

- Ausubel, D. P. (1963). *The psychology of meaningful verbal learning*. New York: Grune & Stratton.
- Ausubel, D. P., Novak, J. D., & Hanesian, H. (1986). *Educational psychology: A cognitive view* (2nd ed.). New York: Werbel and Peck.
- Ayres, K. M., Lowery, K. A., Douglas, K. H., & Sievers, C. (2011). I can identify Saturn but I can't brush my teeth: What happens when the curricular focus for students with severe disabilities shifts. *Education and Training in Autism and Developmental Disabilities, 46*, 11-21.
- Berk, R. A. (1979). Generalizability of behavioral observations: A classification of interobserver agreement and interobserver reliability. *American Journal of Mental Deficiency, 83*, 460-472.
- Blair, R. C., & Higgins, J. J. (1985). A comparison of the power of the paired sample T-test to that of Wilcoxon's signed-ranks test under various population shapes. *Psychological Bulletin, 97*, 119-128.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101.
- Browder, D. M., Wakeman, S. Y., Flowers, C., Rickelman, R. J., Pugalee, D., & Karvonen, M. (2007). Creating access to the general curriculum with links to grade-level content for students with significant cognitive disabilities: An explication of the concept. *The Journal of Special Education, 41*, 2-16.
- Browder, D. M. (2012). Finding the balance: A response to Hunt and McDonnell. *Research and Practice for Persons with Severe Disabilities, 37*, 157-159.
- Brownell, M. T., Ross, D. R., Colón, E. P., & McCallum, C. L. (2003). *Critical features of special education teacher preparation: A comparison with exemplary practices in general teacher education*. (COPSSE Document Number RS-4E). Gainesville, FL: University of Florida, Center on Personnel Studies in Special Education.
- Correa, V. I., Hudson, R. F., & Hayes, M. T. (2004). Preparing early childhood special educators to serve culturally and linguistically diverse children and families: Can a multicultural education course make a difference? *Teacher Education and Special Education, 27*, 323-341.
- Cosier, M., Causton-Theoharis, J., & Theoharis, G. (2013). Does access matter? Time in general education and achievement for students with disabilities. *Remedial and Special Education, 34*, 323-332.
- Courtade, G., Spooner, F., Browder, D., & Jimenez, B. (2012). Seven reasons to promote standards-based instruction for students with severe disabilities: A reply to Ayres, Lowery, Douglas, & Sievers (2011). *Education and Training in Autism and Developmental Disabilities, 47*, 3-13.
- Darling-Hammond, L. (2004). Standards, accountability, and school reform. *Teachers College Record, 106*, 1047-1085.
- Delano, M. E., Keefe, L., & Perner, D. (2010). Personnel preparation: Recurring challenges and the need for action to ensure access to general education. *Research and Practice for Persons with Severe Disabilities, 33*, 232-240.
- Dymond, S. K., & Orelove, F. P. (2001). What constitutes an effective curriculum for students with severe disabilities? *Exceptionality, 9*, 109-112.

- Erickson, J., & Davis, C. (2015). Providing Appropriate Individualized Instruction and Access to the General Education Curriculum for Learners With Low-Incidence Disabilities. In E. West (Ed.), *Including learners with low-incidence disabilities* (International perspectives on inclusive education), pp. 137-158. Emerald Group Publishing Limited.
- Fisher, M., & Meyer, L. H. (2002). Development and social competence after two years for students enrolled in inclusive and self-contained educational programs. *Research and Practice for Persons with Severe Disabilities, 27*, 165-174.
- Gibbs, G. (2009). *Analysing qualitative data*. London: SAGE.
- Hitchcock, C., Meyer, A., Rose, D., & Jackson, R. (2002). Providing new access to the general curriculum: Universal Design for Learning. *Teaching Exceptional Children, 35*(2), 8-17.
- Hunt, P., McDonnell, J., & Crockett, M.A. (2012). Reconciling an ecological curricular framework focusing on quality of life outcomes with the development and instruction of standards-based academic goals. *Research and Practice for Persons with Severe Disabilities, 37*, 139-152.
- Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446, 118 Stat. 2647 (2004) (amending 20 U.S.C. §§ 1400 et seq.)
- Johnson, L. J., & LaMontagne, M. J. (1993). Using content analysis to examine the verbal or written communication of stakeholders within early intervention. *Journal of Early Intervention, 17*, 73-79.
- Kurth, J., & Mastergeorge, A. M. (2010). Individual education plan goals and services for adolescents with autism: Impact of age and educational setting. *The Journal of Special Education, 44*, 146-160.
- Lu, Y., & Bean, J. A. (1995). On the sample size for one-sided equivalence of sensitivities based upon McNemar's test. *Statistics in Medicine, 14*, 1831-1839.
- McDermott, P. A. (1988). Agreement among diagnosticians or observers: Its importance and determination. *Professional School Psychology, 3*, 225-240.
- McDonnell, J., Johnson, J. W., & McQuivey, C. (2008). *Embedded instruction for students with developmental disabilities in general education classrooms*. Arlington, VA: Council for Exceptional Children, Division on Developmental Disabilities.
- McDonnell, J., Hunt, P., Jackson, L., & Ryndak, D. (2013). Educational standards for students with significant intellectual disabilities: A response to Lou Brown. *TASH Connections, 38*(4), 30-34.
- McNemar, Q. (1947). Note on the sampling error of the difference between correlated proportions or percentages. *Psychometrika, 12*, 153-157.
- Novak, J. D., & Gowin, D. B., (1984). *Learning how to learn*. Cambridge: Cambridge University Press.
- Rose, D. H., & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Ryndak, D. L., Moore, M. A., Orlando, A. M., & Delano, M. (2008). Access to the general curriculum: The mandate and role of context in research-based practice for students with extensive support needs. *Research and Practice for Persons with Severe Disabilities, 33*, 199-213.
- Ryndak, D. L., Ward, T., Alper, S., Montgomery, J. W., & Storch, J. F. (2010). Long-term outcomes of services for two persons with significant disabilities with differing educational experiences: A qualitative consideration of the impact of educational

- experiences. *Education and Training in Autism and Developmental Disabilities*, 45, 323-338.
- Ryndak, D. L., & Billingsley, F. (2004). Access to the general education curriculum. In C. H. Kennedy & E. M. Horn (Eds.), *Including students with severe disabilities* (pp. 33-53). Boston Pearson.
- Trent, S. C., Pernell, Jr., E., Mungai, A., & Chimedza, R. (1998). Using concept maps to measure conceptual change in preservice teachers enrolled in a multicultural education/special education course. *Remedial and Special Education*, 19, 16-31.
- Walker, T. (2013). 10 things you should now about the common core. Retrieved from <http://neatoday.org/2013/10/16/10-things-you-should-know-about-the-common-core/>
- Ward, T., Van De Mark, C., & Ryndak, D. L. (2006). Balanced literacy classrooms and embedded instruction for students with severe disabilities: Literacy for all in the age of school reform. *Teaching language arts, math, & science to students with significant cognitive disabilities*. Baltimore, MD: Paul H. Brookes.

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Using Comics to Measure Social Evaluative Reasoning in the Workplace: Instrument Calibration using a Rasch Modeling Approach

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Abstract: A sample of 42 transition-age, young adults with Level 1 ASD completed a scenario-based instrument designed to measure Social Evaluative Reasoning Ability (SER) in the workplace. For the purposes of this analysis, SER was modeled as a unidimensional construct. A Rasch, Partial Credit Model was utilized to examine the psychometric properties of the instrument. The mathematics underpinning the Rasch model are discussed and visual and statistical indicators of fit at the instrument and item levels are presented and considered. Next, an argument for the validity of the instrument is presented. The paper concludes with a discussion of limitations and potential educational implications of the SER instrument.

Efforts to establish evidence-based practices (EBPs) in special education have increased in accordance with the No Child Left Behind Act's push for improved student outcomes (see Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005, for a discussion of EBPs). With respect to the transition period, researchers have endeavored to summarize the extent to which EBPs are reported in the literature. A comprehensive meta-analysis to identify EBPs in secondary transition reviewed 1,306 articles and found two practices—teaching life skills and purchasing skills—to be supported by a strong level of experimental evidence as determined by the presence of at least four acceptable-quality or two high-quality group experimental designs or five high-quality single subject designs in the relevant literature (Test et al., 2009). Surprisingly, as the social cognitive challenges that many individuals with disabilities experience are well documented, *Social skills training* and *Teaching job-related social communication skills* were found to have only a potential level of experimental evidence as determined by the presence of at least one acceptable group

experimental design or one to two acceptable-quality single subject designs (see Horner et al., 2005 & Gersten et al., 2005 for quality indicators for single subject designs and group experimental designs, respectively).

With a relatively short amount of time legally mandated for the development of secondary transition competencies in young adults with disabilities, it is imperative that empirically supported instructional strategies targeting such developmental objectives be identified. This is an especially pressing matter in the case of Autism Spectrum Disorder (ASD). Continued increases in the prevalence of ASD—current prevalence rates are 1 in 68 children, a 30% increase from 1 in 88 two years ago (Baio, 2012)—demand secondary transition practices designed specifically to address the social cognitive and behavioral challenges characteristic of the disorder. If they are to be effective, such practices will be informed by the results of valid and reliable assessments that target relevant knowledge and skill areas.

Within the context of knowledge and skill assessment in secondary transition, a useful instrument should be capable of identifying regularity in the development of students—or, put differently, where along a given developmental continuum a student is located—as it is with this kind of information that targeted instructional practices may be developed (Wilson, 2009). An important initial step in this process is the creation of instruments for measuring a student’s position along or within a given developmental continuum. Wilson’s (2005) “Four Building Blocks” approach to instrument design and construct modeling articulates a progressive framework for instrument development and calibration toward the end of identifying regularity in the context of such development. Following the identification of a measurable construct—in this case, Social Evaluative Reasoning (SER) (to be articulated more fully below), conceptualized as a unidimensional latent variable (or, construct)—one designs a set of items to elicit evidence of this variable in a target sample. The outcome space informs the categorization of this evidence and how it will be scored as indicative of the construct. Finally, a measurement model is selected to evaluate how well the proposed construct was borne out by the data. The family of probabilistic Rasch and Item Response Theory (IRT) models, and variations thereof, in conjunction with Wilson’s (2005) construct modeling approach, provide the researcher with a particularly useful set of tools for instrument design and calibration.

Toward this end, this paper will present the results of a calibration study of an instrument designed to measure SER ability in the workplace for students on the high-functioning end of the autism spectrum (hereafter referred to as Level 1 ASD). SER is defined as context-specific critical

thinking involving appraisal of the effectiveness, validity, and appropriateness of employee behavior as it occurs in response to common antecedent conditions in the context of entry-level, service-sector employment. More specifically, proficiency in SER ability may be conceptualized in an Antecedent (A)-Behavior (B)-Consequence (C) formulation. Put simply, within a given workplace setting, given (A): some amount of available social information (e.g., a customer’s verbal/nonverbal cues); was (B): a target employee’s social-behavioral response; (C): appropriate given the situational context of the workplace and the organizing and directing forces it places upon the target employee’s behavior?

Such an instrument seems timely given recent increases in ASD diagnoses, a disorder that presents significant social cognitive and behavioral challenges (to be discussed further below). At the same time, given increases in the proportion of service-sector jobs in the United States that require soft skills, the domain within which SER is most properly situated—more than 85% of the population worked in service industries in 2009, a nearly 70% increase from 1970 (Kalleberg, 2011)—efforts to understand social cognitive and behavioral development in entry-level employees with Level 1 ASD in the form of SER within this particular vocational arena seems appropriate. While statistics that speak directly to the types of jobs entry-level employees with Level 1 ASD most commonly receive are lacking, given the push to normalize employment experiences for this population by placing them in competitive employment settings alongside their non-disabled peers, it seems reasonable to assume that the service-sector is a likely setting in which such individuals will be hired.

A hallmark of the service-sector is an increased emphasis on soft skills such as work attitudes and communicative ability. These are opposed to hard skills, or, technical abilities, often measured by schooling, grades, and test scores that, historically, have served as valid indicators of success in the context of the manufacturing sector. Kalleberg (2007) argues that the importance of soft skills is likely to increase, given trends in the economy that emphasize services dealing with customers and that require teamwork between employees that have come to fill the void left by the outsourcing of much of the manufacturing industry in the United States. Soft skill proficiency, then, will continue to be an important part of one's *market power*, or, degree of control over their employment situation (Kalleberg, 2007). One factor that affects a person's market power—specifically in the case of entry-level employees with Level 1 ASD—are personal characteristics that might limit that individual's employment. As mentioned, perhaps the most significant personal characteristic of individuals with Level 1 ASD that may present obstacles to successful employment outcomes are the social cognitive and behavioral challenges associated with the disorder and the impediments these pose when attempting to negotiate the soft skill requirements presented by the situational demands of the workplace.

The situational context of the workplace exerts an organizing and directing force on social cognition and behavior that employees with Level 1 ASD may have difficulty adapting to. (A) *Reading between the lines* in social situations; (b) understanding the social requirements of workplaces; (c) navigating social interactions; (d) understanding how to act in the *neurotypical* world; and (e) difficulties

reading facial expressions and tone of voice are a few of the characteristic challenges that may slow this adaptive process (e.g. Muller, Schuler, Burton, & Yates, 2003; Hurlbutt & Chalmers, 2004; Hendricks, 2009). Hochschild (1983) coined the term *emotional labor* to describe a form of emotional regulation intended to create a publicly visible facial, bodily, and attitudinal display within the workplace that engenders a target experiential state within customers—the ability to regulate one's emotion and behavior in this way is at the core of soft skill proficiency. It should at once be apparent that a developed Theory of Mind (ToM) is crucial for success in a job heavy in the requirement of emotional labor—one must understand that their facial, bodily, and attitudinal displays indeed have the power to influence the thoughts and feelings of another person. Numerous studies have demonstrated that individuals with Level 1 ASD perform significantly worse than non-disabled control groups on experimental tasks designed to measure ToM (e.g., Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 2000; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Castelli, Frith, Happe, & Frith, 2002; Chevallier, Noveck, Happe, & Wilson, 2011). Given the unique social cognitive and behavioral challenges Level 1 ASD presents and the emphasis on soft skill proficiency—a domain characterized primarily by social cognitive and behavioral ability—in entry-level service-sector employment, it stands to reason that vocational development as it occurs in the context of secondary transition should emphasize such skill development.

Bennett and Dukes (2013) identified a significant gap in the literature reporting on adolescents with ASD receiving direct instruction in employment and job skills while in middle and high school—an important component of vocational

development in secondary transition. Between the years 1995-2010, a total of 12 studies were identified in their literature review—all studies reported on interventions to increase independent completion of employment tasks or behaviors related to employment. Surprisingly, given the social cognitive and behavioral challenges discussed above, none of the studies targeted the social skills needed for employment. Finally, a total of 55 participants participated in the 12 studies. In a similar vein, Lee and Carter (2012) observed that, while a fairly extensive literature has emphasized the design and delivery of social skills interventions within educational settings for students with ASD, far less concerns their application to teaching work-related social and interpersonal skills. To educators, they advised that instructional efforts intended to teach such skills should be driven by careful assessment of student deficits with an understanding of the skills most important to success within a given place of employment.

Black, Wilson, and Yao (2011) promote the use of formative assessment as a means to inform effective pedagogy. According to them, educators must possess an accurate view of “the learning aim and of the steps along the route, or routes, that the student needs to take to get closer to that aim in light of his or her position en route” (p. 75). Formative assessment, then, with an instrument that is sensitive enough to discriminate between students at various steps along a given route, composed of items that span the range of the learning aim, both in terms of content and level of difficulty, is as good a foundation as any upon which to construct EBPs. For the student with Level 1 ASD, low in workplace SER ability that struggles to negotiate performance demands characteristic of entry-level, service-sector employment heavy in emotional labor, it is the position of this

author, and others (see Zimmer-Gembeck & Mortimer, 2006), that the push should be toward the improvement of this ability, rather than toward employment that does not require it. For example, opportunities to use and develop work-related skills, interpersonal competencies, and overcome social anxiety may be aspects of employment that are uniquely important to entry-level employees (Zimmer-Gembeck & Mortimer, 2006). To miss such opportunities would be to miss out on potentially important, foundational soft skill-set development. Results from effective formative assessments, then, are a step in this direction—they may inform the provision of feedback individualized to the specific needs of particular students and guidance on how to improve (Black et al., 2011).

Method

Participants

Forty-two transition-age students with Level 1 ASD from four different states participated in this study. Participants were recruited by this researcher through the following sources: a Nonpublic School for students with learning differences, the Autism Speaks website, a parent support agency, and a private neurodiversity counseling clinic. A purposive sampling strategy was utilized to ensure that participants fit the necessary study criteria, however it was not possible to obtain formal diagnostic information. Table 1 provides further participant demographics.

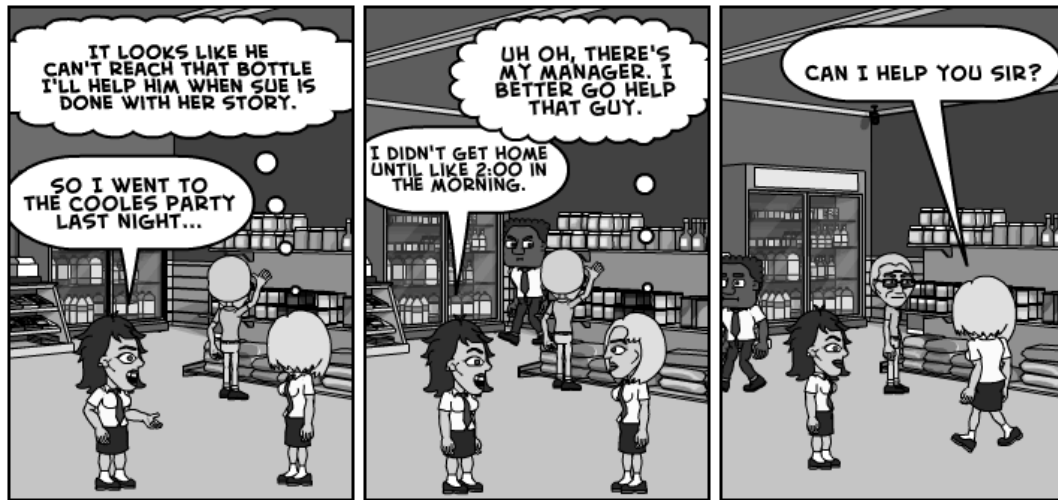
Materials

Workplace scenarios in the context of two, service-sector jobs heavy in emotional labor demands were developed by this researcher (see Figure 1 for a scenario example). Each scenario consisted of three separate comic strips focusing on a target employee and her/his interactions with customers and coworkers. Scenarios varied with respect to: (A) the frequency and type of social information contained in them; (B) the

Table 1. *Participant Descriptive Statistics*

State	N	Male	Female	Mean Age
California	28	22	6	16.25
Arizona	9	8	1	22.5
Ohio	4	4	0	16.5
Virginia	1	0	1	18
Total	42	34	8	17.7

Figure 1. *Workplace Scenario Example.*



frequency and type of employee *helping* behaviors; and (C) whether or not the scenario was resolved correctly, all while holding the situational context constant (McFall, 1982). Students answered the same three, open-ended item prompts for each scenario: (a): List all the social clues/hints that were available to (employee); (b) List all the things (employee) did to help the customer(s) in this scenario; and (c) Overall, did (employee) do the right thing in this scenario? Why?

Procedure

Prior to participation, all students were provided with informed consent. For convenience, the instrument was available in hard copy or soft copy. Completed hard

copies were returned in the mail while completed soft copies were uploaded into a Google Docs spreadsheet. 71% of the sample completed the soft copy version while 29% completed the hard copy version—in the hard copy format, the order in which the two scenarios were presented within each instrument was counterbalanced. In addition to the instrument itself, students completed a brief demographic sheet. Administration of the instrument did not follow a standardized protocol and no time constraints were imposed on its completion. In those cases in which the instrument was administered by a classroom teacher or other support staff, instructions with respect to the type of help and clarifying instruction that could be offered were provided.

Data Analysis

Item analysis. Item responses were scored using a polytomous, or, partial credit scoring rubric (see Appendix A for construct maps and scoring rubric). The Rasch model uses information about item attributes (parameters) and student ability (θ) to model probabilistic response patterns for a set of items, which are compared to the actual response patterns produced by students. Combining the parameters for person ability θ_v , and item difficulty δ_i , is the preliminary step in constructing the Rasch model—it is this difference that governs the probability of what happens in a testing situation where person v uses their ability θ_v , against the difficulty δ_i , of item i (Wright & Stone, 1979). But since $\theta_v - \delta_i$ may range between positive and negative infinity and the probability of a successful response may only vary between zero and one, the exponent of the difference is utilized: $\exp(\theta_v - \delta_i)$. However, this difference may range between zero and positive infinity so to bring it between the zero and one interval, the ratio is formed:

$$P(X_{vi}|\theta_v, \delta_i) = \frac{\exp(\theta_v - \delta_i)}{1 + \exp(\theta_v - \delta_i)}$$

The Rasch model may also be extended to the partial credit case, in which item

Scoring Metric. A useful feature of the Rasch and other IRT models is that student ability (θ) and item difficulty (d_i) are presented on the same scale, the logit. The logit is a unit on the interval scale of measurement, which means that the distance between each point on the scale is equal. On both the item and person dimensions, the logit is calculated based on the odds ratio. For the item dimension, the odds ratio is the ratio of the number of incorrect responses (Q) to the number of correct responses (P) or Q/P. The odds ratio can also be conceptualized as the probability of a correct response (P) to the probability of an

responses may have more than two possible values (Masters, 1988)

$$P(X_{vi} = c | \theta_v, \delta_{ij}) = \frac{\exp(\theta_v - \delta_{ij})}{1 + \exp(\theta_v - \delta_{ij})}$$

where c is an item category and δ_{ij} is the ability level required to expect an equal chance of responding in category j or in category $j - 1$. For an item with 4 categories and 3 steps, then:

$$(0) \frac{1}{1 + \exp(\theta_v - \delta_{i1}) + \exp(\theta_v - \delta_{i2}) + \exp(\theta_v - \delta_{i3})}$$

$$(1) \frac{\exp(\theta_v - \delta_{i1})}{1 + \exp(\theta_v - \delta_{i1}) + \exp(\theta_v - \delta_{i2}) + \exp(\theta_v - \delta_{i3})}$$

$$(2) \frac{\exp(2\theta_v - (\delta_{i1} + \delta_{i2}))}{1 + \exp(\theta_v - \delta_{i1}) + \exp(\theta_v - \delta_{i2}) + \exp(\theta_v - \delta_{i3})}$$

$$(3) \frac{\exp(3\theta_v - (\delta_{i1} + \delta_{i2} + \delta_{i3}))}{1 + \exp(\theta_v - \delta_{i1}) + \exp(\theta_v - \delta_{i2}) + \exp(\theta_v - \delta_{i3})}$$

A student's location on a construct, or, where along the learning continuum that individual is located, is estimated based on that individual's pattern of item responses in conjunction with the estimated item parameters—*location* refers to the value of θ that makes the observed data the most probable (Embreston & Reise, 2000).

incorrect response (1-P), or $\left(\frac{1-P}{P}\right)$. The logit is the natural logarithmic scale of the odds ratio, or, $\log\left(\frac{1-P}{P}\right)$. When the logit is negative, and way below zero, the item is considered easy. When the logit is positive, and way above zero, the item is considered difficult. For the person dimension, the odds ratio is opposite that of the item dimension, or $\left(\frac{P}{1-P}\right)$. As in the item case, for persons, the logit is the natural logarithmic scale of the odds ratio, or, $\log\left(\frac{P}{1-P}\right)$. Positive logit values indicate students with higher levels of ability than students with logit values below zero.

It is useful to note that the origin and scale of the logit metric is arbitrary. Wright and Stone (1979) indicate that any constant may be added to all student abilities and item difficulties without changing the difference $\theta_v - \delta_i$.

In the next section, common Rasch model and IRT model statistics will be presented as a demonstration of how this particular approach to analyzing assessment data can be useful both to instrument designers and teachers.

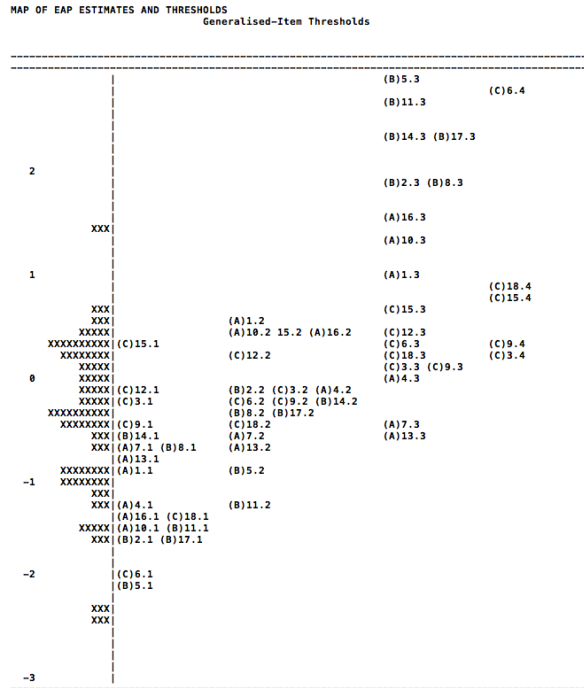
Results

Instrument Level Fit

Figure 2 compares the distribution of student ability estimates (indicated by the “X”s on

the left side of the axis (each “X” represents 0.4 students) to the distribution of *Thurstone Thresholds* (indicated by the numbers on the right side of the axis) on the common logit scale. The *k*th Thurstone Thresholds represent the point (or, θ) at which the probability of the scores below *k* is equal to the probability of score *k* and above (this probability is 0.5) (Wilson, 2005). For example, students with an estimated θ of -0.5 are as likely to achieve a score of 0 on item 14 as they are of achieving a 1 or higher on the item. Similarly, for item 7, students at the same ability estimate are as likely to achieve a score of 0 or 1 as they are of achieving a score of 2 or higher.

Figure 2. *Wright Map for the SER Instrument.*



An overall trend of Thurstone Threshold estimates increasing in difficulty as successive categories across items are achieved suggests the outcome space was appropriate for most items—put differently, the difficulty associated with each successive level in the partial credit model increased as would be expected. Continuing, it is observed that the majority of items fall within the upper and lower bounds of the student distribution. This indicates that the instrument was appropriate for this sample, in that the majority of the items were informative as they were not too challenging nor too easy.

Evidence for Reliability. The instrument was most precise, and provided the most information, for students with ability estimates within the range of -0.9 - 0.6 logits—69% of the sample falls within this range (see Figure 3). As proficiency levels trend toward positive and negative extremes, the instrument loses measurement precision and the information becomes less—this is most pronounced at the lower end of the ability distribution (see Figure 4). As a measure of internal consistency, a coefficient of $\alpha = .88$, indicates that the 18 items consistently measured the SER construct, while a person separation reliability coefficient of .87 suggests the instrument was sensitive enough to distinguish between students with high and low SER ability.

Item Level Fit

Infit Meansquare Statistics. An item's infit mean square is the ratio of the mean of the squares of observed residual to the expected squared residual. Values < 0.75 indicate less randomness in the data than expected by the model and values > 1.33 indicate more randomness in the data than expected by the model. Items 6 and 18 underfit the model

(see Figure 5). This observation will be considered more fully below.

Challenging items. At the sample mean ability level ($\theta = -0.43$), the probability of achieving full credit on (B) items is very small relative to (A) & (C) items (see Table 2). This observation will be considered more fully below.

Validity. Checks for validity conformed to the five strands delineated in the *Standards for Educational and Psychological Testing* and will be discussed in turn (American Educational Research Association et al., 1999).

Validity evidence based on instrument content. Validity based on instrument content was satisfied through the application of the 4 building blocks approach to instrument design (Wilson, 2005). At the outset of the development phase, a construct was defined, viz., SER, and then two theoretical continuums along which students could be ordered, moving from a complete absence of SER ability to full proficiency in it, was outlined (see Appendices A & B). The next step undertaken was that of item design. Item prompts were intended to aid students in identifying the information necessary to appraise the effectiveness, validity, and appropriateness of the employee's actions in response to the social clues/hints provided by the customers in the scenarios. Such cognitive and behavioral approaches to social problem solving are common in the field of special education, specifically with students with Level 1 ASD. Simultaneous to item design, a polytomous outcome space was articulated that was sensitive to the range of variation in participants' responses. Finally, the Partial Credit Model was employed for the purpose of relating the scored outcomes back to the construct as identified in the outcome space.

Figure 3. *Test Information Function.*

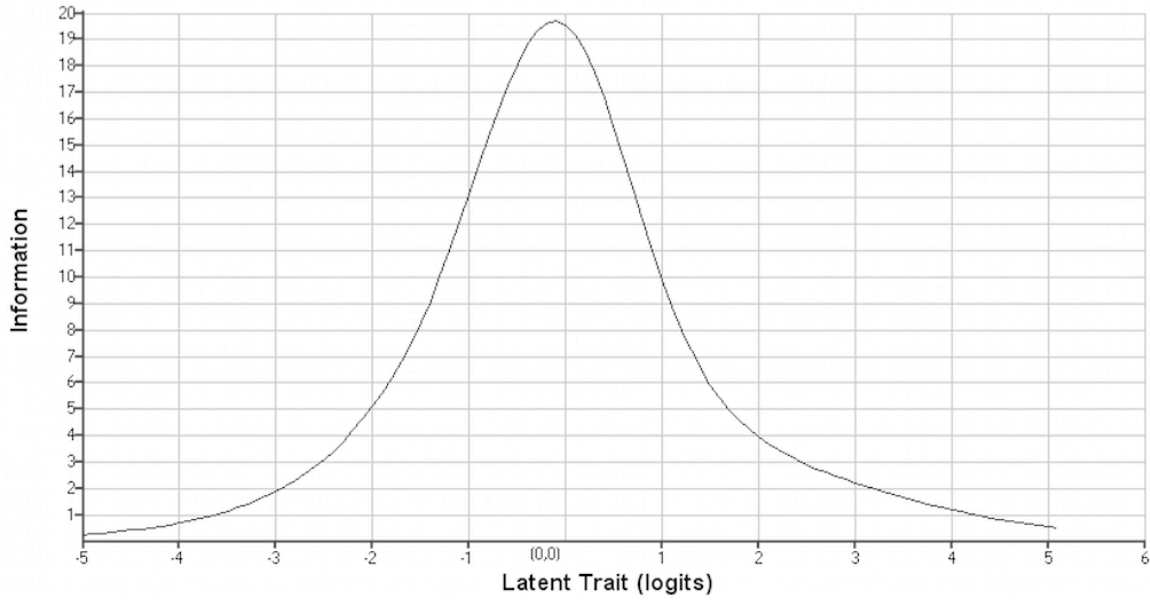


Figure 4. *Standard Error of Measurement.*

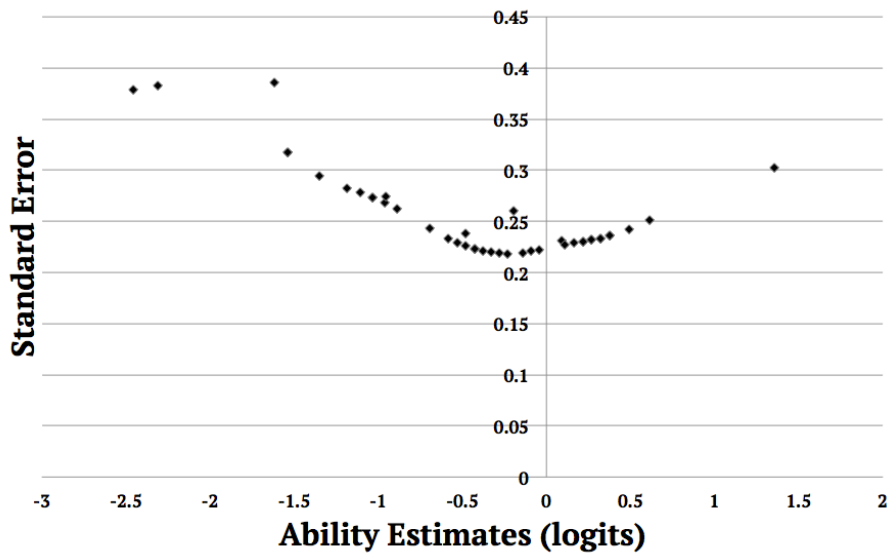


Figure 5. *Item Fit Statistics.*

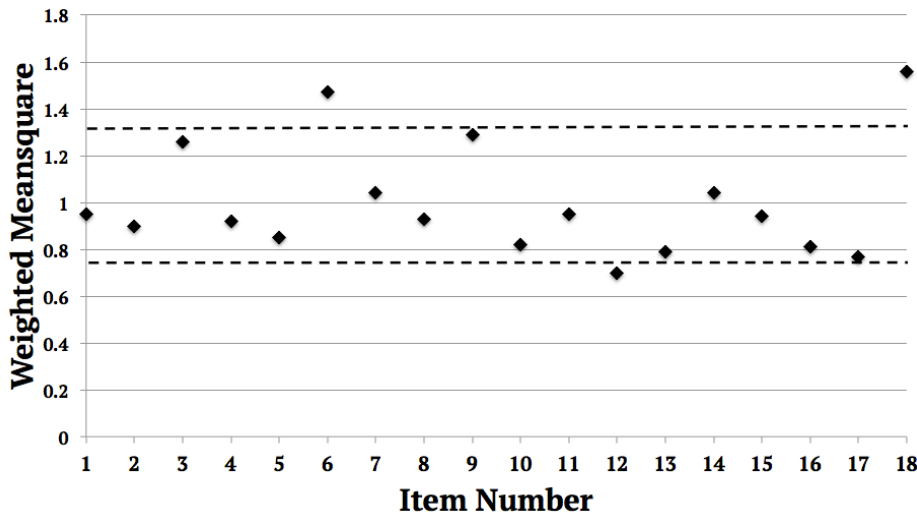


Table 2. *Probability of Achieving Highest Step by Item Type*

Item Type	Mean Difficulty Estimate for Achieving Highest Step	Probability of Achieving Highest Step at Mean Ability Level (-0.43)
Antecedent	-0.497	0.52
Behavior	2.196	0.07
Consequence	-0.353	0.48

Validity evidence based on response processes. Validity based on response processes was addressed with data gained from exit interviews with a cross-section of students, parents, and Special Education personnel during a previous administration of this instrument in which the scenarios were presented entirely in written format. A common theme that emerged during these exit interviews was that the written format of the scenarios made the instrument too challenging. By utilizing a visual format, it was possible to reduce the mean scenario word length by 64% and to present key nonverbal social clues/hints in a medium more consistent with reality.

The use of visual supports to aid reading comprehension for students with ASD is consistent with research demonstrating strengths in visual learning and processing for this population (Gately, 2008; Marks et al., 2003). For example, Comic Strip Conversations have been demonstrated to improve perceptions of social situations, reduce maladaptive social behaviors, and improve the ability to generate solutions to challenging social situations independently (Pierson & Glaeser, 2005). McVicker (2007) wrote about the potential benefits of utilizing comics as a format to promote reading comprehension in the classroom. She suggests that the images that make up comic strips may enhance and extend

traditional text communication and be more effective in attracting the attention of readers. Weitkamp and Burnet (2007), in designing a comic strip to incorporate humor into the science curriculum for a group of students in the UK, received positive feedback from their sample: the students found the comic strip entertaining to read and engaged with the protagonist. Of further significance, teachers of the students reported that the combination of visual and text-based narrative helped students who were less motivated or experienced challenges with reading.

Validity evidence based on internal structure. Validity evidence based on internal structure was addressed at two different levels: test and item. At the level of the test, concordance between the theoretical expectations of the construct maps (Appendices A & B) and the empirical results were analyzed visually and quantitatively. To consider the latter, Spearman’s correlation was computed to quantify the strength of concordance between the theoretical expectations of the construct and the empirical results. Based on the complexity of each scenario—complexity being a function of the number and type of social clues/hints contained in

each scenario and the extent to which the target employee’s response to these social clues/hints was appropriate—a hypothesized order of difficulty was proposed for each item which was then compared to the estimated level of difficulty for the items (see Figure 6). This relationship showed a weak, positive correlation ($\rho = .23$).

At the item level, a trend of mean Thurstone Threshold estimates increasing as each score group increases is evidence that students higher on the SER construct actually scored higher on each item (see Figure 7) (Wilson, 2005).

Validity evidence based on relations to other variables. To satisfy validity evidence based on relations to other variables, Pearson’s R was calculated to measure the relationship between students’ grade level and SER ability estimates. It was hypothesized that these two variables would be positively correlated—as grade level increases, so might the likelihood of having employment experience to draw upon when responding to the items. There was a weak, positive correlation between the variables $r = 0.38$ (Figure 8 summarizes this relationship).

Figure 6. Spearman’s Rank Correlation Plot.

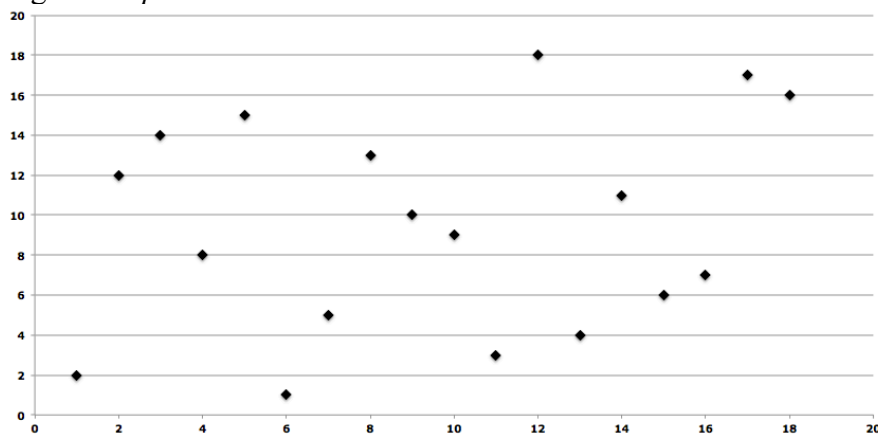


Figure 7. *Item Threshold Trends.*

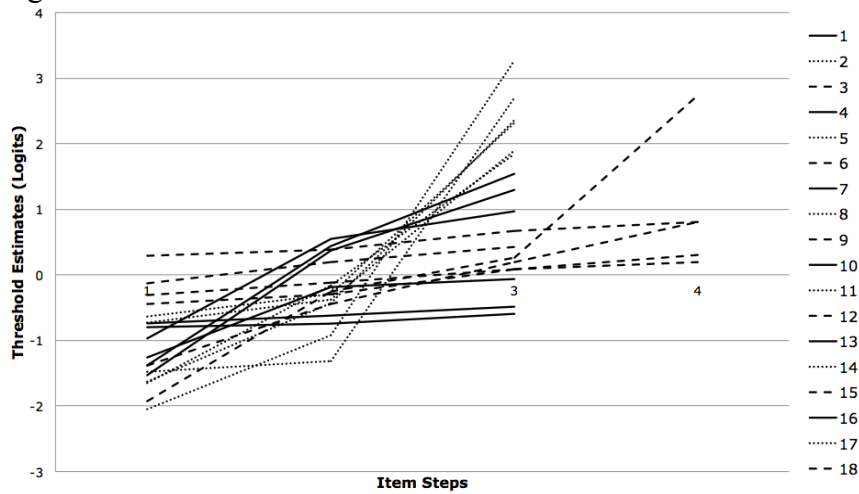
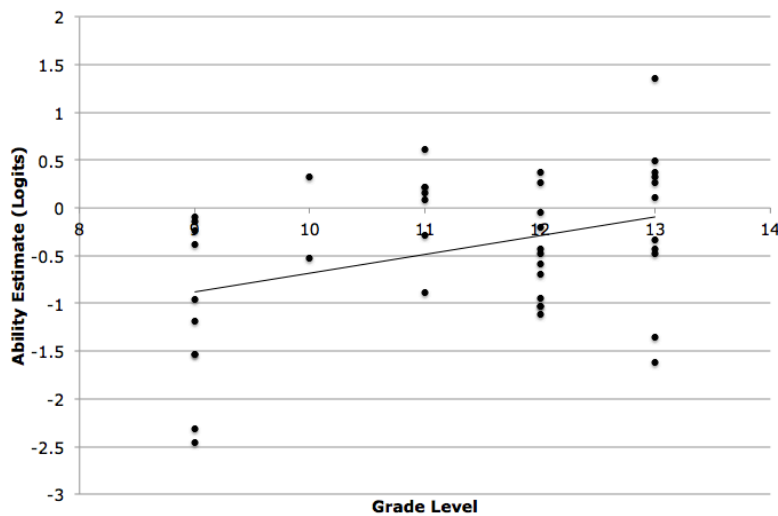


Figure 8. *Relationship between Grade Level and Ability Estimate.*



Validity evidence based on the consequences of using the instrument. To consider a potential positive consequence, data from the SER instrument may be relevant for informing classroom curriculum toward the end of preparing students in this population for working in such employment settings. On the other hand, findings from such an assessment tool have the potential to

be recruited for negative purposes. Specifically, a student may be denied the opportunity to participate in an employment opportunity on the basis of a poor performance on the SER instrument, thereby missing out on critical instances of learning and development in a domain wherein progress may be instrumental to success in post-secondary life. Data from such an

instrument should never form the crux of a justification for a complete denial of opportunity, especially in the context of a finite period for development within that domain, in this case vocational development in the context of transition.

Discussion

The results of this calibration study demonstrate that the SER instrument possesses a few desirable psychometric qualities. In general, the items were relatively informative, and measured with some precision, students at the lower end of the ability distribution—a sought-after quality in a potential formative assessment intended to identify points of weakness within a given learning domain. In addition, high internal consistency suggests that the (A), (B), and (C) item prompts are functional to the extent that they are measuring a single, unidimensional latent variable. Continuing, while infit meansquare statistics that fall outside the range for useful measurement may suggest problematic items to be removed from an instrument, in this context, the model underfit of items 6 and 18 may be interpreted as empirical evidence for comic strips that present scenarios depicting social dynamics that require a much more discerning level of SER ability to be successful. Unfortunately, a full delineation of the dynamics included in these items is not possible given the limited amount of space for this article, however, it may be stated that the *immediately correct* response for these scenarios is not necessarily the *fully correct* one. In other words, the scenarios included social information and employee behaviors of a more subtle nature, in the case of the former, and that were less obviously correct versus incorrect, in the case of the latter. The higher levels of variance generated by these scenarios, then, may be indicative of potentially challenging employee/customer

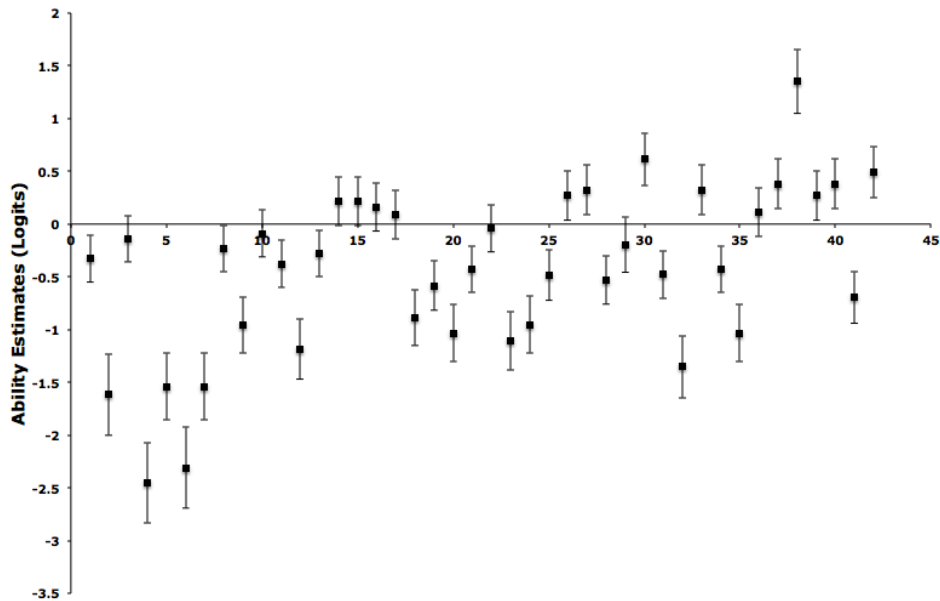
dynamics that could be addressed in a classroom context.

In addition to these virtues, there is also a prominent issue that emerged in this calibration study that should be addressed: the relatively high difficulty estimates associated with achieving full credit on (B) items compared to (A) and (C) items (see Table 2 above). The explanation for this outcome embodies one of the strengths of using a Rasch modeling approach to model assessment data: the item prompt says explicitly to “list” instances of help, while the outcome space provides full credit only for students who go one step above listing them and summarize these instances using accurate emotional/attitudinal descriptors (see Appendix A). Prior to a further iteration of this instrument, then, it will be necessary to either, collapse response categories 2 and 3 or remove the word “list” from the item prompt.

Limitations

An important limitation to these results is the small sample size used for this calibration study. While in the ASD research literature an $N = 42$ is considered large, (see the Bennett & Dukes (2013) study discussed above), the measurement model utilized here estimates item and person parameters much more precisely when samples are considerably larger. For example, Figure 9 presents student ability estimates for the sample with error values. It is at once apparent based on a visual analysis of this graph that the large margins of estimation error provide for a fairly large range of possible student locations. This is an indication of the fact that, even when the SER instrument is measuring within its range of maximum sensitivity, the extent to which these estimates may fluctuate is somewhat extensive.

Figure 9. *Student Ability Estimates with Error Bars.*



Implications for Practice

At the global level, information presented in the Wright map (see Figure 2) has potentially useful implications for practice. Based on the distribution of student ability estimates relative to the distribution of item difficulty estimates, insights about student SER ability relative to item content may be gained. For example, items extremely high or low on the difficulty distribution relative to the student ability distribution may indicate potential issues with item wording—as was the case here—content, or both. By making necessary edits to such items, then, an instructor would have a more informative assessment instrument for future administration.

Continuing, there exist potentially useful instructional implications related to the SER instrument with respect to points of weakness that may be identified through its use—it is conceivable that, based on where a

student is located on the SER ability map (see Appendix B), appropriate instructional strategies targeting the skills needed to achieve higher levels of competency in the ability may be devised. The general trend in moving up the SER scale included in Appendix B is that competence in this ability is achieved through the acquisition of progressively more complex reasoning skills. For example, the transition from the *Comprehensive* to the *Summative* stage requires the ability to make an inferential leap beyond the evidence contained explicitly in a scenario—a primarily local processing ability—by bringing into consideration the situational constraints characteristic of a workplace heavy in soft skill demands as a frame of reference to inform an accurate global judgment on the scenario’s outcome. Classroom instruction designed to articulate the situational demands of a given workplace and how these should inform one’s behavior in such a

context, then, would be one avenue to consider.

A further educational implication of the SER instrument relates to the type of social information contained in the comic strips and the channel through which this information is presented ((A) items). Table 3 presents descriptive statistics for the frequency of occurrence of the different types of social information (referred to as social clues/hints in the item prompts) contained in the SER instrument and the percentage of the sample that identified them in their responses. To illustrate, the column labeled UG4 corresponds to the comic strip presented in Figure 1, above. Two pieces of social information were presented in this strip: 1. A non-verbal-emotional clue (the angry manager in the top of the frame in the second panel) and; 2. A non-verbal-non-emotional clue (the reaching customer in the center of panels one and two). As the data shows, 71% of the sample identified the non-verbal-non-emotional clue

in their responses while 33% identified the non-verbal-emotional clue. A potential explanation for the relative difficulty of the non-verbal-emotional clue may be found in the challenges with ToM ability that students with Level 1 ASD often experience. More specifically, it is necessary that a student understand *why* the manager in this particular scenario is angry. This, of course, requires an understanding of the impact that the negligent employee's choice to continue her conversation with her coworker, in the presence of a customer who clearly requires assistance, has on the behavior and attitude of the manager. This is a much more complex chain of reasoning than is required to simply interpret the meaning of a reaching customer. Such information, then, may be useful for informing lessons about common *workplace antecedents* to employee behavior and how appropriate responses serve to engender desired experiential states within customers, managers, and coworkers.

Table 3. Number of Students that Identified Clues (% of Total Sample)

Clue Type	UR1	SR2	UR3	UG4	UG5	SG6
NE(C)	13 (31%)	-	-	-	-	-
NE(A)	7 (17%)	24 (58.5%)	4 (9.5%)	14 (33.3%)	8 (20%)	-
VE(S)	7 (17%)	-	-	-	-	-
VE(A)	2 (4.8%)	-	1 (2.38%)	-	0	-
NNE	14 (33.3%)	16 (38.1%)	-	30 (71.4%)	-	-
VNE	-	-	-	-	-	17 (40.5%)
NE+VE	7 (17%)	-	22 (52.4%)	-	19 (47.5%)	22 (52.4%)

Note. NE = nonverbal-emotional; VE = verbal-emotional; NNE = nonverbal-non-emotional; VNE = verbal-non-emotional; NE + VE = nonverbal-emotional + verbal emotional; (C) = confusion; (A) = anger; (S) = sarcasm

References

- American Educational Research Association, American Psychological Association, National Council on Measurement in Education, Joint Committee on Standards for Educational & Psychological Testing (US) (1999). *Standards for educational and psychological testing*. American Educational Research Association.
- Baio, J. (2012). *Prevalence of autism spectrum disorder among children aged 8 years—Developmental disabilities monitoring network, 11 sites, United States, 2010*. Retrieved from, http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6302a1.htm?s_cid=ss6302a1_w
- Baron-Cohen, S., O’Riordan, M., Stone, V., Jones, R., & Plaisted, K. (2000). Recognition of faux pas by normally developing children and children with Asperger syndrome or high-functioning autism. *Journal of Autism and Developmental Disorders*, *29*, 407-418.
- 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.
- Bennett, K. D., & Dukes, C. (2013). Employment instruction for secondary students with autism spectrum disorder: A systematic review of the literature. *Education and Training in Autism and Developmental Disabilities*, *48*, 67-75.
- Black, P., Wilson, M., & Yao, S. (2011). Road maps for learning: A guide to the navigation of learning progressions. *Measurement*, *9*, 71-123. doi: 10.1080/15366367.2011.591654
- Castelli, F., Frith, C., Happe, F., & Frith, U. (2002). Autism, Asperger syndrome and brain mechanisms for the attribution of mental states to animated shapes. *Brain*, *125*, 1839-1849.
- Chevallier, C., Noveck, I., Happe, F., & Wilson, D. (2011). What’s in a voice? Prosody as a test case for the theory of mind account of autism. *Neuropsychologia*, *49*, 507-517. doi: 10.1016/j.neuropsychologia.2010.11.042
- Embreston, S. E., & Reise, S. P. (2000). *Item response theory for psychologists*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Fischer, G. H. (1995). The linear logistic test model. In G. H. Fischer & I. W. Molenaar (Eds.), *Rasch models: Foundations, recent developments, and applications*. New York, NY: Springer-Verlag
- Gately, S. E. (2008). Facilitating reading comprehension for students with autism spectrum. *Teaching Exceptional Children*, *40*(1), 40-45.
- Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. S. (2005). Quality indicators for group experimental and quasi-experimental research in special education. *Exceptional Children*, *71*, 149-164.
- Hendricks, D. R., & Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders. *Focus on Autism and Other Developmental Disorders*, *24*, 1-12. doi: <http://dx.doi.org/10.1177/1088357608329827>
- Hochschild, A. R. (1983). *The managed heart: Commercialization of human feeling*. Los Angeles, CA: University of California Press.
- Horner, R. H., Carr, E. G., Halle, H., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, *71*, 165-179.
- Hurlbutt, K., & Chalmers, L. (2004). Employment and adults with asperger syndrome. *Focus on Autism and Other Developmental Disorders*, *19*, 215-222.

- Kalleberg, A. L. (2007). *The mismatched worker*. New York, NY: W. W. Norton & Company.
- Kalleberg, A. L. (2011). *Good jobs, bad jobs: The rise of polarized and precarious employment systems in the United States, 1970s-2000s*. New York, NY: Russell Sage Foundation.
- Lee, G. K., & Carter, E. W. (2012). Preparing transition-age students with high-functioning autism spectrum disorders for meaningful work. *Psychology in the Schools, 49*, 988-1000. doi: 10.1002/pits.21651
- Marks, S. U., Shaw-Hegwer, J., Schrader, C., Longaker, T., Peters, I., Powers, F., & Levine, M. (2003). Instructional management tips for teachers of students with autism spectrum disorders (ASD). *Teaching Exceptional Children, 35*(4), 50-55
- Masters, G. N. (1988). The analysis of partial credit scoring. *Applied Measurement in Education, 1*, 279-297.
- McFall, R. (1982). A review and reformulation of the concept of social skills. *Behavioral Assessment, 40*(1), 1-33.
- McVicker, C. J. (2007). Comic strips as a text structure for learning to read. *The Reading Teacher, 61*(1), 85-88. doi: 10.1598/RT.61.1.9
- Muller, E., Schuler, A., Burton, B. A., & Yates, G. B. (2003). Meeting the vocational and support needs of individuals with asperger syndrome and other autism spectrum disorders. *Journal of Vocational Rehabilitation, 18*, 163-175.
- 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. doi:
- Pierson, M. R., & Glaeser, B. C. (2005). Extension of research on social skills training using comic strips conversations to students without Autism. *Education and Training in Developmental Disabilities, 40*, 279-284.
- Test, D. W., Fowler, C. H., Richter, S. M., White, J., Mazzotti, V., Walker, A. R., Kohler, P., & Kortering, L. (2009). Evidence-based practices in secondary transition. *Career Development for Exceptional Individuals, 32*, 115-128. doi: 10.1177/0885728809336859.
- Weitkamp, E., & Burnet, F. (2007). The chemedian brings laughter to the chemistry classroom. *International Journal of Science Education, 29*, 1911-1929.
- Wilson, M. (2005). *Constructing measures: An item response modeling approach*. New York, NY: Psychology Press.
- Wright, B. D., & Stone, M. H. (1979). *Best test design*. Chicago, IL: Mesa Press.
- Zimmer-Gembeck, M. J., & Mortimer, J. T. (2006). Adolescent work, vocational development, and education. *Review of Educational Research, 76*, 537-566. doi: <http://dx.doi.org/opac.sfsu.edu/10.3102/00346543076004537>

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Appendix A
Outcome Space for (A) and (B) Items

Students	Direction of increasing ability to detect customer/employee social behaviors	Response to Items
<p>(3) Summative stage of social clue detection: Responses are in the form of attribution statements that characterize the overall emotional/attitudinal tone of the social clues (responses may include specific examples).</p>		<p>“That the lady was impatient and upset.”</p> <p>“The first customer was openly displaying her frustration and impatience with her body language.”</p>
<p>(2) Developed stage of social clue detection: Students’ ability to detect social clues is developed, indicated by responses that detect all instances of them—responses may be verbatim duplications of prompt text.</p>		<p>“She was looking at him with a frown on her face and her arms crossed on her chest; she is tapping her foot rapidly and standing in a very tense posture.”</p>
<p>(1) Emergent stage of social clue detection: Students’ ability to detect social clues is emerging, indicated by responses that fail to detect all instances of them (responses may be verbatim duplications or partial attributions).</p>		<p>“She complains.” (1 out of 3).</p> <p>“He saw the woman standing by the shoes scratching her head and then signaled to him for help.” (2 out of 3)</p>
<p>(0) Pre-emergent stage of social clue detection: Students are not able to provide a response indicative of the ability to detect social clues. Responses focus on irrelevant aspects of scenarios.</p>		<p>“He was very helpful.”</p> <p>“Quan called another store that would have the shoes the customer wants.”</p>
	<p>Direction of decreasing ability detect customer/employee social behaviors</p>	

Appendix B Outcome Space for (C) Items

Students	Direction of increasing SER ability	Response to Items
<p>Summative SER ability Students pass accurate, global-level judgments on the outcome of the scenario that include valid behavioral inferences based on employee’s actions in response to pertinent social clues that invoke principles not explicitly present in the scenario.</p>		<p>“Because you are supposed to actually help them, you should always try to be polite to the customer. Even when they are rude, you should always try to be nice to them. So, no. He should not have mocked her and told her about being able to buy the shoes online.”</p>
<p>Comprehensive stage of SER ability Students pass accurate judgments on the outcome of the scenario, citing all relevant pieces of evidence in support.</p>		<p>“Yes because she told the mother that she could have someone else clean up for her instead of making a scene with the mother. She helped the mother so she won’t be late for her appointment.”</p>
<p>Partial justification stage of SER ability Students pass accurate judgment on the outcome of the scenario, highlighting an instance in which the employee did bad/good, or suggesting an alternative in the case that the employee did bad. Students fail to cite all relevant pieces of evidence in support.</p>		<p>“Yes, because he told another employee to assist a third customer.”</p>
<p>Basic stage of SER ability: Students pass an accurate judgment on the outcome of the scenario, but respond with one-word responses or provide very high-level/vague explanations.</p>		<p>“Yes.” “Yes, because it shows he cares and takes care of the job.”</p>
<p>Confused stage of SER ability: Students provide inaccurate judgments on the outcomes of the scenarios.</p>		<p>“Not really, he could have talked more.” “I think (employee) did and didn’t do anything bad/disrespectful. It was mostly the customer’s fault.”</p>
	<p>Direction of decreasing SER ability</p>	

Examining the Effectiveness of Technology-Based Intervention on Student Engagement and Products of Learning in an Earth Science Class

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Abstract: Engagement in learning is critical to student learning outcomes. Meaningful inclusion of students with disabilities should support engagement in order to ensure their learning and quality of learning products. This project examined the effectiveness of a technology-based intervention designed within the principles of the Universal Design for Learning for a high school sophomore with autism spectrum disorder enrolled in an earth science class. The dependent variables examined in this case study were levels of engagement and learning products. The findings support the need for designing curriculum within the Universal Design for Learning framework in order to ensure learning of all students.

Today's schools struggle to create and maintain an academically engaging environment for all students, including those with disabilities (McLeskey, Tyler, & Flippin, 2004). High school academic success is particularly critical to achieving positive long term outcomes (Cooper, 2014; Lawson & Lawson, 2013). Adolescents with a diagnosis of Autism Spectrum Disorder (ASD) continue to fall below average in academic achievement despite average or above average intellectual abilities (Fleury et al., 2014). Interventions supporting academic achievement may aid schools in overcoming learning barriers. Current literature links engagement and instructional technology to academic achievement for adolescents with a diagnosis of ASD within secondary education (Cooper, 2014; Fleury et al., 2014).

Academic Engagement

Student engagement has three dimensions: behavior, cognition, and emotion (Christenson, Reschly, & Wylie, 2012;

Cooper, 2014; Fredricks, Blumenfeld, & Paris, 2004; Hollingshead, 2013; Hollingshead, Carnahan, Lowrey, & Snyder, under review). Thus, engaging instruction will elicit behaviors of (a) being prepared, orientating toward the speaker, following directions, participating, and working toward completion of assignments (i.e., behavioral aspect of engagement; Cooper 2014); (b) asking and responding to questions and processing information (i.e., cognitive component of engagement); and (c) demonstration of motivation and positive emotions related to learning (i.e., emotional aspect of engagement). Research supports the link between increased engagement and academic achievement (Appleton, Christenson, & Furlong, 2008; Fredricks et al., 2004; Skinner & Belmont, 1993; Skinner & Pitzer, 2012). For example, academic engagement results in higher grades and higher standardized test scores (Cooper, 2014; Klem, & Connell, 2004). Academic engagement is not only a facilitator of learning, but also as a potential solution to

high drop-out rates, students' boredom, and lack of respect for authority and rules (Finn & Zimmer, 2012; Fredricks et al., 2004; Fredricks & McColskey, 2012; National Research Council and the Institute of Medicine, 2004).

Being a critical facilitator of student learning outcomes, engagement responds to intervention (Finn & Zimmer, 2012; Fredricks et al., 2004; Skinner & Pitzer, 2012). Skinner & Pitzer (2012) described engagement as, "a malleable state that can be shaped by schools" (p. 21). Several external and internal factors may influence engagement. First, student characteristics related to attention and information processing may impact engagement (Ruble & Robson, 2007). Though it seems understandable that specific learner characteristics may influence a student's academic engagement, the literature overwhelmingly accentuates the role of the school and the teacher (Pianta, Hamre, & Allen 2012; Sharan, 2008). Thus, student individual characteristics cannot be the only factor in an analysis of a child's lack of engagement. Academic engagement is possible for all learners, though some students may require more support than others (Mahatmya, Lohman, Matjasko, & Farb, 2012).

Classroom-specific variables, such as teacher interaction style, play a deciding role in the degree of student engagement (Pianta et al., 2012; Skinner & Pitzer, 2012). Cooper (2014) outlines three characteristics of teaching practices linked to increased student engagement: academic rigor, lively teaching, and connective instruction. Conversely, Karich, Burns, and Maki (2014) found that self-directed learning may facilitate student engagement. One type of instruction found to support engagement is instructional technology (Parsons, &

Leonard, 2007; Wang & Reeves, 2007; Mitchell).

Instructional Technology

Research supports the use of instructional technology to increase motivation and engagement for adolescents with ASD (Wang & Reeves, 2007; Mitchell et al., 2007). Wang and Reeves (2007) implemented a web-based instructional technology learning environment in a high school earth science class. The authors measured the impact of a web-based instructional technology on student academic motivation. The results indicated an increase in academic motivation with the implementation of the web-based instructional technology (Wang & Reeves).

Instructional technology is an effective tool for designing instruction on diverse topics (Fleury et al., 2014; Whalen et al., 2010; Wang, & Reeves, 2007; Mitchell et al., 2007). Yet, it is the visual component of instructional technology, visual media, and graphics that has been found to be particularly successful at appealing to secondary students with ASD (Fleury et al., 2014; Whalen et al., 2010). This can be especially important in classrooms that use more traditional instructional methods that may not engage or appeal to students with ASD or similar disabilities.

Samson, Mottron, Soulières, & Zeffiro (2012) support visual processing as strength associated with ASD. The authors performed a meta-analysis on 26 peer-reviewed functional magnetic resonance imaging (fMRI) articles and concluded that there is more activity within visual processing regions of the brain of people with ASD than in people without a diagnosis of ASD. Thus, visual processing strengths associated with ASD are maximized by the visual nature of instructional technology

(Fleury et al., 2014). Additionally, visual graphics have been linked to increased engagement, high intervention response rate, and academic motivation (Singh, Granville, & Dika, 2002; Traynor, 2003; Whalen et al., 2010).

The visual components of instructional technology aid adolescents with ASD in overcoming potential deficits in social processing and observational learning (Fleury et al., 2014). Plavnik and Hume (2014) reported teacher-directed instruction presents a challenge for some students with ASD. Students with ASD have difficulty learning through observation and social processing, thus teacher lecturing is not the best medium for them. The visual component of instructional technology may eliminate the need for social processing as an element of information processing (Fluery et al., 2014). This frees up mental processes for academic content. Although research supports the use of instructional technology for adolescents with ASD, there is little research linking instructional technology to engagement in a high school earth science classroom (Browder, Spooner, Wakeman, Trela, & Baker, 2006).

Conceptual Framework and Study Purpose

This explanatory case study (Yin, 2003) is guided by the conceptual framework of the Universal Design for Learning (UDL) (Rose & Meyer, 2000). The three core principles of UDL (multiple means of representation, expression, and engagement) are aimed to improve curriculum and instruction based on the knowledge of how the brain develops and uses learning networks (Rose & Meyer, 2000). While UDL implementation science is still emerging, these principles offer a proactive framework for promoting engagement and learning of all students in the general education curricula. Engagement

is the key element in this framework. The Center for Applied Special Technology (CAST; n.d.) provides a variety of strategies for fostering student engagement within the UDL framework including addressing student interests, promoting self-regulation strategies, and supporting ongoing effort and motivation.

Thus, the purpose of this explanatory case study was to examine the effectiveness of designing individualized science instruction within the UDL framework utilizing an instructional technology package for a student with ASD. The explanatory case study approach was chosen to specifically investigate the cause and effect relationship (Scholz & Tietje, 2002) between the instructional technology and student engagement. This case study is based on the following propositions supported by the extant literature:

1. Increased student engagement is linked to improved learning outcomes (Lawson & Lawson, 2013)
2. Self-directed learning incorporating the use of technology stimulates engagement (Karich et al., 2014)

Consequently, we addressed the following research questions:

1. How do products of learning change after implementation of an instructional technology package for a student with ASD within a high school science classroom?
2. How does implementation of an instructional technology package increase engagement and independence levels for a student with ASD within a high school science classroom?

Method

This explanatory embedded case study was focused on increasing student engagement in

an earth science class while utilizing an instructional technology package tailored to the course content. Thus the “unit of analysis” (Baxter & Jack, 2008) was student engagement, and this case was bound by time and activity (Stake, 1995). This individual embedded case study (Scholz & Tietje, 2002) was a part of a larger funded project that investigated technology integration for high school students with special needs in STEM-related classes. The embedded explanatory case study design provides a framework for bridging the quantitative and qualitative approaches that are used within larger mixed methods design studies (Scholz & Tietje, 2002), thereby allowing for a more comprehensive overview of the complex issues inherent in social/educational settings.

Participant and Setting

This embedded case study focused on one particular student: Will, a high school sophomore with a diagnosis of autism spectrum disorder (ASD). Will attended a general education earth science class with two other peers with disabilities and a paraprofessional. On average, Will spent more than 60 percent of his school day in the general education setting. Will had limited verbal skills and did not independently engage in social interactions. During baseline observations in earth science class, Will demonstrated limited engagement levels and if left alone would spend his time flipping through the course textbook’s pages one by one. This repetitive behavior was consistent with his ASD diagnosis.

The earth science class met four times a week during third period. The class was conducted in a semi-rural high school located in the northwestern United States. There were on average 20 students without disabilities in this class. The earth science

classroom teacher had a Master’s degree and 15 years of teaching experience. The expressed a desire to increase the engagement of the students with disabilities in his classes, although he readily admitted that he did not have the knowledge or background to effectively do so.

Study Design

This study was reviewed and approved by the Institutional Review Board. The main participant in the study signed an assent form, and his legal guardians approved of this research by signing informed consent form and a video release form. Additionally, parents of other students present in the classroom during the study, as well as the classroom teacher, signed the consent forms and video release forms.

Procedure. Two of the authors spent three weeks observing Will and his classmates with disabilities across a variety of settings before deciding on the students who would be targeted for the intervention. A review of the field notes and observations led to a specific focus on Will’s performance in the earth science class. Prior to the intervention, Will sat in the earth science class passively observing the teacher or engaging in obsessive turning of pages in the textbook. When students were asked to complete work, he would either copy the work from his peers or write down what a paraprofessional was dictating to him. Both of these behaviors required a significant amount of prompting from a paraprofessional.

The two dependent variables targeted in this study were *engagement* and *learning products*. We defined engagement as a student sitting with their body, face, and eyes in the direction of the learning materials; using learning materials for the purpose designated by the teacher;

documenting/recording topics related to class and refraining from activities unrelated to the topic; responding to the teacher/paraprofessional's questions (adapted from Carnahan, Musti-Rao, Basham, 2009). We defined learning products as tangible outcomes of a class period (e.g., a worksheet, an essay, a drawing, a quiz, or typed responses to content-related questions) that reflected the content covered during that class session.

The intervention package (i.e., the independent variable) consisted of individualized earth science curriculum that aligned with UDL principles and addressed all three components of engagement: cognitive, emotional, and behavioral. We modified the curriculum to provide Will with multiple means of representation of information, ways of expression of his knowledge, and means to engage in learning. Specifically, we collaborated with the classroom teacher to identify a weekly schedule of class topics and key vocabulary words related to the topic for the week. Based on that information, we planned lessons that incorporated videos and articles related to the topics. Each lesson we planned for Will was closely aligned with the rest of the class; however, we provided him with multiple means of engagement with the topic and representation of the information (i.e., videos, images, articles, interactive simulations). Will completed his work on a laptop assigned to him and produced his learning products utilizing First Author™, a software package that supports emergent writers. He was able to work at his own pace and complete his work independently while following a visual schedule.

Data collection. We collected data on Will's engagement levels during the class, utilizing six second whole interval recording. During the six seconds of

observation, Will had to be engaged the entire time to be marked as A (actively engaged). If he was not engaged, we marked N for not engaged. We observed Will during the entire class period utilizing the intervals of six second observation and 24 seconds for recording on a data sheet. Apart from scoring engagement levels, we also marked classroom activities (i.e., TL – teacher lecture, V – video, I – independent work, GA – group activity) and tally marked prompts Will required during each six-second interval to refocus his attention to the task at hand.

Due to the fact that the earth science class met four times a week, there were four data collectors involved in the study to ensure daily observations. Two university faculty, one doctoral student, and one undergraduate student collected the data. The fact that there were multiple data-collectors from various backgrounds ensured a higher level of objectivity, especially within the observation of Will's behavior. Each class period was also video recorded, with the video camera focused on Will, and Will's engagement was reviewed by an independent, external evaluator. This allowed the research team to establish a measure of inter-rater reliability for each observation session. Lastly, at the end of the session, we took digital photos of Will's products of learning.

All data collectors were trained by the first author and the main researcher of this study. During the training, all were provided with a study protocol that clearly outlined the procedures, materials needed, and operationally defined target behaviors. Upon a description of the procedures and an overview of the protocol, all data collectors practiced scoring data sheets utilizing one of the baseline videos. The training lasted an hour and ended once there was 100% agreement across the data collectors.

Baseline. During the baseline, phase A, no intervention was present and no changes were implemented. The typical class consisted of an unstructured teacher lecture with frequently embedded personal jokes and digressions. During the second part of the class period, the students were either given independent work (e.g., worksheets) or a small-group activity. As per typical class session, Will was included in group activities and was supported by his teacher's aide with some modifications to the material. Modifications included completing partial assignments or projects.

Intervention. During the intervention, phase B, the instructional technology package described above was implemented. Before class began, Will watched a video model following the steps in his visual schedule. Will was given a laptop, a set of headphones, and a visual schedule listing his tasks at the beginning of earth science class. Each day his visual schedule prompted him to review focus vocabulary words, watch video links, complete readings, and independently write a sentence containing one of his target vocabulary words utilizing First Author™ software. First Author™ includes customizable picture prompting, topic-based word banks, word prediction, and speech to text and text to speech options.

Interrater Reliability

Inter-rater reliability of Will's engagement level, measured as the percentage of time engaged per session, was calculated for 50 percent of the sessions. The range of agreement was 33.3 and 100 percent. The average agreement equaled 88.2 percent. The variability of the agreement appeared to be due to the varied quality of video recordings and the general lack of context cues available to the second rater.

Results

This explanatory embedded case study (Scholz & Tietje, 2002) was focused on increasing student engagement in an earth science class while utilizing instructional technology package. The data was collected on the engagement level percentages as well as on the products of learning.

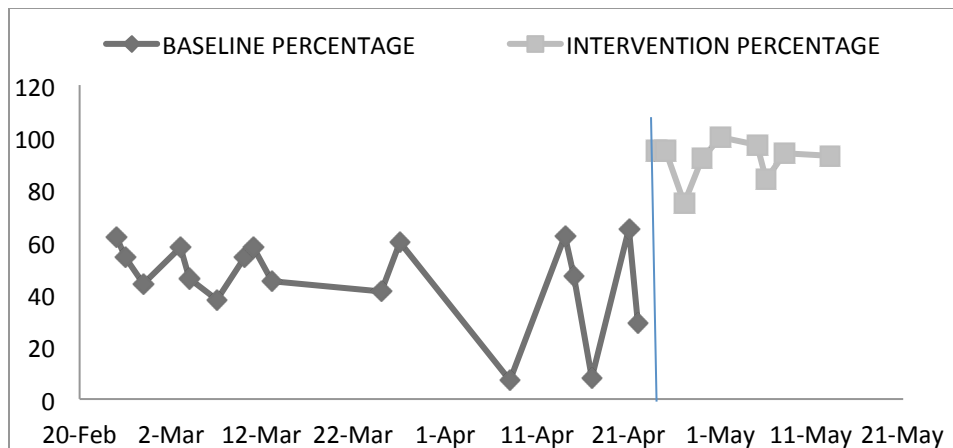
Engagement Levels

Figure 1 presents the results of the observations of Will's engagement levels. There were two phases of this study: baseline and intervention. During the baseline, Will's average engagement levels were 46 percent. Comparatively, upon introducing the intervention, the engagement levels increased to an average of 92 percent. There were no overlapping data points (PND, Scruggs, Mastropieri, Cook, & Escobar, 1986) between the two phases, which suggested significant effect size. Because this study did not extend beyond AB design, one should be cautious before asserting that the change in engagement levels was due to the intervention.

Products of Learning and Independence

We utilized typological analysis of artifacts (Hatch, 2002) to analyze the digital images of the daily products of learning. Two independent scorers classified the products of learnings into categories based on the type of product. The results show that during the baseline, the products of learning can be classified as (a) free form (e.g., a drawing), (b) worksheet, and (c) simple essay. Thirty-three percent of Will's work during the baseline was classified as free form. Forty-eight percent was worksheets, and 19 percent was simple essays. All of that work was completed with full prompting from a peer or teacher's aide. The majority of this work was dictated to Will or copied by him.

Figure 1. *Engagement data (as percentage) for Will across baseline and intervention phases.*



Conversely, upon introducing the intervention, Will’s work was completely independent. Will continued to require prompting to follow a visual schedule, but he was able to complete his work independently. There was one category of work upon the introduction of the intervention: emergent writing products in a form of simple sentences to describe a picture prompt given by the First Author™ software.

Discussion

This embedded case study was based on the following propositions supported by the extant literature:

1. Increased student engagement is linked to improved learning outcomes (Lawson & Lawson, 2013)
2. Self-directed learning incorporating the use of technology stimulates engagement (Karich et al., 2014)

The findings of this study provide support to both propositions. First, upon an introduction of the intervention, Will demonstrated immediate increase in the levels of engagement during earth science class. This increase in engagement combined with the particular design of the

intervention, which focused on providing a student with multiple means of representation of information, engagement in learning, and methods for expression (i.e. UDL principles), led to more independent and thus higher quality learning products (Lawson & Lawson, 2013). Will’s learning products changed from worksheets, extended responses, and other free forms, which were all fully prompted by a paraprofessional or copied from a peer, to completely independent emergent writing samples. A case study of this particular student supports the notion of the importance of providing students with disabilities with (a) motivating environments and resources, (b) writing models, (c) supportive instruction, and (d) opportunities to write (Mayer, 2007) in order to strengthen their emergent writing skills.

Second, the findings of this case study are consistent with the proposition that self-directed learning that incorporates the use of technology may stimulate and increase engagement (Karich et al., 2014). These findings extend research of Wang and Reeves (2007) to demonstrate that not only motivation, but also student engagement in

learning and the meaningfulness of the learning products may change with an implementation of technology-based instruction. In turn, this study is also consistent with the notion that visual processing may be a strength of some adolescents with ASD (Fleury et al., 2014; Samson et al., 2012, Whalen et al., 2010).

The findings of this case study emphasize the importance of aligning instruction with UDL principles (Rose & Meyer, 2000) in order to ensure learning of all students. Moreover, designing instruction within the three principles of UDL may ensure that all three dimensions of engagement (i.e. behavioral, emotional, and cognitive) are being addressed (Hollingshead et al., under review). When teachers represent information in multiple ways, allow students to engage in learning in a variety of strategies, and express their knowledge through multiple means, they ensure that all students respond to instruction.

Students with disabilities often attend general education classes, but their level of involvement in learning is far from true inclusion. Many general education teachers, especially at a high school level, struggle with differentiating instruction and meeting the needs of all students (McLeskey et al., 2004). This may lead to an overreliance on a paraprofessional to support a student with disabilities in the general education setting (Giangreco & Broer, 2005). However problematic it may seem, the common practice is to charge paraprofessionals with a task of being a primary support of a student in inclusive classrooms (Giangreco & Broer, 2007; Giangreco, 2013). In this case study, a paraprofessional accompanied Will and two other students with disabilities in the earth science class. The content of the lessons was unfamiliar to her, so she spent the majority of the class period listening to the teacher's

lecture, taking notes, and then dictating the answers to the three students. Through our intervention, we demonstrated to her other ways of supporting students' learning and engagement.

Finally, the findings of this case study are consistent with previous research that links the use of instructional technology to support students with ASD engagement at a secondary level (Cooper, 2014; Fleury et al., 2014). The instructional technology package paired with the elements of structured teaching (i.e., visual schedule and video modeling) led to the student's increased engagement in learning. In turn, engagement as a facilitator of learning led to more meaningful learning outcomes.

Limitations

This embedded case study had certain limitations that decrease the magnitude of the findings. First, in this case study we focused on a single participant; thus the findings cannot be generalized to a larger group. The intervention had a positive impact on engagement and learning products of this individual, but we cannot assert that other students with ASD would benefit from similar strategies. This leads to another limitation: lack of withdrawal or control. A simple AB design without a withdrawal and not implemented across multiple participants limits the impact of this intervention. Lastly, the inherent challenges of an applied research at schools presented some difficulties during the course of this case study. Some of the challenges were related to the need to rely on the technical support from the school technical team. That process significantly delayed the implementation of the intervention and extended the baseline data collection. Secondly, the teacher's resistance to preparing and sharing his lesson plans with us delayed the intervention as well. Once the teacher recognized the

positive impact the intervention had on Will's engagement, he collaborated more readily and provided us with his lesson plans with a greater enthusiasm.

Implications for Research

Future research should extend this intervention to multiple participants across a variety of settings. Multiple baseline design across participants may be a better approach to drawing any conclusions about this intervention. Secondly, future research should include a component of teacher training. This intervention was researcher-led by design with an intention to involving the teacher and providing coaching and modeling. The challenges of applied research and the teacher's lack of time led to continuing the intervention as researcher-

led. In the future, involving a teacher from the beginning may result in stronger collaboration and a lasting impact on that teacher's instruction.

Conclusion

High school success is closely linked to positive long-term outcomes of all students, including those with disabilities (Cooper, 2014; Lawson & Lawson, 2013). Engagement in learning is one factor that facilitates such success. Aligning instruction within the framework of UDL principles may ensure engagement and learning for all students. Finally, utilizing instructional technology to provide differentiation and supplement a teacher's instruction may deem positive results for adolescents with ASD.

References

- Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45*, 369-386.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report 13*, 544-559.
- Browder, D. M., Spooner, F., Wakeman, S., Trela, K., & Baker, J. N. (2006). Aligning instruction with academic content standards: Finding the link. *Research and Practice for Persons with Severe Disabilities, 31*, 309-321.
- Center for Applied Special Technology (CAST, n.d.). <http://www.cast.org/udl/>
- Carnahan, C., Basham, J., & Musti-Rao, S. (2009). A low-technology strategy for increasing engagement of student with autism and significant learning needs. *Exceptionality, 17*, 76-87.
- Christenson, S., Reschly, A., & Wylie, C. (2012). *Handbook of research on student engagement*. New York: Springer.
- Cooper, K. S. (2014). Eliciting engagement in the high school classroom: A mixed-methods examination of teaching practices. *American Educational Research Journal 51*, 363-402.
- Finn, J. & Zimmer, K. (2012). Student engagement: What is it? Why does it matter? In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement*, (pp. 97-132). New York: Springer.
- 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.

- Fredricks, J., Blumenfeld, P., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*, 59-109.
- Fredricks, J. A., & McColskey, W. (2012). The measurement of student engagement: a comparative analysis of various methods and student self-report instruments. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 763-782). New York: Springer.
- Giangreco, M. F., & Broer, S. M. (2005). Questionable utilization of paraprofessionals in inclusive schools: Are we addressing symptoms or causes? *Focus on Autism and Other Developmental Disabilities, 20*, 10-26.
- Giangreco, M. F., & Broer, S. M. (2007). School-based screening to determine overreliance on paraprofessionals. *Focus on Autism and Other Developmental Disabilities, 22*, 149-158.
- Giangreco, M. F. (2013). Teacher assistant supports in inclusive schools: Research, practices and alternatives. *Australasian Journal of Special Education, 1*, 1-14.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. Albany, NY: State University of New York Press.
- Hollingshead, A. (2013). *Broadening the definition of engagement for students with severe disabilities: A phenomenological study of the experts in the field* (Doctoral dissertation, University of Cincinnati).
- Hollingshead, A., Carnahan, C., Lowrey, A., & Snyder, K. (under review). Engagement for students with severe disabilities: The need for a common definition in education.
- Karich, A. C., Burns, M. K., & Maki, K. E. (2014). Updated meta-analysis of learner control within educational technology. *Review of Educational Research, 84*, 392-410.
- Klem, A., & Connell, J. (2004). Relationships matter: Linking teacher support to student engagement. *Journal of School Health, 74*, 262-273.
- Lawson, M. A., & Lawson, H. A. (2013). New conceptual frameworks for student engagement research, policy, and practice. *Review of Educational Research, 83*, 3-69.
- Mahatmya, D., Lohman, B., Matjasko, J., & Farb, A. (2012). Engagement across developmental periods. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement*, (pp. 45-64). New York: Springer.
- Mayer, K. (2007). Research in review: Emerging knowledge about emergent writing. *Young Children, 62*, 34-40.
- McLeskey, J., Tyler, N. C., & Flippin, S. S. (2004). The supply of and demand for special education teachers a review of research regarding the chronic shortage of special education teachers. *The Journal of Special Education, 38*, 5-21.
- Mitchell, P., Parsons, S., & Leonard, A. (2007). Using virtual environments for teaching social understanding to 6 adolescents with autistic spectrum disorders. *Journal of Autism and Developmental Disorders, 37*, 589-600.
- National Research Council and the Institute of Medicine (2004). *Engaging Schools: Fostering High School Students' Motivation to Learn*. Committee on Increasing High School Students' Engagement and Motivation to Learn. Board on Children, Youth, and Families, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academic Press.
- Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement*, (pp. 365-386). New York: Springer.

- Plavnik, J., & Hume, K. (2014). Observational learning by individuals with autism: A review of teaching strategies. *Autism: International Journal of Research and Practice, 18*, 458-466.
- Rose, D., & Meyer, A. (2000). Universal design for learning. *Journal of Special Education Technology, 15*, 67-70.
- Ruble, L., & Robson, D. (2007). Individual and environmental determinants of engagement in autism. *Journal of Autism and Developmental Disorders, 37*, 1457-1468.
- Samson, F., Mottron, L., Soulières, I., & Zeffiro, T. A. (2012). Enhanced visual functioning in autism: An ALE meta-analysis. *Human Brain Mapping, 33*, 1553-1581.
- Scholz, R.W. & Tietje, O. (2002). *Embedded case study methods: Integrating quantitative and qualitative knowledge*. Thousand Oaks, CA: Sage Publications.
- Scruggs, T. E., Mastropieri, M. A., Cook, S. B., & Escobar, C. (1986). Early intervention for children with conduct disorders: A quantitative synthesis of single-subject research. *Behavioral Disorders, 260-271*.
- Sharan, S. (2008). Student engagement in learning. In S. Sharan, & I. Tan (Eds.), *Organizing schools for productive learning*, (pp. 41-45). New York: Springer.
- Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. *The Journal of Educational Research, 95*, 323-332.
- Skinner, E., & Belmont, M. (1993). Motivation in the classroom: Reciprocal effects of teacher behaviors on student engagement across the school year. *Journal of Educational Psychology, 85*, 571-581.
- Skinner, E., & Pitzer, J. (2012). Developmental dynamics of student engagement. Coping, and everyday resilience. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement*, (pp. 21-44). New York: Springer.
- Stake, R.E. (1995). *The Art of Case Study Research*. Thousand Oaks, CA: Sage.
- Traynor, P. L. (2003). Effects of computer-assisted-instruction on different learners. *Journal of Instructional Psychology, 30*, 137-143.
- Wang, S. K., & Reeves, T. C. (2007). The effects of a web-based learning environment on student motivation in a high school earth science course. *Educational Technology Research and Development, 55*, 169-192.
- Whalen, C., Moss, D., Ilan, A. B., Vaupel, M., Fielding, P., Macdonald, K., ... & Symon, J. (2010). Efficacy of TeachTown: Basics computer-assisted intervention for the intensive comprehensive autism program in Los Angeles unified school district. *Autism, 14*, 179-197.
- Yin, R.K. (2003). *Case study research: Design and methods*. (3rd.ed.) Thousand Oaks, CA: Sage.

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Teaching Reading Comprehension Strategies to Students with Autism Spectrum Disorders: Initial Analysis of a Survey on Current Classroom Practices

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Abstract: Although the number of college courses focused on the unique needs of students with Autism Spectrum Disorders (ASD) seems to be rising, it is still unclear whether or not classroom teachers are using effective strategies in instructing students with ASD on improving their reading comprehension. Seventy-one participants who work with students with ASD in a variety of educational settings across all grade levels responded to an on-line survey, providing data on their educational and professional experience as well as data on the reading programs they used and books that were available to their students. Results indicated that participants had collegiate coursework on teaching reading and ASD. Instructional time spent on reading was commensurate with national average. Students had access to literary and informational texts in alignment with Common Core expectations. Participants used reading programs which included strategies and approaches that research has found to be effective for a more generalized population, rather than programs designed specifically for individuals with ASD.

Current Policy Expectations

Reading comprehension is considered to be an essential component of developing literacy (National Institute of Child Health and Human Development, NICHD, 2000). In order to succeed in school, career and life, it is essential to be able to interpret and infer information from written material. In 2013, 45 states, the District of Columbia, and four territories had adopted the Common Core State Standards (CCSS) (National Governors Association for Best Practices, 2012). These standards emphasize the importance of reading comprehension across the curriculum, especially the comprehension of complex texts. Current federal legislation (Individuals with Disabilities Education Act (IDEA), 2004) requires students with disabilities, including those with Autism Spectrum Disorder (ASD) to have access to the general education curriculum and be included in statewide assessments. In most states, these assessments are linked to directly to CCSS.

This confluence of educational policies means that teachers are challenged to find instructional strategies that will assist all students, including students with disabilities, in meeting the standards. Many times pre-service teachers and practicing teachers enter the field with very little or no knowledge of ASD and how the disability affects children's learning. Even teachers certified in special education may enter the profession without the level of specialization needed to reach children with ASD (Busby, Ingram, Bowron, Oliver, & Lyons, 2012). It is important, not only to identify strategies that will assist students with ASD in reading comprehension, but also identify needs in teacher education.

It is generally agreed that in order to comprehend what is read, high-level cognitive mental processes are activated (Cain, Oakhill, & Bryant, 2004; García-Madruga et al., 2013; Nation, Adams, & Bowyer-Crane, 1999). There is more to

reading than decoding and literal interpretation of words. Students with disabilities often struggle with managing the cognitive load required to comprehend what they are reading (Cain et al., 2004; Duff & Clarke, 2011). When reading any text, it is essential to be able to infer connections that may not be explicitly stated (Berninger, Vermeulen, & Abbott, 2003; Cain et al., 2004). This is particularly challenging to students with ASD (Saldaña & Frith, 2007), who exhibit cognitive patterns which differ considerably from that of their typically developing peers (Mesibov, Shea, & Schopler, 2005).

Reading Comprehension Difficulties in Individuals with ASD

Autism Spectrum Disorder (ASD) is a neurological disorder characterized by impairments in social interaction and communication, as well as restricted, repetitive, stereotyped patterns of behavior interests and activities (American Psychiatric Association, 2013). Diagnostic criteria include deficits in social reciprocity and nonverbal communication, difficulties in adjusting to social situations, as well as repetitive, ritualized behaviors and restricted fixated interests. Expressive language deficits must be severe enough to impede daily functioning and often affect learning and social interactions. These specific language deficits and the associated cognitive processes create specific comprehension challenges for students with ASD (Nation, Clark, Wright, & Williams, 2006).

Students with ASD may have strong decoding skills, but often have difficulty with reading comprehension and making abstract inferences from text (Nation et al., 2006; Newman, Macomber, & Naples, 2007). Many students with ASD have an impaired ability to draw inferences, make

cause and effect connections, and often misunderstand social cues (Baron-Cohen, 2008; Baron-Cohen, Leslie, & Frith, 1985). These social challenges can translate into academic challenges in the area of reading comprehension across content areas. Students with ASD may have difficulty understanding different perspectives and inferring information about the behavior of people featured in a text. They may focus on details within the text rather than the main idea, and make connections between ideas at different points in the text. In addition, they may also have difficulty making reasonable predictions and monitoring their own understanding (Carnahan, Williamson, & Christman, 2011).

Purpose of the Study

The purpose of this study was twofold. The first purpose was to ascertain what kind of education and experience teachers had in teaching reading to students with ASD. The second purpose was to determine instructional approaches and materials, teachers use when teaching strategies for reading comprehension to their students with ASD. There is a need to identify current practices in order to determine whether effective interventions established by research are in fact being practiced in the classroom. While existing research has identified effective practices in teaching strategies in reading comprehension to students with ASD (El Zein, Solis, Vaughn, & McCulley, 2014), the link between research and practice has not been clearly identified. This study sought to answer the following research questions:

- (1) What training or preparation do teachers of students with ASD have in teaching reading comprehension?
- (2) What are the methods and instructional strategies used by teachers to teach reading

comprehension to students with ASD?

- (3) What kinds of text are students with ASD exposed to in the classroom?

Method

Participants

Fifty special education teachers and administrators from New York, New Jersey, Florida, Pennsylvania and Colorado were sent an email explaining the study. The special education teachers and administrators were known by the researchers and chosen for their experience working with individuals with ASD. The potential participants were asked to complete the survey on surveymonkey.com, titled *Instructional Approaches in Reading for Children with Autism Spectrum Disorder*, and forward the email to colleagues who also met the criteria to complete the survey. Additional participants were obtained through snowball sampling. Secondly, a forum post was added to the CEC All Member Forum with the link to the survey. These two methods of sampling were chosen for the ability to access a wide-range of participants from many states, with a variety of training and experience teaching reading comprehension to students with ASD. A total of 71 participants, from 31 states were included in the survey. Sixty-seven participants completed all questions in the survey. Seventy-one participants completed 80% or more of the questions, providing enough information for inclusion in the study.

Over half of the participants reported holding a degree at the master's level or above. Eleven participants reported their highest degree as a bachelor's degree. Most of the participants had been teaching for 10 years or more. Only 11 participants reported teaching 10 years or less. When identifying

their current professional role most participants (60.6%) reported their current placement as a classroom special education teacher. Other participants reported that they worked as general education teachers (4.2%), resource room teachers (16.9%), not working (8.4%) or as program support staff (9.8%). Program support staff included administrators, reading specialists, and ASD specialists. Participants taught a wide range of grade levels. Most of the participants (55%) currently teach 1-10 students, 18.3% teach 11-20 students and a few (7%) currently teach 21 or more students. These numbers mirror the number of students with ASD participants current teach. A summary of participant demographic characteristics can be found in Table 1.

Research Design

This study was designed to identify both the educational background of participants in (a) ASD and (b) reading comprehension, as well as their classroom practices for teaching reading comprehension to students with ASD. The data were collected using the researcher-designed survey *Instructional Approaches in Reading for Children with Autism Spectrum Disorder*, which was available on surveymonkey.com from April 2014-November 2014. The survey was divided into sections. The sections used for this study were as follows (a) informed consent (b) multiple-choice questions on demographic information (c) questions on instructional decision-making practices. The questions in the latter section were open-response and required participants to describe the selection of and use of curricular materials in the classroom.

Data Analysis

The survey questions were systematically analyzed following a three-step process identified by Creswell (2008). The first step,

Table 1. *Participant Demographic Characteristics (n=71)*

	<i>f</i>	%
Highest Degree Earned		
Bachelors Degree	11	15.5
Masters Degree	41	57.7
Post Masters Degree	19	26.8
Number of Years Teaching		
Less than 1 year	3	4.2
1-10 years	8	11.2
11-20 years	28	39.4
21+ years	16	22.5
Current Teaching Placement		
Classroom Special Education Teacher	43	60.6
Classroom General Education Teacher	3	4.2
Resource Room Teacher	12	16.9
Program Support (ASD or Learning Specialist)	7	9.8
Not Working	6	8.4
Current Grades Taught		
Pre-School	2	2.8
Pre-School/Elementary	1	1.4
Elementary	40	56.3
Elementary/Middle	5	7
Elementary/Middle/High	2	2.8
Middle	6	8.4
Middle/High	1	1.4
High School	12	16.9
Pre-School/High School	2	2.8
Number of Students Currently Teaching		
1-10 students	39	55
11-20 students	13	18.3
21+ students	19	26.8
Number of Students with ASD Currently Teaching		
1-10 students	62	87.4
11-20 students	4	5.8
21+ students	5	7

calculating a response rate is not applicable to this survey due to the use of snowball sampling and forum posting. The second

step in the process was to descriptively analyze the data (both multiple-choice and open-ended questions) to identify general

trends. Descriptive statistics were calculated for each question on the survey and a demographic profile of the sample was developed. The third step in the analysis was to code the answers in the open-ended questions, identify patterns of responses and variation in results. Once the analysis was completed the researchers were able to address themes in participants' responses. The results of the analysis were compared with current research in effective practices for teaching strategies in reading comprehension to students with ASD.

Results

In order to answer the first research question, what preparation do teachers of students with ASD have in teaching reading comprehension, the researchers analyzed the responses from three survey questions, (a) what is the highest degree you have earned, (b) to what extent did your collegiate coursework include information on students with ASD, and (c) to what extent did your collegiate studies include coursework on reading?

While all participants reported at least a bachelor's degree, 84.5% reported a master's degree or higher. No participants reported having all coursework focus on ASD. Six (8.5%) reported many courses on ASD, but the majority of participants, 48 (67.7%), indicated some courses on ASD. Thirteen (18.3%) participants had specific coursework on ASD and four reported very little coursework on ASD or no coursework on ASD. Most participants, 32 (45%) reported specific courses on reading comprehension. Twenty-seven (38%) reported some coursework on reading comprehension and nine (12.7%) reported many courses on reading comprehension. No participants responded that all courses focused on reading comprehension, two

responded little coursework focused on reading comprehension, and one responded that no coursework focused on reading comprehension. Results are displayed in Table 2.

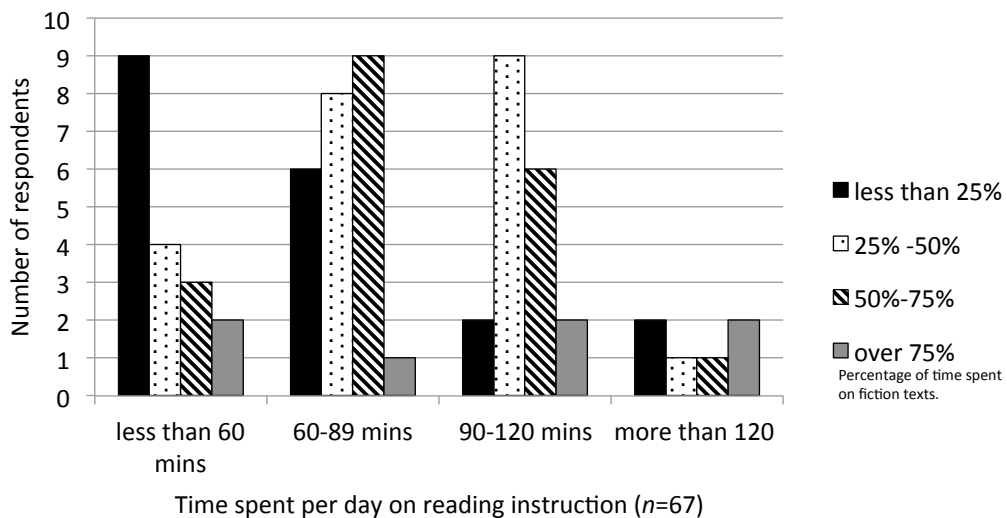
The second research question, what are the methods and instructional strategies used by teachers to teach reading comprehension to students with ASD, was analyzed next. Three survey questions were used to answer this questions, (a) on average how much time do you devote to reading instruction each day, (b) what percentage of that time is devoted to reading fiction versus informational texts, and (c) list all the reading programs you use in your classroom. Four participants skipped these questions or responded that the questions was not applicable to their current teaching placement.

Most participants (33.8%) indicated that they devoted 60-89 minutes a day to reading instruction. 25.84% indicated that they spent less than 60 minutes a day on reading instruction, 26.8% indicated that they spent 90-120 minutes a day on reading instruction, and 8.5% indicated that they spent over 120 minutes on reading instruction. In regard to time spent on fiction vs. non-fiction texts 26.8% participants stated that they spent less than 25% of the time devoted to reading on fiction, 30.9% spent between 25%-50% of the time on fiction texts, 26.8% spent between 50%-75% time on fiction text and 9.9% spent over 75% of reading instruction time on fictional texts. The responses to these questions were then formatted (see Figure 1) to show how the percentage of time teachers utilized fiction texts varied according to the overall time that teacher spent on reading instruction. Notably those participants who spent an average of less than 60 minutes a day on reading instruction

Table 2. *What preparation do teachers of students with ASD have in teaching reading comprehension? (n=71)*

	<i>f</i>	<i>%</i>
Highest Degree		
Bachelors Degree	11	15.5
Masters Degree	41	57.7
Post Masters Degree	19	26.8
Coursework in ASD		
All courses focused on ASD	0	0
Many courses	6	8.5
Some courses	48	67.7
Specific courses	13	18.3
Very little	2	2.8
None	2	2.8
Coursework in Teaching Reading		
All coursework focused on teaching reading	0	0
Many courses	9	12.7
Some courses	27	38
Specific courses	32	45
Very little	2	2.8
None	1	1.4

Figure 1. *Graph to show percentage of reading instruction time participants devoted to fiction texts (n=67).*



were likely to spend less than 25% of that time on fiction. Those nine participants wrote that they taught reading using Edmark (Worsham, Donnelly, & Pro-Ed, 2011), Reading Recovery (Reading Recovery Council of North America, 2015) or stated that they did not use a reading program at all. The majority of participants indicated that they divided their time evenly between fiction and informational texts.

When asked to list all the reading programs they used, participants gave over 140 different responses. The majority of participants (56.3%) named two or more programs, 31.0% gave one written response, 12.7% skipped the question or stated that it was not applicable to their current teaching placement. No indication was given as to why some participants skipped this question as all these participants indicated that they devoted instructional time to reading.

The remaining responses were then reviewed to ascertain whether or not the response referred to a reading program or not. In order to sort and categorize the responses referring to published reading programs, the following coding procedure was used. First, using the publishers' description of the product, terms and phrases describing the reading program were selected. Next, these terms and phrases were then sorted to determine common terms used. Then, the researchers then used the commonalities in the terms to create groups of similar reading programs. Finally the researchers settled on the terms which could be best used to categorize the group. In all, 16 categories were agreed upon. Table 3 shows the number of responses fitting each category as well as the number of published programs identified by participants.

Table 3. *Reading programs identified by participants.*

	<i>Number of Responses (n=146)</i>	<i>Number of Programs (n=68)</i>
Published Reading Programs		
Phonics Based Reading Programs	24	12
Sight Word Recognition	16	4
Classroom Reading Programs	13	6
Direct Instruction	12	4
Five Pillars	9	3
Guided Reading	7	3
Cognitive Strategy Development	4	3
Balanced Literacy	2	2
Additional Reading Publications		
Supplemental Reading Publications	17	4
Fluency/Grammar/Vocabulary	5	4
Electronic Books	2	2
Alternative Answers		
Assessment	10	3
Miscellaneous Responses	17	17
None/Other	7	n/a

Phonics based programs developed by Wilson were listed more frequently than other phonic based reading programs. Six participants listed Wilson Reading System (Wilson, 1989, 1996) and five listed Foundations. Three participants listed the Early Skills Literacy Builder (Browder, Gibbs, Ahlgrim, Courtade, & Lee, 2007) and two listed Reading Milestones (Quigley, McAnally, Rose, & King, 2012). Terms used by publishers to describe their programs included, phonics, phonemic awareness, systematic, multi-sensory, repeated reading and Orton-Gillingham.

Other commonly listed programs were sight word recognitions programs (Edmark was listed by 11 participants), classroom reading programs and direct instruction programs (the majority of which are published by McGraw-Hill). There was a wide variety of responses, with most programs being listed by only 1-3 participants. Sight word programs were consistently identified as such, with one publisher also highlighting the repetition in the program. Classroom reading programs were also clearly identified. Classroom reading programs are developed by publishers to meet the needs of the majority of all students across all grade levels. They incorporate extracts from previously published articles and stories with explanatory notes and guiding questions. Classroom reading programs are sold as a package which includes student materials, teacher manuals and workbooks.

Programs placed in the five pillars category were grouped this way because the publishers indicated that the program emphasized the 'five pillars' of reading instruction (i.e., phonemic awareness, phonics, vocabulary, fluency and reading comprehension). The five pillars are based on the findings of the National Reading Panel (NICHD, 2000). All the publishers

noted that the programs were skill-based. Other terms included remediation and individualized. Direct instruction programs, guided reading programs and balanced literacy programs were all clearly identified by the publishers as such. Other terms used by publishers to describe direct instruction programs included decoding, vocabulary and comprehension. One guided reading program (Four Blocks Way) was also described as a balanced literacy program.

Cognitive strategy programs were grouped together as the publishers used terms like, cognitive skills, comprehension concepts, strategies, close reading, and graphic organizers to describe them. The publishers emphasized that these programs included strategies to develop independent readers. This contrasts greatly with programs that are teacher led. The remaining categories were created using the publishers terms to describe their purpose, i.e. to develop fluency, grammar or vocabulary skills. In addition, supplemental reading programs were clearly identified by publishers as such. They were assigned to separate categories because they were clearly not intended to be used as the main reading curriculum.

Assessment was categorized as an alternative answer, because although the methods constitute good practice, assessment in of itself does not comprise instruction. In the miscellaneous category there were 17 different responses, ranging from programs that could not be identified, approaches to instruction, materials, and general classroom practices. Seven participants indicated that they did not use a reading program. A response of none cannot be taken to mean that reading was not taught. Three participants gave rationales for this response, "too many to list", "only

resource” and “None by choice. Kill joy of literature. It’s all dribble.”

Five survey questions were used to answer the third question, what kinds of texts are students with ASD exposed to in the classroom? First, the types of books in the classroom library was examined. Of the 71 participants, four skipped this question or responded with an answer that was not applicable. Most participants (43.7%) wrote they had a variety of book choices in the classroom library. Interestingly, three claimed not to have a classroom library. The most commonly mentioned type of book was non-fiction or informational (14.1%). This category also included classroom textbooks. Participants reported the types of books their students with ASD appear to enjoy reading. After initial review of the results, answers were categorized into broad, topic-based categories.

More participants reported students enjoying non-fiction (8.4%) as opposed to fiction (4.5%). Other themes to emerge from analysis of respondent report: books on concrete and non-fiction topics such as transportation (7.7%), animals (4.5%), science (7.7%), social studies (5.8%) were more popular than books on fiction or abstract topics such as humor (.6%). Participants reported students enjoying specific authors such as Eric Carle and Dr. Seuss (5.8%), specific TV or movie characters (6.5%) and popular children’s book characters (5.1%). The third question asked participants to respond with the types of books their students with ASD read repeatedly. Of the 71 participants, 25 (20.5%) skipped the question and five (4.1%) answered that their students do not or are not allowed to read books repeatedly. Of the 41 who answered the question, the most popular topic was specific character books (12.3%). These books have the same

character engaging in different activities so there is an element of both familiarity and repetition. The next most popular category was transportation (9.8%). Lowest on the list were picture dictionaries, popular music books, sports books and comic books (.8% each). Interestingly, these books were much more common when participants were asked what books their students with ASD enjoyed, especially comic books. Finally, participants were asked to report the specific features of books their students with ASD appear to enjoy. The most commonly mentioned feature was illustrations (19.8%) with e-books (11.7%) and sensory books (9.9%) also mentioned more frequently than other options. Real or realistic photos were also reported to be a popular feature (7.2%).

Discussion

As expected, most of the participants were special education teachers, and taught a relatively small number of students. Statistics from the National Center for Education Statistic (U.S. Department of Education, 2013) show that in 2011-2012 the percentage of teachers in public schools holding a Master’s degree or higher was 56.7%. The percentage of participants who held a Master’s degree or higher in this survey was higher than the national average, but this may have been due to the fact that the majority of participants had also been teaching ten years or longer. There was little disparity between the number of college courses participants had taken on ASD versus reading comprehension. Existing research suggests that the number of college courses focusing on ASD may indeed be rising (Barnhill, Sumutka, Polloway, & Kee, 2014), but there is also evidence that they may not adequately prepare teachers in implementing evidence-based practices for students with ASD (Loiacono & Allen, 2008; Morrier, Hess, & Heflin, 2011). It would be reasonable to conclude that the

participants are educators with a strong educational background in ASD and reading comprehension, and would be able to meet the educational needs of students with ASD.

Results showed that the majority of participants spent on average between 60-120 minutes a day and this time was divided evenly between fiction and non-fiction texts. This is not dissimilar to the national average (National Assessment Governing Board, 2012). As with other studies in which teachers are requested to report on how much time they spend on reading instruction, it is impossible to determine if all participants interpreted the question in the same way. Some participants may have included time spent on other language arts activities such as writing. In addition, teachers from different grade levels and classroom settings may have interpreted the question differently, e.g., a high school teacher may have recorded the time he spent with one class or all his classes. The even divide of instructional time between fiction and non-fiction texts falls in line with the expectations of the CCSS (National Governors' Association, 2010). One of the emphasis of the CCSS is that students build knowledge through content-rich nonfiction, which means to fulfill the standards students in grades K-5 require a 50-50 balance between informational and literary reading. It is recognized in grades 6-12 students will spend more time reading nonfiction, but that ELA teachers will pay substantial attention to literature.

It is important to note that participants who indicated that they spent less than 60 minutes a day on reading indicated that they used reading programs like Edmark, Reading A-Z or stated that they did not use a reading program. Results showed that these participants taught different grade levels, and did necessarily have a large number of

students to teach. There is no evidence to suggest that these participants had a student with significant cognitive disabilities which might have contributed to their decision to spend less than an hour a day on reading instruction. This reported behavior contradicts research-based recommendations that suggest extensive reading practice is critical to the development of reading proficiency (What Works Clearing House, 2010b).

Many students with ASD have normative reading accuracy (Nation et al., 2006) and do not show significant weakness in decoding, yet many participants stated that they use phonics-based reading programs. There may be many reasons for this. First, many teachers may have adopted phonics-based programs after the National Reading Panel (NICHHD, 2000) found that instruction in phonics was highly effective. Secondly, teachers may be required to use programs adopted by their school district. Thirdly, teachers may have adopted these programs because they are beneficial for other students in the class. Substantial work has been done on the benefit of sight word instruction (Browder & Xin, 1998; Spector, 2011) and direct instruction (Crowley, McLaughlin, & Kahn, 2013; Flores & Ganz, 2009; Shillingsburg Bowen, Peterman, & Gayman, 2015). They are marketed toward special educators so it was not unexpected that they would be listed.

Many programs are created based on current research in effective practices. This is true for classroom based reading programs, guided reading programs, programs based on the five pillars, which explicitly draw on research conducted by the National Reading Panel (NICHHD, 2000) and programs focusing on cognitive strategy development. Classroom reading programs are often adopted by school districts as part of their

general education curriculum, and oftentimes guided reading programs are too. Very few of the programs listed have been studied by What Works Clearinghouse (WWCH), but those that are show mixed effects (*Fast ForWord* (WWCH, 2013)), potentially positive benefits (*Wilson Reading System* (WWCH, 2010d), *Lindamood Bell LIPS* (WWCH, 2010c), *Lexia* (WWCH, 2009), *Waterford* (WWCH, 2007), *Corrective Reading* (WWCH, 2010a), PALS (WWCH, 2012) or have not been studied by WWCH (Foundations, Barton Reading and Spelling System, Project Read, Read 180, Odyssey, Reading Mastery, Voyager). Some teachers stated they did use programs, such as *Corrective Reading* (Engelmann, Haddox, Hanner, & Osborn, 2002), that have been researched with a population of students with ASD (Flores et al., 2013) but have not yet been established as evidence-based practice at a national level.

Brock, Huber, Carter, Juarez, and Warren (2014) reported that teachers lack confidence in implementing evidence-based practices for students with ASD. Although this study did not seek to assess teacher confidence, the array of responses shows the vast number of choices available to teachers and thereby the difficulty they face in selecting a reading program to meet their students' needs.

When examining the texts that students are exposed to, it was not possible to determine whether purchases for the classroom library were dictated by student interest or whether students developed an interest in the books that were purchased for them. The survey results show that a wide range of material is available for students with ASD, with both fictional and informational texts included. This is in alignment with the expectations with the CCSS. Very few participants

reported that they had grade-level texts in their classroom. This is concerning when teachers are expected to prepare students to meet grade level expectations. Interesting to note is that many teachers reported that visuals (illustrations, photographs, graphic novels) and audio books, E-books and books with large print were popular features, which suggests that students with ASD would like books with features that enhance comprehension.

Limitations of the Study

The results of this study can be used to broaden our understanding of teachers' use of evidence-based practice. By documenting reading programs teachers are currently using, it is possible to formulate hypothesis on teacher's instructional decision-making, frame further research questions and improve teacher education in instruction in reading comprehension. However, there are a number of limitations. First, the responses collected only provided an overview of current practices. It did not delve into questions, such as why teachers selected particular reading programs or texts for their students to use. Second, the survey had a relatively small number of participants, whose experiences and practices may or may not reflect the practices of teachers as a whole. Third, although the survey included participants from across the United States, the sample was not chosen at random. Fourth, the study did not examine any correlations between participants and their responses. Further analysis may or may not yield more information. Fifth, the participants were asked to report on their own practices. Participants may interpret terms such as 'reading instruction' or 'reading comprehension' differently, thus adding indeterminable variance to their responses.

Implications for Research and Practice

The findings of this study were largely positive, demonstrating a high level of experience and education amongst teachers. Collectively, the participants in this study had many years teaching experience, a high level of education and knowledge of a range of reading programs. The qualitative nature of this study, allowed the researchers to examine current practice in teaching reading comprehension to students with ASD, before developing hypothesis as to why teachers selected the materials they did. Qualitative data analysis revealed trends in educators' instructional-decision making, most of which was based on existing research in effective instruction for reading comprehensions, although not necessarily the research on developing reading comprehension skills in students with ASD.

However, a few discrepancies between practice, research and policy were noted, most notably the predominance of phonics-based reading programs. It is unlikely that participants were deliberately mismatching materials with students' characteristics. More likely they were subject to constraints beyond their control or were not aware that

decoding deficits are not a predominant concern in students with ASD. Further research is needed to answer this question.

The study also has implications for professionals in teacher education. Teachers need education and preparation, not only in the general characteristics of individuals with ASD, but also opportunities to develop an understanding of how those characteristics affect reading comprehension and other academic skills. With this understanding teachers will be better able to match available reading programs with reading deficits more commonly found in students with ASD. It is clear from this study, as with others, that teacher education in working with students with ASD still needs improvement. With the high incidence of students with ASD in schools today, it may be time to start including college coursework on students' needs not just on teaching students with disabilities in self-contained settings, but also in methodology classes, which develop content related competences e.g. reading comprehension skills to a diverse group of students, including students with ASD.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Barnhill, G. P., Sumutka, B., Polloway, E. A., & Lee, E. (2014). Personnel preparation practices in ASD: A follow-up analysis of contemporary practices. *Focus On Autism And Other Developmental Disabilities, 29*, 39-49. doi:10.1177/1088357612475294
- Baron-Cohen, S. (2008). Theories of the autistic mind. *Psychologist, 21*(2), 112-116.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a 'theory of mind'? *Cognition, 21*, 37-46. doi:10.1016/0010-0277(85)90022-8
- Berninger, V. W., Vermeulen, K., & Abbott, R. D. (2003). Comparison of three approaches to supplementary reading instruction for low-achieving second-grade readers. *Language, Speech, and Hearing Services in Schools, 34*, 101-116. doi: 10.1044/0161-1461
- Brock, M. E., Huber, H. B., Carter, E. W., Juarez, A. P., & Warren, Z. E. (2014). Statewide assessment of professional development needs related to educating students with Autism

- Spectrum Disorder. *Focus on Autism and Other Developmental Disabilities*, 29, 67-79. doi:10.1177/1088357614522290
- Browder, D., Gibbs, S., Ahlgrim-DeLzell, L., Courtade, G., & Lee, A. (2007). *Early literacy skills builder*. Verona, WI: Attainment Company.
- Browder, D. M., & Xin, Y. P. (1998). A meta-analysis and review of sight word research and its implications for teaching functional reading to individuals with moderate and severe disabilities. *The Journal of Special Education*, 32, 130-153. doi:10.1177/002246699803200301
- Busby, R., Ingram, R., Bowron, R., Oliver, J., & Lyons, B. (2012). Teaching elementary children with autism: Addressing teacher challenges and preparation needs. *Rural Educator*, 33(2), 27-35.
- Cain, K., Oakhill, J., & Bryant, P. (2004). Children's reading comprehension ability: Concurrent prediction by working memory, verbal ability, and component skills. *Journal of Educational Psychology*, 96, 31-42. doi:10.1037/0022-0663.96.1.31
- Carnahan, C. R., Williamson, P. S., & Christman, J. (2011). Linking cognition and literacy in students with Autism Spectrum Disorder. *Teaching Exceptional Children*, 43, 54-62. doi:10.1177/004005991104300606
- Creswell, J.W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. New Jersey: Prentice Hall/Pearson
- Crowley, K., McLaughlin, T., & Kahn, R. (2013). Using direct instruction flashcards and reading racetracks to improve sight word recognition of two elementary students with Autism. *Journal of Developmental & Physical Disabilities*, 25, 297-311. doi:10.1007/s10882-012-9307-z
- Duff, F. J., & Clarke, P. J. (2011). Practitioner review: Reading disorders: What are the effective interventions and how should they be implemented and evaluated? *Journal of Child Psychology & Psychiatry*, 52, 3-12. doi:10.1111/j.1469-7610.2010.02310.x
- El Zein, F., Solis, M., Vaughn, S., & McCulley, L. (2014). Reading comprehension interventions for students with autism spectrum disorders: A synthesis of research. *Journal of Autism and Developmental Disorders*, 44, 1303-1322 doi: 10.1007/s10803-013-1989-2
- Engelmann, S., Haddox, P., Hanner, S., & Osborn, J. (2002). *Corrective reading thinking basics: Comprehension A*. Columbus, OH: SRA McGraw-Hill.
- Flores, M. M., & Ganz, J. B. (2009). Effects of direct instruction on the reading comprehension of students with Autism and Developmental Disabilities. *Education and Training in Developmental Disabilities*, 44, 39-53.
- Flores, M. M., Nelson, C., Hinton, V., Franklin, T. M., Strozier, S. D., Terry, L., & Franklin, S. (2013). Teaching reading comprehension and language skills to students with Autism Spectrum Disorders and developmental disabilities using direct instruction. *Education and Training in Autism and Developmental Disabilities*, 48, 41-48.
- García-Madruga, J., Vila, J., Gómez-Veiga, I., Duque, G., & Elosúa, M. (2014). Executive processes, reading comprehension and academic achievement in 3th grade primary students. *Learning & Individual Differences*, 35, 41-48. doi: 10.1016/j.lindif.2014.07.013
- Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004 & H.R. 1350).
- Loiacono, V., & Allen, B. (2008). Are special education teachers prepared to teach the increasing number of students diagnosed with Autism? *International Journal of Special Education*, 23, 120-127.

- Mesibov, G. B., Shea, V., & Schopler, E. (2005). *The TEACCH approach to autism spectrum disorders*. New York, NY, US: Springer Science.
- Morrier, M. J., Hess, K. L., & Heflin, L. J. (2011). Teacher training for implementation of teaching strategies for students with Autism Spectrum Disorders. *Teacher Education and Special Education, 34*, 119-132. doi:10.1177/0888406410376660
- Nation, K., Adams, J. W., Bowyer-Crane, C. A., & Snowling, M. J. (1999). Working memory deficits in poor comprehenders reflect underlying language impairments. *Journal of Experimental Child Psychology, 73*, 139-158. doi:10.1006/jecp.1999.2498
- Nation, K., Clarke, P., Wright, B., & Williams, C. (2006). Patterns of reading ability in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders 36*, 911-919. doi:10.1007/s10803-006-01301
- National Assessment Governing Board (2012). *Time for Learning: An Exploratory Analysis of NAEP Data*. Washington D.C.: National Assessment Governing Board. Retrieved from <http://www.eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED539916>
- National Governors Association Center for Best Practices, Council Chief State School Officers (2010). *Common Core State Standards*. National Governors Association Center for Best Practices, Council Chief State School Officers: Washington, D.C.
- National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.
- Newman, T. M., Macomber, D., Naples, A. J., Babitz, T., Volkmar, F., & Grigorenko, E. L. (2007). Hyperlexia in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37*, 760-774. doi:10.1007/s10803-006-0206-y
- Quigley, S.P., McAnally, P.L., Rose, S., & King, C.M. (2012). *Reading milestones*. Austin, Tex: Pro-Ed.
- Reading Recovery Council of North America (2015). Reading Recovery. Retrieved from <http://www.readingrecovery.org>.
- Saldaña, D., & Frith, U. (2007). Do readers with autism make bridging inferences from world knowledge? *Journal of Experimental Child Psychology, 96*, 310-319. doi:10.1016/j.jecp.2006.11.002
- Shillingsburg, M. A., Bowen, C. N., Peterman, R. K., & Gayman, M. D. (2015). Effectiveness of the direct instruction language for learning curriculum among children diagnosed with Autism Spectrum Disorder. *Focus on Autism & Other Developmental Disabilities, 30*, 44-56. doi:10.1177/1088357614532498
- Spector, J. E. (2011). Sight word instruction for students with autism: An evaluation of the evidence base. *Journal of Autism and Developmental Disorders, 41*, 1411-1422. doi:10.1007/s10803-010-1165-x
- U.S. Department of Education, National Center for Education Statistics. (2013). Table 209.20: Number, highest degree, and years of full-time teaching experience of teachers in public and private elementary and secondary schools, by selected teacher characteristics: Selected years, 1999-2000 through 2011-In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2013 ed.). Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_209.20.asp

- What Works Clearinghouse (2007). *Waterford Early Reading Level One[TM]. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=541>
- What Works Clearinghouse (2009). *Lexia Reading. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=274>
- What Works Clearinghouse (2010a). *Corrective Reading. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=120>
- What Works Clearinghouse (2010b). *Improving reading comprehension in Kindergarten through 3rd Grade: IES Practice Guide*. NCEE 2010-4038. Princeton, NJ: What Works Clearinghouse. Retrieved from <http://www.eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED512029>
- What Works Clearinghouse (2010c). *Lindamood Phoneme Sequencing[R] (LiPS[R]). What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=279>
- What Works Clearinghouse (2010d). *Wilson Reading System[R]. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=546>
- What Works Clearinghouse (2012). *Peer-Assisted Learning/Literacy Strategies. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=364>
- What Works Clearinghouse (2013). *Fast ForWord[R]. What Works Clearinghouse Intervention Report*. Washington DC: What Works Clearing House. Retrieved from <http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=172>
- Wilson, B. A. (1989, 1996). *Wilson reading system*. Oxford, MA: Wilson Language Training Corporation.
- Worsham, C. A., Donnelly, B., & Pro-Ed. (2011). *Edmark reading program: Level 1*. [Kit]. Austin, Tex: Pro-Ed.

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The iPad as an Alternative Reinforcer during Functional Communication Training: Effects on Self-Injury and Aggression

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Abstract: The present study used a multiple baseline design across settings to examine the effects of using an iPad as an alternative reinforcer on self-injury and aggression when reinforcement for appropriate communication was denied following Functional Communication Training in an adolescent with Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and severe aggression. The study also assessed collateral effects of the intervention on the use of self-management to control aggression. Data indicated the use of an iPad as an alternative reinforcer decreased the duration of self-injury and physical aggression in an adolescent in a big box store, grocery store, and classroom. Instances of self-injury and aggression remained low during maintenance sessions and a six-month post-hoc analysis. Collateral gains in self-management were made during treatment and maintenance sessions.

According to the Center for Disease Control (CDC) over the past several decades, the prevalence of children classified as having an autism spectrum disorder (ASD) has continued to rise (CDC, 2012). Autism spectrum disorder includes autism, Asperger's disorder, childhood disintegrative disorder and pervasive developmental disorder not otherwise specified. Individuals in the ASD category must exhibit deficits in both social communication and interaction as well as restricted repetitive behaviors, interests and activities (American Psychiatric Association, 2015). Today, children with ASD represent the second most common serious developmental disability after intellectual disability (CDC, 2012).

Aggression, one of the most debilitating and frequent problems found in individuals with ASD can be more problematic than many core symptoms of ASD. Although

management for aggression is a high priority only a limited number of studies are found in the literature (Matson, 2014). Individuals with ASD are also at risk for developing challenging behaviors such as, self-injury, and tantrums due to communication deficits (Farmer & Aman, 2011; Matson & Shoemaker, 2009; Murphy, Healy, & Leader, 2009). Challenging behaviors such as aggression can be a major obstacle for those who are responsible for their education and can wreak havoc in the daily lives of the families who care for them (Durand & Merges, 2001). Aggression has been found to be more common among individuals with intellectual disability (ID) than among those in the general population (Holden & Gitleson, 2006; Hudson & Chan, 2002; Lowe, Allen, Jones, Brophy, Moore, & James, 2007; Moss, Emerson, Kiernan, Turner, Hatton, & Alboroz, 2000) with an added risk factor for aggression for those individuals with a dual diagnosis of ASD

and ID (Hill & Furnis, 2006; McClintock, Hall, & Oliver, 2003).

Aggression by individuals with ASD is often a learned behavior or set of behaviors that functions as a way to communicate, i.e., aggressing towards another individual achieves a desired outcome. The aggressive behavior becomes functionally related to the consequences that reliably follow it (Foxx & Meindl, 2007). Typically the desired outcome is to gain attention from a recipient or bystanders (Thompson, Fisher, Piazza, & Kuhn, 1998), to gain access to tangible reinforcers (DeLeon, Fisher, Herman, & Crosland, 2000), to escape or avoid an unpleasant situation or demand (Horner, Day, Sprague, O'Brien, & Heathfield, 1991), or to achieve multiple desirable outcomes (Braithwaite & Richdale, 2000).

Different behavioral interventions have been used and evaluated over the past 40 years to decrease severe aggression and self-injury. Functional communication training (FCT) and extinction are two of the most common and well established interventions in the literature for severe behavior problems (Carr & Durand, 1985; DeLeon et al., 2000; Mancil, 2006; Durand, 1999). FCT initially involves assessing the function of the problem behavior to determine how the behavior operates on the environment (i.e. access to escape, attention, tangibles, sensory induction/reduction). Subsequently, the individual is taught an alternative, functional communicative response (FCR), based on the identified function, to replace the problem behavior (e.g. to gain access to attention, instead of hitting someone, the individual exchanges a card). The alternate response is then typically trained with a dense schedule of reinforcement (e.g. fixed-ratio of 1:1 response-reinforcer relation (Kelley, Lerman, & Van Camp, 2002), evaluated to demonstrate effectiveness and

schedule thinning procedures are applied to make the intervention more practical in the natural environment (e.g. Hanley, Iwata, & Thompson, 2001).

Functional Communication Training

FCT far exceeds the American Psychological Association's criteria for empirically supported treatments for problem behavior in children with intellectual and developmental disabilities, and for children with ASD (Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011). FCT is an empirically supported intervention integrating the principles of Applied Behavior Analysis and Alternative and Augmentative Communication (AAC) to treat challenging behaviors such as aggression and self-injury.

Although the use of continuous reinforcement in FCT results in the rapid and clinically significant reductions in problem behavior, the approach also presents as a challenge to maintenance and generalization (Hanley et al., 2001). Teaching tolerance to delayed or denied reinforcement is critical to the successful integration of FCT into everyday practices for caregivers and educators. Parents and teachers are unable to sustain the continuous reinforcement causing the problem behavior to increase or return to pre-treatment rates. Many problem behaviors occur when an individual is denied access or has to wait for a highly desired item.

Schedule Thinning

Schedule thinning is used following FCT as a means to program formally for generalization and maintenance by exposing the individual to conditions that more closely resemble the natural environment. The purposes of schedule thinning are (a) to lower the overall rate of the FCR, (b) to maintain the strength of the FCR, and (c) to

prevent resurgence of problem behavior during times when the FCR is not reinforced (Hagopian, Contrucci Kuhn, Long, & Rush, 2005; Hagopian, Toole, Long, Bowman, & Lieving, 2004; Roane, Fisher, Sgro, Falcomata, & Pabico, 2004; Tiger & Hanley, 2004).

Schedule thinning procedures have become recognized as an important component of FCT due to likely situations when reinforcement for communication is delayed or denied. When repeated attempts to gain attention through communication are unsuccessful, an individual is likely to try another response that previously maintained the requested reinforcer (e.g., aggression). When reinforcement is denied or delayed, the effectiveness of the communication response decreases and the likelihood destructive behavior will return to pretreatment levels.

One strategy for addressing persistent increases in problem behavior associated with reinforcement thinning during FCT is to incorporate additional treatment components. These components have included the provision of an alternative work activity during the delay to reinforcement (Fisher, Thompson, Hagopian, Bowman, & Krug 2000), and the use of punishment for problem behavior (e.g., Fisher et al., 1993; Hagopian et al., 1998). These procedures were implemented following FCT and were not effective at maintaining low levels of problem behavior when the reinforcement schedule was thinned.

Another strategy for addressing persistent increases in problem behavior associated with reinforcement is providing access to stimuli that produce reinforcement and compete with the maintaining reinforcer during times when the preferred reinforcer is not immediately available—may function as

an abolishing operation (AO) for problem behavior and thus decrease the probability that problem behavior will recur during schedule thinning (Hagopian et al., 2005; Hagopian et al., 2001; Roane et al., 2004). More recent research has led to several advances in the application of FCT demonstrating that the effects of FCT used alone and in combination with alternative reinforcement (e.g., noncontingent and differential) resulted in an 80% reduction in problem behavior for those who were unresponsive to FCT. The addition of alternative reinforcement to FCT in at least one study facilitated schedule thinning and low levels of problem behavior during thinning in all cases in which alternative reinforcement was introduced and used in conjunction with FCT (Hagopian et al., 2004).

Alternative and Augmentative Communication

Research on the effects of teaching those with limited communication to use AAC had been well established in the literature several years prior to the introduction of FCT. AAC refers to communicative systems or strategies which may be used to supplement an individual's existing speech or as a primary communication alternative to speech (Rispoli, Franco, Van Der Meer, Lang, & Camargo, 2010). Alternative and Augmentative Communication can include unaided communication (e.g. hand or body signals) or aided communication. Aided communication involves the use of external equipment with a communicative function, such as the exchange of pictures or activation of a speech-generating device (SGD). AAC gives individuals a strategy for expressing choice and preferences in the absence of verbal language; therefore reducing the risk of challenging behaviors.

Apple iPad. In recent years, the Apple iPad has emerged as a popular educational and SGD communication device for individuals on the autism spectrum. Diverse applications specific to the needs of those with ASD include portability, large touch screen, ease in individualizing and programming, and a lack of social stigma due to their frequent use by neurotypical individuals (van Laarhoven, Johnson, van Laarhoven-Myers, & Grider, 2009).

Although iPads have been widely used and supported by many educators, therapists, and parents, empirical research is only now beginning to emerge in the literature. Kagohara et al. (2013) conducted a review of studies involving the iPod, iPad and the iPhone. Fifteen studies were found and all reported positive outcomes using the iPod and iPad. A very promising study by Neely, Rispoli, Camargo, Davis, and Boles (2013) revealed that challenging behaviors decreased and academic engagement increased under the iPad condition while challenging behavior remained high and academic engagement low under the traditional instruction condition. In addition reports are emerging suggesting that individuals with ASD find portable handheld devices reinforcing thus-increasing motivation to participate in and respond to interventions (Goldsmith & LeBlanc, 2004). More specifically, children often use these technological devices to engage in highly preferred activities like watching movies or playing video games and may associate positive experiences with the device itself, consequently making interventions that use the device more enjoyable and interesting (Goldsmith & LeBlanc, 2004).

Self-management

Self-management contributes to independence, self-determination, and overall quality of life for those with

developmental disabilities (Fullerton, 1995). Support for the efficacy of self-management interventions in increasing appropriate behaviors among students with autism (Lee, Simpson, & Shogren, 2007). Self-management strategies empower individuals to control their own behavior instead of relying on parent or teacher prompts or external interventions and assist generalization in various natural settings (Koegel, Harrower, & Koegel, 1999).

Individuals diagnosed with ASD and ID who exhibit severe aggression and self-injury present with diverse and complex characteristics. Although individually many factors have been shown to be successful with increasing or decreasing straightforward behavior, a more complex approach may need to be taken to address the complicated nature of non-verbal individuals with autism comorbid with ID and related issues such as aggression. Sophisticated combinations of proven strategies need to be generated to address multifaceted behavioral issues experienced by individuals with multilayered challenges. The purpose of this study was to provide answers to the following questions:

- 1.) Will the use of an iPad as an alternative reinforcer decrease self-injury and aggression in an adolescent with ASD and ID when reinforcement for communication is unavailable or denied?
- 2.) Will collateral gains in self-management be obtained without direct instruction?

Method

Participant

Emma, a 17-year old female classified as autistic since age 3, with comorbid ID and limited expressive language skills, displays extreme aggressive and self-injurious behavior when reinforcement for requested

objects is denied or delayed. Given Emma's extreme behavior, formal intelligence measures and social scales, such as the Vineland, were not considered valid or reliable and not reported in this paper. Emma has attended two private special education day schools for children with ASD and severe behavior disorders after attending preschool and kindergarten in a public school setting. Both private schools Emma attended specialized in the treatment of students with autism and severe behavior disorders however neither program provided interventions effective in reducing Emma's severe aggression and self-injurious behaviors to manageable levels. Emma's severe self-injury and aggression involved hitting her head on any hard surface with enough force to break the skin and/or cause damage to the object (i.e., holes in walls were common). Other aggressive behaviors included throwing herself to the ground and repeatedly hitting the back of her head and back against the floor, biting others and herself, pinching, scratching, hair pulling and screaming. Her one-on-one paraeducator and classroom teacher used physical restraint when necessary to keep Emma and others safe. Emma would remain in physical restraint until she was calm for 5 seconds and then released. At the time of the study, Emma's aggression had become so extreme that unless the behavior was significantly reduced and under control, she was likely to be committed to an institution. Prior to the study presented in this paper, Emma's severe aggression and self-injury were occurring 4 out of 5 days a week, 2 events per day, for a total duration of 2 hours out of a 5 hour school day. These behaviors served multiple functions including escape from demands and gaining attention but most occurred when she was denied access to preferred objects and activities.

Preference assessment, iPad training, baseline, intervention, and maintenance sessions were conducted in Emma's classroom with her teacher, a speech pathologist and a one-on-one assistant who was assigned to her at all times. Emma interacted very little with her peers and preferred to stay in her own area with her assigned assistant. Emma sat at the same table most of the day and transitioned only for community outings with her assistant and teacher although she was free to move around the classroom as she would choose but only did so when looking for a preferred object.

Prior to the intervention utilized in this study, FCT using the iPad as a speech generating device had been implemented and resulted in a 10% reduction in aggression and 5% reduction in self-injury from baseline. Emma's iPad was placed within her visual field at all times and carried by her assistant if Emma moved to other areas.

Although problem behaviors decreased as a result of FCT, they continued to persist when Emma's communication was not immediately reinforced. Emma was not making any gains towards tolerating delayed or unavailable reinforcement using delay fading as the schedule thinning procedure. Emma, however, was highly motivated to use the iPad and had learned to communicate her preferences, indicate her protests, make choices, answer simple questions, engage in an appropriate activity independently, and for the first time have some control over her environment in a socially acceptable manner. The intervention described in this study aimed to increase Emma's time for tolerating delayed or unavailable reinforcement in the community, specifically a big box store and a grocery store and later the classroom.

Social validity was based on the desire of her family to include Emma on family outings which in turn would improve Emma's independence and quality of life. Upon permission from the IRB, the intervention was instituted.

Experimental Procedures and Settings

Preference assessment. A stimulus preference assessment was conducted using free operant observation to identify preferred applications (e.g., music, videos, educational) on the iPad for 10 consecutive days prior to baseline and treatment sessions. A preference assessment form was used to record the name of the application and the duration Emma engaged with the application during a period of unrestricted access to the iPad. Inclusion criteria were those applications with which Emma engaged for 5 minutes or longer and on three or more occasions. All other activities were removed from the iPad.

Baseline. Baseline condition consisted of the participant being denied immediate reinforcement for a requested food, activity, or object across the grocery store, big box store and classroom. In this condition, the iPad was used as a communication modality only. Duration of aggression was recorded across all three settings. Problem behaviors were treated with consequence procedures currently in place such as verbal and physical redirection, response blocking, and physical restraint. Sessions were conducted until a stable baseline was achieved in each setting.

iPad training. A five step task analysis was used to probe independent use of the iPad. These steps included orienting to the iPad, taking the iPad, unlocking the iPad, navigating, and selecting the preferred application. To ensure independent use of the iPad, training sessions were conducted in

the classroom setting then probed for generalization at the grocery store, and finally the big box store. All steps within the task analysis needed to be mastered in each setting. Each session was 15 minutes in duration, three times per day, five days per week. The criterion to mastery was achieved when Emma independently correctly completed all steps within the task analysis on the iPad at 80% of trials tested over five consecutive sessions in three different settings.

Intervention. The intervention condition was identical to baseline except the participant was given the iPad with preferred applications during delayed or unavailable reinforcement. The participant was verbally directed to choose an activity on the iPad while she waited or was denied access to a requested item. Treatment sessions were first conducted in the big box store, until stable responding occurred, then introduced in the grocery store, and last in the classroom.

Walmart

Walmart Supercenter was the big box store setting chosen for the first implementation of the intervention. Emma's family chose this location because they shop there frequently and would like to include Emma. Emma had not been to Walmart for over a year due to her excessive and inappropriate behaviors. On previous trips with her family, Emma enjoyed walking around and taking items to look at while she carried them to a different area and then would repeat the behaviors. On every trip, Emma wanted to leave the store with a few chosen items. On the rare occasion Emma was denied her chosen items or asked to leave before she was ready, she became physically aggressive with episodes lasting up to an hour. During all sessions, prior to going to Walmart, Emma was presented with a choice of two

categories and asked to pick one. These categories included Toys, Books, Videos, Coloring (e.g., markers and paper). These same choices were used through the duration of the study. Emma was required to pick the category of the item from two choices. This request was to prevent her from wandering around the store. Once she chose the category she was given a visual to carry. Upon entering the store, the teacher reminded Emma of what she had chosen and where the item was located. Once in the designated area, Emma was given 20 minutes to choose an object. Two verbal warnings, one at 5 minutes and then a count-down from 3 were given to be consistent with what her family previously used with Emma.

Baseline. The one-on-one assistant and her teacher were the only two adults present on all outings with Emma and were responsible for all data collection. Emma's teacher was a licensed speech pathologist and Emma's instructor for over five years. The one-on-one assistant was trained by the teacher. During the preference assessment sessions, a preference assessment implementation sheet was used as quick reference for Emma's one-on-one assistant to record high preference applications on the iPad. Step by step instructions were outlined and reviewed with the one-on-one assistant. The Preference Assessment Recording Form asked for the title of the applications Emma engaged in and the duration of engagement. A stop watch and the iPad were also used during these sessions.

Upon entering Walmart, Emma was given the picture of her chosen item to buy and then was guided by the teacher to find that area. Emma willingly went to the designated toy area. When it was time to leave, Emma was holding three toys she wanted to have. Emma was directed to put two of them back

because she was only able to buy one toy. The researcher waited 3 seconds for Emma to comply before she started to take the objects from Emma and put them away.

Intervention. An increase in aggression occurred by the third baseline session at Walmart, therefore, this setting was the first chosen to implement the intervention. Baseline sessions continued in the grocery store and classroom while the intervention was implemented only at Walmart. The multiple baseline across settings design requires the intervention be implemented in one setting while baseline sessions continue in the other settings. All procedures remained the same across the baseline condition in the three settings; once baseline had been established the intervention was implemented when Emma was denied access to a requested reinforcer. Emma was provided with an alternative reinforcer (e.g., the iPad with highly preferred applications), after she was denied access to a desired toy, Emma was told she could choose something on her iPad. The teacher unlocked the iPad so Emma could view preferred applications. The teacher held the iPad in front of Emma and then removed the iPad for 3 second intervals until Emma either took the iPad or calmed down on her own.

Grocery Store

Baseline and intervention sessions were conducted at a local grocery store. The grocery store chain frequented by the family was selected for this study. The same grocery store location was used for all sessions throughout the duration of the study. The grocery store was a large chain with no prior arrangements or accommodations made with management. Sessions took place during normal business hours so at times the store was very busy with other shoppers. Prior to going to the store, the same procedure of making a list

was used, telling Emma about the outing the day before, and giving her transition predictions prior to going to the store. Only food and drinks were choices presented for the grocery store.

Baseline. The one-on-one assistant and the teacher were the only two adults present on all outings to the grocery store during baseline with Emma. Emma was given a choice of food or drink which determined the area of the store visited. Emma typically chose and willingly went to a snack from that area in the store. In the grocery store, Emma would only pick one food choice, but then find items she wanted on her way out, usually by the check-out counter. Emma was directed to put them back and the same procedure was used as in Walmart. The teacher waited 3 seconds for Emma to comply before she started to take the objects from Emma and put them away.

Intervention. The grocery store was the second setting chosen for the intervention. This setting was chosen after Walmart because the duration of self-injury and aggression was higher in stores than in the classroom plus the parents had a greater need for control in public than in the classroom. The introduction of the iPad as the alternative reinforcer was implemented after the 5th baseline session.

Classroom

Sessions were conducted in Emma's classroom with the teacher and her one-on-one assistant present.

Baseline. During Baseline sessions, the teacher and Emma's one-on-one assistant were present. Sessions took place at times when Emma was permitted to get items from different rooms. Within the classroom, Emma had access to objects such as CD's, Rainbow Pegs, markers, farm animals,

colored bowls which Emma routinely requested.

Intervention. The third setting chosen was the classroom which was less of a safety risk as indicated by the low level baseline in this setting. After steady responding was achieved in setting 2, the intervention was implemented in setting 3, the classroom.

Experimental Design

A single-subject multiple baseline across settings design examined the effects of using an iPad as an alternative reinforcer on severe aggression and self-injury when reinforcement for communication was delayed or unavailable following FCT. Collateral gains in self-management were also assessed. Pre-treatment sessions were conducted to determine high preference iPad applications and to ensure independent use of the iPad. Baseline, treatment, and maintenance sessions were conducted in a big box store (i.e., Walmart), a grocery store, and the participant's classroom.

Response definition and measurement.

Self-injury and aggression were identified as one target behavior because Emma rarely displayed these behaviors in isolation. She typically alternated between both behaviors throughout the duration of the episode. Self-injury and aggression were operationally defined as any attempt or instance of throwing herself on the ground and repeatedly banging her head and back, hitting her head with her knee, her hips with her elbows, biting herself, hitting or kicking others, biting others, scratching with nails, pinching, head butting, grabbing others or their clothes, and/or pulling hair occurring in isolation or in any combination together, lasting at least 5 seconds in duration. They were counted as a separate occurrence if self-injury and aggression ceased for 2 minutes or more. A stopwatch was used to

record the duration of self-injury and aggression in minutes and was converted to seconds in all sessions.

Collateral gains in self-management were assessed during baseline, intervention, and maintenance sessions. Self-management was defined as any instance of Emma reaching for the iPad, pulling the iPad back to her, unlocking, navigating, and choosing a preferred application (e.g., music, videos, educational) on the iPad after reinforcement for communication was denied. Emma needed to demonstrate independence in 4 out of 4 steps to meet the operational definition of self-management. A task analysis of the steps required for Emma to independently self-manage her behavior (see Table 1) was used to record percentage of steps mastered.

Data collection and instrumentation.

During the preference assessment sessions the preference assessment implementation guide (see Table 2) was used as a quick reference for Emma's one-on-one assistant to record high preference applications on the iPad. Step by step instructions were outlined and reviewed with the one-on-one assistant. A preference assessment recording form asked for the title of the applications in which Emma engaged and the duration of engagement. A stop watch and iPad were also used during these sessions. A task analysis of steps required to independently use the iPad (Table 1) was used to probe mastery level for each step. All baseline, intervention, and maintenance sessions required the use of an iPad, stopwatch, as well as the self-injury and aggression behavior data recording form (see Figure 1). This form defined the target behavior, if Emma requested an item, the response of the examiner, the presence or absence of aggression, the duration of the problem behavior, and if self-management was

exhibited. A fidelity of implementation recording form (see Table 3) clearly defined the required components of the intervention with a place for the observer to mark the absence or presence of the required component during the intervention phases of the study.

Social Validity

The social validity questionnaire used in this study was a modified version from the original Treatment Evaluation Inventory-Short Form (TEI-SF) (Kelley, Heffer, Gresham, & Elliott, 1989). The questionnaire is a five-point Likert rating scale with nine statements regarding treatment procedures and effectiveness. Emma's family and her one-on-one assistant were asked to rate each statement by indicating strongly disagree, disagree, neutral, agree, or strongly agree.

Interobserver Agreement

A second observer independently recorded data during 50% of all sessions for the purposes of measuring reliability for aggression and self-management. Percentage of agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Percent agreement was calculated per session then averaged across all sessions. Reliability for aggression was calculated to be 95% and 90% for self-management.

Implementation Fidelity

Treatment fidelity was assessed using a checklist for each phase of the study. An independent observer recorded data during 33% of the intervention phases. Treatment fidelity measures verified the use of the intervention, which included providing the iPad, prompting the participant to activate the device, and collecting data, during all phases of the study. Data confirmed that all

Table 1. *Task Analysis of Self-Management*

Natural Prompt: “You need to wait”, etc. Emma is denied access
Put an X under the required prompting level for each step.

<i>Skill</i>	<i>Physical Prompt</i>	<i>Visual Prompt (i.e., gestures, pointing)</i>	<i>Verbal Prompt (i.e., Choose something on your iPad)</i>	<i>Independent</i>
Reaches for iPad				
Unlocks iPad				
Navigates iPad				
Selects iPad application				

Table 2. *Preference Assessment*

<i>Instruction</i>	<i>Mark (+) if demonstrated</i>	<i>Mark (-) if Absent</i>
1. iPad is present		
2. Emma has unrestricted access to iPad		
3. iPad is programmed with Applications		
4. Stop watch is used to time the duration of engagement with app		
5. Duration of session is 20 minutes		
6. Data sheets are used during session		

Materials:

1. Preference Assessment Form
2. iPad
3. Stop Watch

Table 3. *Fidelity of Implementation Recording Form*

	<i>Mark (+) if demonstrated</i>	<i>Mark (-) if Absent</i>
1. iPad is present		
2. Emma has unrestricted access to iPad		
3. Examiner or 1:1 assistant carry iPad for Emma		
4. Stop watch is used to time the duration of behavior		
5. Emma denied access to requested item		
6. iPad shown to Emma after 30 sec wait time		
7. Data recording forms used		

Figure 1. Self-injury and aggression behavior data form

Date: _____

Target Behavior: Self-Injurious behaviors are defined as any instance of banging head against objects, other people, or own knee, biting self, and throwing body against objects. Aggression is defined as hitting, biting, scratching, pinching, or head butting others. These behaviors can occur in isolation or in any combination to count as one event.

Duration: Start the timer at the onset of either self-injury and/or aggression and stop the timer when the participant has refrained from displaying the target behavior for 5 consecutive seconds.

Request Activity	Denied Immediate Reinf	Granted Imm. Reinf	SIB/AGG Present	SIB/AGG Absent	Duration

materials were set up and intervention procedures accurately implemented 100% of the time.

Data Analysis

As data were collected, information was entered and graphed in Excel. The graph displayed visual analysis of day-to-day variation in the data set, including the duration of aggression. Data were presented in a line graph. The y-axis, a vertical line on the left-hand side of the graph, was marked as seconds. The x-axis, a horizontal line on the bottom of the graph, was marked as sessions.

During the baseline phase, all data points were entered, and within-phase patterns (e.g., level, trend, and variability) were used to visually analyze the data points to initially determine when to implement the intervention. For the purpose of this study, the phase change line (i.e., a dashed line running vertically) was used to designate the

condition when changed from baseline to intervention phase.

Results

Through the use of a sophisticated combination of proven strategies multifaceted behavioral issues experienced by a nonverbal, female adolescent diagnosed with comorbid conditions of autism and severe emotional disorders was successfully addressed. Results provided evidence that the use of an iPad is successful as an alternative reinforcer to decrease self-injury and aggression in an adolescent with ASD and ID when reinforcement for communication is unavailable or denied and demonstrated that collateral gains in self-management can be obtained without direct instruction.

Preference Assessment

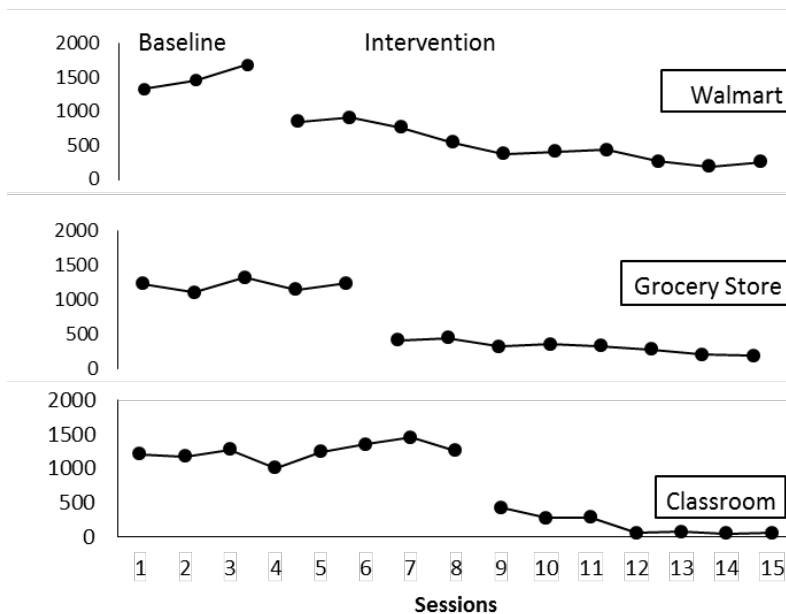
A stimulus preference assessment was conducted for 10 consecutive school days to identify highly preferred applications (e.g.,

music, games, videos) to be used during treatment sessions. Sixteen applications in addition to the camera and TouchChat (Alternative and Augmentative Application) were identified as being highly preferred and remained on the iPad during baseline and treatment sessions. YouTube was identified as Emma's most preferred application. Emma enjoyed watching videos of people going to the grocery store and Walmart after her first trip to each. She also enjoyed listening to music, and watching movie and TV episodes. A YouTube downloader application was used to save videos on the iPad so an internet connection was not needed and she could watch them in any setting. An independent observer was present for 50% of sessions to record implementation of the iPad. Implementation fidelity was measured to be 92%.

iPad Training

A four step task analysis was used to probe independent use of the iPad across three settings. Emma's behavior was probed the last three days of the preference assessment. Three probes were conducted within the classroom and three probes were conducted while riding in a car, two at the grocery store and one probe at the big box store. Emma mastered 4 out of 4 steps on the task analysis in all environments. The iPad was kept within Emma's visual field and accessible during all phases of the study. Emma was not expected or taught to carry and transition with her iPad. Either the teacher or her one-on-one assistant carried it for her when she was transitioning (e.g., from the classroom to the car) and shown where she could locate the machine if needed.

Figure 2. The effects of using an iPad as an alternative reinforcer when reinforcement for communication is delayed or unavailable on the duration of self-injury and aggression across three settings during baseline, intervention, and maintenance sessions.



Settings

The effects of using an iPad as an alternative reinforcer when the requested reinforcer was delayed or unavailable were evaluated using a multiple baseline across settings design. Data analysis revealed a functional relation between the intervention and the duration of aggression in all settings (i.e., Walmart, Grocery Store, and Classroom) for Emma. Figure 2 displays the results of using of an iPad as an alternative reinforcer on the duration of self-injury and aggression across three settings Walmart, Grocery Store, and Emma's classroom.

Walmart

Baseline. Returning two toys resulted in Emma becoming aggressive 100% of the time. The duration of aggression was 22 minutes and 8 seconds on the first trip. The second trip to Walmart, Emma was denied access to a different area of the store than the one on her list. This decision resulted with Emma becoming aggressive for 24 minutes and 13 seconds, and in the final trip during baseline, Emma's aggression was 28 minutes and 4 seconds after being denied access for multiple toys. Emma's problem behavior was a combination of self-injury and aggression alternating between the two throughout the duration. The teacher and one-on-one paraeducator kept Emma safe by putting her helmet on and restricting her in to an area away from others. Although Emma could see the iPad, she did not attempt to reach for or use it in any way nor was the iPad given or shown to her while she displayed aggressive behaviors. Emma eventually calmed down on her own and willingly left the store. Once back in the car, Emma was given her iPad to use.

Intervention. Emma took the iPad 100% of the time and engaged with preferred applications. Aggression significantly decreased to 14 minutes and 8 seconds when

the intervention was first introduced. A 49% reduction in self-injury and aggression from baseline was documented when the intervention was implemented. Emma's self-injury and aggression remained low throughout the duration of the intervention with the lowest duration on session twelve for 3 minutes and 7 seconds.

Grocery Store

Baseline. Denial of snacks resulted in Emma displaying self-injurious and aggressive behaviors 100% of the time, lasting 20 minutes and 32 seconds, 18 minutes and 28 seconds, 22 minutes and 6 seconds, 19 minutes and 8 seconds, 20 minutes and 40 seconds, and 20 minutes and 40 seconds. Although the iPad was accessible and visible, Emma did not attempt to use the iPad to assist in calming herself down. The teacher had the iPad on her shoulder and although Emma could see the iPad she did not attempt to reach for or use the iPad.

Intervention. The duration of self-injury and aggression decreased from 20 minutes and 40 seconds during the last baseline session to 6 minutes and 54 seconds during the initial intervention session, yielding a 66% reduction once the intervention was implemented. Emma's self-injury and aggression continued to decrease throughout the remaining sessions from 6 minutes and 54 seconds to 3 minutes and 6 seconds.

Classroom

Baseline. The duration of the target behavior ranged from 20 minutes and 10 seconds during the first session to 24 minutes and 16 seconds the second to last session. Emma's self-injury and aggression were significantly decreased at the Grocery Store after three treatment sessions. Although Emma was having success in the other environments, she continued to display

self-injury and aggression lasting 20 minutes and 54 seconds. The teacher held the iPad for Emma the same as in the other two settings; Emma could see her iPad, however the examiner did not provide visual and verbal cues to use the iPad.

Intervention. Aggression significantly decreased to 55 seconds and 75 seconds during sessions 12 and 13. Additionally, Emma started to demonstrate self-management skills by independently reaching for the iPad and engaging in a preferred activity during delayed or unavailable reinforcement.

Self-Management

Although Emma made progress in the mastering steps towards self-management, she needed to complete all steps to meet the criteria for self-management. Emma demonstrated self-management by completing the required steps on the task analysis during the last two intervention sessions in setting three, the classroom.

Maintenance

Maintenance sessions were conducted in the classroom for three sessions one week post-intervention. Emma maintained low rates of aggression as the teacher and paraeducator continued to use the iPad as an alternative reinforcer during delays of reinforcement or when reinforcement was unavailable. Maintenance sessions were discontinued due to Emma's iPad breaking with a subsequent three-month delay for repairs.

Social Validity

Emma's family and one-on-one assistant were given a copy of a social validity questionnaire one week after the intervention was terminated due to Emma's iPad breaking. The family and paraprofessional found the intervention very beneficial, easy to implement, and continue

to use strategies from the intervention months later.

Post-Hoc Analysis

Eight months after the study ended, the teacher visited Emma at home and took her to Walmart. Emma independently carried her iPad until she gave it to her sister while she looked around. When Emma started to get upset to leave the store, her sister gave her the iPad, and she immediately reached for it, pulled it to her, unlocked and navigated her iPad. No inappropriate incidences occurred. Emma's family has continued to use the iPad as an alternative reinforcer and reported that his approach has resulted in successful trips to other similar settings.

Discussion

The purpose of the current research was to evaluate the effects of using an Apple iPad as an alternative reinforcer on severe aggression when reinforcement for communication is delayed or unavailable during FCT in an adolescent with ASD, ID, and severe aggression. Results of this study support the research on FCT as an effective intervention for individuals with severe problem behaviors (Carr & Durand, 1985; Fisher et al., 1993; Hagopian et al., 1998) and the use of AAC decreases severe problem behaviors (Carr & Durand, 1985; Durand & Carr, 1992; Dunlap, Kern-Dunlap, Clarke, & Robbins, 1994). During FCT, Emma's severe aggression and self-injury were reduced when she received immediate reinforcement for all communication using the iPad as a speech generating device. Although Emma learned to use the iPad as a speech generating device and was able to communicate her wants to others, she continued to struggle when reinforcement was delayed or unavailable.

Although Emma's aggression decreased overall, she continued to display aggression when her communication using the iPad was not reinforced. This limitation inhibits maintenance and generalization making sustainability of appropriate behavior difficult. Research is limited on effective ways to facilitate tolerance to delayed or denied reinforcement when traditional schedule thinning methods are ineffective. Two studies appear in the literature at this time; one discusses the use of an alternative work activity (Hagopian, Boelter, & Jarmolowicz, 2011) and the other more recent study reports results of the use of an alternative reinforcer (Rooker, Jessel, Kurtz, & Hagopian, 2013). Rooker et al. (2013) extends the research by using an alternative reinforcer in conjunction with FCT to facilitate delayed or denied reinforcement. Research has started to address this limitation by examining FCT when used in combination with alternative reinforcement.

Results of this study extend and support the findings from Rooker et al. (2013) and Hagopian et al. (2011), concluding that FCT when used in combination with alternative reinforcement is effective in reducing and maintaining low levels of problem behavior when schedule thinning is unsuccessful. The results of this study demonstrate using an iPad as an alternative reinforcer was effective in decreasing aggressive behaviors when requested reinforcement was delayed or unavailable following FCT.

The results also provide a significant addition to the literature base as related to the limited research on interventions with the adolescent population, specifically those with severe autism and comorbid ID and extreme aggression. Equally important is the contribution of this study for reporting research conducted in natural environments especially with regard to thinning the

schedule of reinforcement, that is, for maintenance of low levels of problem behavior when reinforcement is denied or delayed. Finally, the emergence of collateral gains in self-management through this approach is an important step in developing self-awareness to be successful independently.

Emma was 17 years old by the time she received appropriate educational and behavioral programming. Parents report this was the first time in many years Emma made progress at school and they felt like others now also understood their daughter. Prior to treatment, Emma's extreme physical aggression significantly impacted her family, her education, and her independence. Emma spent the majority of her day in one room with her one-on-one assistant and half of the day displaying severe aggression and self-injury. More restrictive residential placements were being considered due to the difficulty in finding staff to work with her. She continued to display high rates of aggression and self-injury when she was denied access to objects she requested using her iPad. FCT is effective at reducing problem behaviors because the target behavior (i.e., using the iPad as a SGD) is continuously reinforced until a designated criterion is met. Thinning can be problematic as the individual comes to expect the requested items and is unable to tolerate times when requested objects are unavailable.

Although aggressive and inappropriate behavior was not diminished completely as a result of the intervention, Emma was able to remain in her current school placement. Episodes of self-injury and aggression remain manageable. Emma uses her iPad to communicate, record videos, and self-manage her own behaviors. She goes on outings to the store and Walmart and

continues to use her iPad to improve her quality of life and independence.

Limitations

The single case study was conducted with one participant in three different environments, affecting the generalizability of the results. FCT, using the iPad as a SGD reduced Emma's aggression and self-injury, supporting the well-established literature on the effects of AAC on problem behaviors. The severity of Emma's aggression, her age, and diagnosis in addition to being the only participant contribute to the lack of generalization to other populations not similar to Emma. Replication of the study with individuals who are similar to Emma in age, severity of behavior, and diagnosis would strengthen the validity of the research demonstrating the effects of the intervention on adolescents with severe ASD, ID, and extreme challenging behaviors.

Future Research

A need for effective interventions for adolescents is critical since most research in the literature focuses on children and school age, even with the large population of adolescents with ASD, ID, and challenging behaviors. Over the past two decades, a wide range of behavioral and developmental interventions have been designed and implemented to improve the various symptoms associated with ASD. Without appropriate interventions, the resulting deficits in social understanding, basic functional communication skills, and appropriate social behavior can limit the educational progress individuals with ASD.

Research needs to be conducted in natural environments such as the classroom and/or community setting. FCT has been in the literature and labeled an one of the most common and effective treatments for problem behavior since 1985; yet it has

taken 30 years to reveal that the effectiveness of the intervention is limited to controlled environments and the use of continuous reinforcement. Positive Behavior Support utilizing strategies like FCT, is an applied science that focuses on the use of proactive and instructional, educational methods to promote socially desirable behavior for the purpose of improving an individual's life (Carr & Durand, 1985).

Over the last few years researchers have started to focus on identifying methods for building for maintenance over time and across settings while thinning the schedule of reinforcement. Most researchers that have attempted to do this have conducted such studies in analogue settings or added a punishment component to get clinically significant results (Bambara & Kern, 2005). A critical need exists for studies assessing the implementation of FCT and methods for increasing tolerance to delays to reinforcement in natural settings. The results of this study demonstrate that use of an alternative reinforcer can be effective at reducing severe self-injury and aggression as well as maintaining low levels of problem behaviors when reinforcement is delayed or denied.

The use of an iPad as an alternative reinforcer to increase tolerance to delayed reinforcement is a simple concept requiring little time and resources for parents and teachers to implement. Many individuals with ASD have demonstrated skills and interests never seen before they started using an iPad. The iPad is used as a speech-generating device for many with ASD, yet can also be used in educational and home programs as reinforcement.

Summary

This study demonstrates the utility of the iPad as a strategic tool for increasing

tolerance to delays of reinforcement in natural settings in a way that provides parents and teachers with a realistic and sustainable intervention for maintaining appropriate behaviors. The viability of the utility of the iPad and other mobile forms of technology as interventions in naturalistic settings not only may address social validity but may also have significant consequences for increased quality of life for many individuals with multi layered behavioral

challenges when reinforcement for communication is delayed or unavailable. Investigations built from these findings have the prospect of potentially documenting new approaches to naturalistic interventions for developing more normal communicative behavior as well as tolerance to feasible delays in reinforcement for individuals with multilayered conditions comorbid with autism.

References

- American Psychiatric Association. (2015). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision*. Washington D.C., American Psychiatric Association.
- Bambara, L. M., & Kern, L. (2005). *Individualized supports for students with problem behaviors: Designing positive behavior support plans*. New York: Guilford Press.
- Braithwaite, K. L., & Richdale, A. L. (2000). Functional communication training to replace challenging behaviors across two behavioral outcomes. *Behavioral Interventions, 15*, 21-36.
- Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*, 111–126.
- Centers for Disease Control and Prevention. (2012, March 29). CDC estimates 1 in 88 children in united states has been identified as having an autism spectrum disorder. *CDC Online Newsroom Press Release*, Retrieved from http://www.cdc.gov/media/releases/2012/p0329_autism_disorder.html
- DeLeon, I., Fisher, W. W., Herman, K. M., & Crosland, K. C. (2000). Assessment of a response bias for aggression over functionally equivalent appropriate behavior. *Journal of Applied Behavior Analysis, 33*, 73–77.
- Dunlap, G., Kern-Dunlap, L., Clarke, S., & Robbins, F. R. (1994). Some characteristics of nonaversive intervention for severe behavior problems. In E. Schopler & G. B. Mesibov (Eds.), *Behavioral issues in autism* (pp. 227–245). New York: Plenum Press.
- Durand, V. M. (1999). Functional communication training using assistive devices: recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis, 32*, 247-267.
- Durand, V. M., & Carr, E. G. (1992). An analysis of maintenance following functional communication training. *Journal of Applied Behavior Analysis, 25*, 777-794.
- Durand, V. M., & Merges, E. (2001). Functional communication training: a contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities, 16*, 110-119.
- Farmer, C. A., & Aman, M. G. (2011). Aggressive behavior in a sample of children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 1*, 317–323.
- Fisher, W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1993).

- A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, 25, 491–49.
- Fisher, W. W., Thompson, R. H., Hagopian, L. P., Bowman, L. G., & Krug, A. (2000). Facilitating tolerance of delayed reinforcement during functional communication training. *Behavior Modification*, 24, 3–29.
- Foxx, R. M., & Meindl, J. (2007). The long-term successful treatment of the aggressive destructive behaviors of a pre-adolescent with autism. *Behavioral Interventions*, 22, 83–97.
- Fullerton, A. (1995). Promoting self-determination for adolescents and young adults with autism. *Journal of Vocational Rehabilitation*, 5, 337–346.
- Goldsmith, T. R., & LeBlanc, L. A. (2004). Use of technology in interventions for children with autism. *Journal of Early and Intensive Behavior Intervention*, 1, 166
- Hagopian, L. P., Fisher, W. W., Sullivan, M. T., Acquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis*, 31, 211–235.
- Hagopian, L. P., Contrucci Kuhn, S. A., Long, E. S., & Rush, K. S. (2005). Schedule thinning following communication training: Using competing stimuli to enhance tolerance to decrements in reinforcement density. *Journal of Applied Behavior Analysis*, 38, 177–193.
- Hagopian, L. P., Boelter, E. W., & Jarmolowicz, D. P. (2011). Reinforcement schedule thinning following functional communication training: Review and recommendations. *Behavior Analysis in Practice*, 4(1), 4–16.
- Hagopian, L. P., Toole, L. M., Long, E. S., Bowman, L. G., & Lieving, G. A. (2004). A comparison of dense-to-lean and fixed lean schedules of alternative reinforcement and extinction. *Journal of Applied Behavior Analysis*, 37, 323–337.
- Hanley, G. P., Iwata, B. A., & Thompson, R. H. (2001). Reinforcement schedule thinning following treatment with functional communication training. *Journal of Applied Behavior Analysis*, 34, 17–31.
- Hill, J., & Furnis, F. (2006). Patterns of emotional and behavioral disturbance with autistic trait in young people with severe intellectual disabilities and challenging behaviors. *Research in Developmental Disabilities*, 27, 517–528.
- Holden, B., & Gitleson, J. P. (2006). A total population study of challenging behavior in the county of Hemark, Norway: Prevalence and risk factors. *Research in Developmental Disabilities*, 27, 456–465.
- Horner, R. H., Day, H. M., Sprague, J. R., O'Brien, M., & Heathfield, L. T. (1991). Interspersed requests: A non-aversive procedure for reducing aggression and self-injury during instruction. *Journal of Applied Behavior Analysis*, 24, 265–278.
- Hudson, C., & Chan, J. (2002). Individuals with intellectual disability and mental illness: A literature review. *Australian Journal of Social Issues*, 37(1), 31–49.
- Kagohara, D. M., van der Meer L., Ramdoss, S., O'Reilly, M. F., Lancioni, G. E., Davis, T. N., Rispoli, M., Lang, R., Marschik, P. B., Sutherland, D., Green, V. A., & Sigafos, J. (2013). Using iPods and iPads in teaching programs for individuals with developmental disabilities: A systematic review. *Research in Developmental Disabilities*, 34, 147–156.
- Kelley, M. L., Heffer, R. W., Gresham, F. M., & Elliott, S. N. (1989). Development of a

- modified treatment evaluation inventory. *Journal of Psychopathology and Behavioral Assessment*, 11, 235-247.
- Kelley, D., Lerman, D. C., & Van Camp, C. M. (2002). The effects of competing reinforcement schedules on the acquisition of functional communication. *Journal of Applied Behavior Analysis*, 35, 59-63
- Koegel, L. K., Harrower, J. K. & Koegel, R. L. (1999). Support for children with developmental disabilities in full inclusion classrooms through self-management. *Journal of Positive Behavior Intervention*, 1, 26-34.
- Kurtz, P. F., Boelter, E. W., Jarmolowicz, D. P., Chin, M. D., & Hagopian, L. P. (2011). An analysis of functional communication training as an empirically supported treatment for problem behavior displayed by individuals with intellectual disabilities. *Research in Developmental Disabilities*, 32, 2935-2942.
- Lee, S., Simpson, R. L., & Shogren, K. A. (2007). Effects and implications of self-management for students with autism: A meta-analysis. *Focus on Autism and Other Developmental Disabilities*, 22, 2–13.
- Lowe, K., Allen, D., Jones, E., Brophy, S., Moore, K., & James, W. (2007). Challenging behaviours: Prevalence and topographies. *Journal of Intellectual Disability Research*, 51, 625–636.
- Mancil, G. R. (2006). Functional communication training: a review of the literature related to children with autism. *Education and Training in Developmental Disabilities*, 41, 213-224.
- Matson, J. (2014). Treating aggression in persons with autism spectrum disorders: A review. *Research in Developmental Disabilities*, 35, 3386-3391.
- Matson, J. L., & Shoemaker, M. (2009). Intellectual disability and its relationship to autism spectrum disorders. *Research in Developmental Disabilities*, 30, 1107– 1114.
- McClintock, K., Hall, S., & Oliver, C. (2003). Risk Markers associated with challenging behaviors in people with intellectual disabilities: A meta-analytic study. *Journal of Intellectual Disability Research*, 47, 405–416.
- Moss, S., Emerson, E., Kiernan, C., Turner, S., Hatton, C., & Alboroz, A. (2000). Psychiatric symptoms in adults with learning disability and challenging behavior. *British Journal of Psychiatry*, 177, 452–456.
- Murphy, O., Healy, O., & Leader, G. (2009). Risk factors for challenging behaviour for children with autism spectrum disorder in Ireland. *Research in Autism Spectrum Disorders*, 3, 474- 482.
- Neely, L., Rispoli, M., Camargo, S., Davis, H., & Boles, M. (2013). The effect of instructional use of an iPad on challenging behavior and academic engagement for two students with autism. *Research in Autism Spectrum Disorders*, 7, 509–516.
- Rispoli, M. J., Franco, J. H., van der Meer L., Lang, R., & Camargo, S .P. (2010). The use of speech generating devices in communication interventions for individuals with developmental disabilities: a review of the literature. *Developmental Neurorehabilitation*, 13, 276-293.
- Roane, H. S., Fisher, W. W., Sgro, G. M., Falcomata, T. S., & Pabico, R. R. (2004). An alternative method of thinning reinforcer delivery during differential reinforcement. *Journal of Applied Behavior Analysis*, 37, 213–218.
- Thompson, R. C., Fisher, W. W., Piazza, C. C., & Kuhn, D. E. (1998). The evaluation and treatment of aggression maintained by attention and automatic reinforcement.

- Journal of Applied Behavior Analysis*, 31, 103–116.
- Tiger, J. H., & Hanley, G. P. (2004). Developing stimulus specifying stimuli. *Journal of Applied Behavior Analysis*, 37, 517-521
- van Laarhoven, T., Johnson, J. W., van Laarhoven-Myers, T., Grider, K. L., & Grider, K. M. (2009). The effectiveness of using a video iPod as a prompting device in employment settings. *Journal of Behavioral Education*, 18, 119–141.

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Autism in the Arctic: A Capacity Building Project in Rural Alaska

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Abstract: In most every rural state, there are distance related challenges to providing quality autism instruction and support services. However, due to its sheer size and extremely diverse geographical regions, in Alaska, there are the most extreme distance-related challenges possible to providing support for individuals with autism spectrum disorder. This article describes how a grant provided by the Autism Speaks organization aided the Alaska Autism Resource Center, a small grant overseen by the Special Education Service Agency in Anchorage, Alaska, in building ASD capacity in rural Alaska.

Alaska is composed of five large regions (i.e. Anchorage, Mat-Su, Juneau, Kenai, and Fairbanks), and approximately 488 small rural communities and villages according to the State of Alaska's Community and Regional Affairs website. The State of Alaska encompasses 586,412 square miles (more than twice the size of Texas), with 6,640 square miles of coastline. Alaska's population center is Anchorage, with approximately 300,950 people. The remainders of the state's 735,132 residents are spread throughout the state in isolated medium and small sized communities. According to the Alaska Department of transportation, 85% of Alaskan communities are only accessible by small plane or boat, with hundreds of miles of tundra (and NO roads) separating one village from the next. (<http://alaskaasp.com>) In the larger areas, families, schools, individuals with autism, and community service providers have access to a variety of autism spectrum disorder (ASD) services and training options. This is not true for the extremely underserved populations in rural/remote Alaska.

In Alaska, services for Autism, Vision, Hearing, ED, etc. are often delivered by remote service providers who may only visit the village one to three times a year. These visits can include assessment, training, consultation, and service delivery. While this is not ideal, a shortage of providers is a real problem in the state, especially in the rural and remote areas.

Barriers to Accessing ASD Services in Rural Alaska

Diagnosis of ASD. In previous years, screening and diagnosis of children with ASD was a problem in Alaska due to the only diagnostic clinic being located in Anchorage, which is hundreds of miles from most villages. Also, with it being the only diagnostic clinic in the state, the waiting list to be seen in the clinic was extremely long. Three years ago, the state implemented a traveling Neuro-developmental Screening Clinic that would take a nurse practitioner or pediatrician who specializes in autism diagnosis out to eleven hubs in the state. Children could then be referred into the clinic by their community health clinic and receive a screening without having to fly into Anchorage. This program has been very

successful in getting children in the rural/remote areas diagnosed.

The problem that rural Alaska now has is that since more children are being diagnosed, there are not enough services in these rural areas to meet their needs. Between the lack of services, and lack of trained professionals to implement evidence-based interventions, the rate of out of district placement for students with autism has risen steadily. In Alaska, out of district means “out of village and/or state”, due to the lack of continuum of services available within the state. When children are placed out of their villages, and/or out of the state, they lose their connection to their family, their Alaska Native culture, and their community.

Prevalence of ASD in Rural Alaska.

Because of the lack of an official estimate of the number of Alaskans with ASD, the prevalence rate in Alaska cannot be compared to the national rates. However, the Alaska State Department of Education FY13 Child Count indicated 1,007 children with ASD in Alaska school districts. This constitutes 0.8% of the total student enrollment, as compared to 0.9% nationally (U.S. Department of Education, 2015). The authors determined this figure by dividing the number of students with autism (1007), as identified by the FY2013 Alaska Department of Education Child Count, by the total number of the Alaskan student population (132,185), as noted in the Alaska Department of Education and Early Development Assessment and Accountability District Enrollment FY13 document (www.education.alaska.gov/stats/DistrictEnrollment.2013DistrictEnrollment.pdf).

In Alaska, 489 of the 1007 students eligible for special education services under the

category of ASD live in rural and/or remote areas of the state. Services, in general, are scarce in these areas, and are largely non-existent for individuals with autism. Even within the school districts, services are not consistent due to high staff turnover, availability of specialists, and lack of autism specific training.

Teacher Turnover. The teacher turnover rate in Alaska is at 12% statewide and 24% in the rural school districts (Hirshberg & Hill, 2006), as compared to 15% nationwide (Goldring, Taie, & Riddles, 2014). The turnover rate in the rural areas is often due to the teachers being recruited from other states, but not having any personal roots in the village. According to Hashberg and Hill, teacher turnover is a real problem for rural schools; struggling school districts are forever filling open positions with new teachers who have not yet developed the skills necessary to support a struggling student population. School districts and state agencies often put an extensive amount of time into training these professionals to work with children on the autism spectrum, only to have them leave the village, or the state, after one to two years in the classroom.

Building Capacity in Rural Alaska

Special Education Service Agency (SESA).

The Special Education Service Agency was created in 1986 by the Alaska State Legislature to provide special education service services to Alaska’s remote villages and small communities. SESA provides instructional support and training for district personnel in several low-incident-disability (LID) categories. Currently, SESA employs 1.5 full time autism specialists who serve 100+ children statewide.

When a new teacher enters the village school system, SESA Autism Specialists have to begin by assessing the teacher's knowledge level, observing their strengths and weaknesses, then developing recommendations and a plan of support for the student and the teacher. This can affect the student's progress in many ways, including: time away from the student to re-teach skills that were taught to the previous teacher; an unsupported transition of the student to a new teacher; lack of knowledge about the student and their family by the new teacher, etc.

Alaska Autism Resource Center (AARC). The AARC is a grant-funded project overseen by the Special Education Service Agency, located in Anchorage, Alaska. The mission of the AARC is to increase understanding and support for Alaskans of all ages with autism spectrum disorder via collaboration with families, schools and communities throughout the state. The AARC serves the needs of individuals with autism spectrum disorders, their families, caregivers, and service providers by providing information, training, and consultation, via on-site and distance delivery methods.

In 2013, the AARC, proposed to build capacity in the state by providing training and support to rural communities. An Autism Speaks Community Grant awarded to the AARC aided in providing program assessment, training in key areas of evidence-based practice (i.e. social/communication skills, transitions, and behavioral supports), and follow-up support to the individuals, families, paraprofessionals, and community members who are living in these largely Alaska Native villages. In the past, training efforts were concentrated on special education

teachers who tend to come to the villages and leave after a very short time. The AARC proposed to change this by training individuals, families, paraprofessionals, and community members, in addition to teachers, so that the knowledge stayed in the community.

Method

Selecting a Program Model

In preparation for their capacity building project, the AARC reviewed several existing models of service delivery to determine which would be the best fit to assist them in meeting their capacity building objectives. The AARC searched for a model that was research-based, data driven, team focused, and inclusive. The model found that best met the requirements was the Illinois Autism Training and Technical Assistance Project (IATTAP).

According to their website, <http://www.illinoisautismproject.org> (accessed May 2012; no longer online), the IATTAP is a research-based model that focuses heavily on creating school teams (including family members) who use data to determine educational programs and supports used with students with ASD. School teams using this model are encouraged to use self-assessments to create action plans to guide their ASD programming. Perhaps most notable in IATTAP's work with teams is the increase in more inclusive education placements for students with autism. According to the IATTAP 2011 annual report, schools that are higher implementer IATTAP schools include students with autism at a higher rate than non-IATTAP implementer schools in Illinois overall, and surpass national averages. This indicates that schools that are implementing practicum components are more able to provide inclusive education

programming to students with autism. Schools that implemented this model of support also saw a reduction in the rates of students with ASD who were at risk of needing an out-of-district- placement due to their high levels of need.

Ultimately, the AARC chose to model its capacity building efforts on the IATTAP based efficacy of the IATTAP, in combination with the overall goals of the model. The goals listed in their 2011 annual report were:

1. Build local capacity to establish and implement effective educational supports and programming for children and youth with Autism Spectrum Disorders
2. Promote a proactive approach to working with individuals with Autism Spectrum Disorders and their families
3. Help children and youth with Autism Spectrum Disorders remain with their families in their home communities and become productive community members
4. Increase the percentage of students on the autism spectrum who are educated in the general education classroom
5. Increase effective and meaningful involvement of parents in their children's education

(<http://www.illinoisautismproject.org>, accessed May 2012)

Developing Curriculum for ASD Training Workshops

The training content developed was based off of the model by the National Professional Development Center on Autism (Odom, Cox, & Brock, 2013) and the National Standards Project by the National Autism Center. The AARC hosted Dr. Odom for a two-day workshop in February 2013, where their staff was trained in using this model for professional development. The AARC proposed to provide three

(Supporting Social Interaction Skills, Supporting Communication Skills, & Positive Behavioral Interventions and Supports) - 12-hour trainings, in three different regional hubs in Alaska. Each training session would feature research-based interventions in each of the above listed categories. Teams attending the training would complete the *Autism Environmental Rating Scale (APERS) Self-assessment*, and development an action plan based on their results. One 500 level credit would be offered for each two day training course through the University of Alaska Fairbanks. All classes would be open to the public in the communities in which they would be held.

Participants

The AARC partnered with local school districts, community service agencies, and tribal organizations to determine which three hubs would be chosen as a location for the training series. Memorandum Of Agreement's were developed with three school districts stating the services that the agency will provide and the services that the district is expected to provide. Hub sites selected for the project were Bethel, Craig, and Fairbanks, Alaska.

Bethel, AK has a population of approximately 6,300 residents and serves as a hub for Western Alaska. Craig, Alaska is a village of nearly 1,300 residents located on Prince of Whales Island (POW). POW is home to 15 smaller villages and communities. Fairbanks, AK is comprised of approximately 32,000 people, and serves as a hub to Interior Alaska. Training sites were chosen based on their geographic location with the state in order to reach the maximum amount of people possible (www.commerce.state.ak.us).

As outlined in the MOA's, the AARC requested that schools send at least one, three-person team, to the trainings. Each three-person team needed to include one parent, one teacher, and one para-educator, with 2/3 team members representing local village residents (typically the parent and the para-educator). Having two of the three participants being local residents promoted participation from the entire community, and assisted the trainer in making the supports and strategies taught, culturally appropriate. This concept was key to the capacity building mission.

Training activities required that participants come into the rural hub from their village. Travel between the village and the hub typically requires a flight on a small plane. The average cost of a village to hub round-trip flight, based off of FY 13 airfare, was \$400. The average cost of lodging in the hub was \$200 per night. Travel stipends were

offered to offset the costs of participation for families in the remote villages. The average cost per family member would have been \$800. The AARC gave family members, who applied, stipends for actual travel costs. See Table 1 for a collective summary of the three separate training sessions.

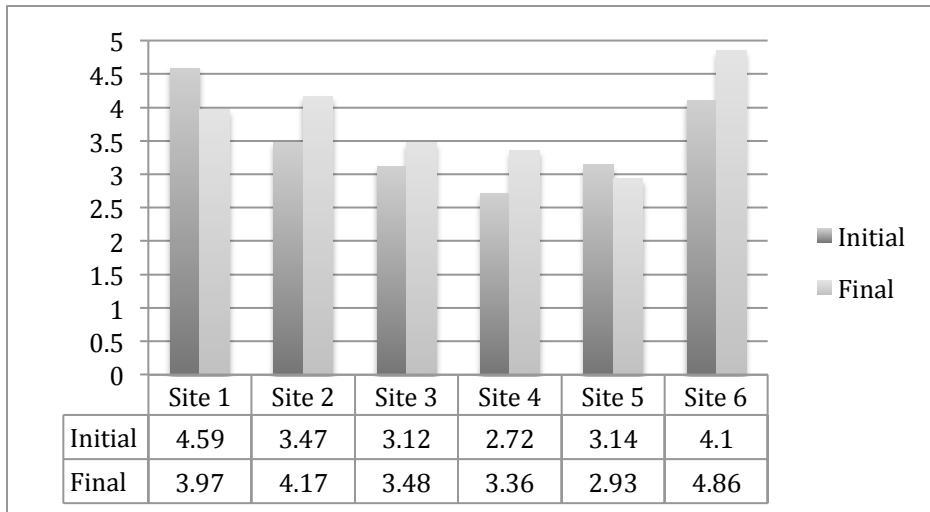
Data Collection

To determine effectiveness of this project, the AARC staff were trained by the National Professional Development Center on Autism to deliver the Autism Program Environment Rating Scale Self-assessment (APERS). Training session participants completed the APERS Self-Assessment, as a team prior to the first training, in order to determine baseline scores of their programming. Participants then completed the assessment again at the end of the project. Figure 1 shows the baseline and final scores for each site that participated in the project.

Table 1. *Summary of Training Sessions*

Training Location	Average Number of Participants Per Training Session	Demographics	Villages Represented
Bethel	34	Families, teachers, self-advocates, community service providers, administrators, speech therapists, adult service providers, and paraprofessionals	Bethel, Nightmute, Atmautluak, Napaskiak, Tuluksak, Akiachak, Kasigluk, and Kipnuk
POW	33	Families, teachers, paraprofessionals, community service providers, administrators, speech therapists, and adult service providers.	Craig, Klawock, Thorne Bay, Hollis, Naukati, Girdwood, Edna Bay, and Hydaburg
Fairbanks	23	Families, teachers, paraprofessionals, community service providers, administrators, speech therapists, adult service providers, medical service providers, and military personnel.	Fairbanks, Anchorage, Slana, Tok, Fort Yukon, Ft. Wainwright, Nenana, Healy, Venetie, and Delta Junction

Figure 1. APERS Self-Assessment Scores by Site



In order to determine the knowledge gained from each training session, participants were asked to complete a pre/post assessment, and a satisfaction survey evaluating the training and trainer. Figures 2-4 show the pre and post test scores for each site along with the total percentage of knowledge gained. Participants were asked to answer four content-specific questions, related to the training topic, before and after the training was delivered. To determine the quality of training provided, participants were asked to rate their satisfaction with the overall training according to the following criteria:

1. The objectives of the training were clear, and the material was relevant to the training objectives.
2. The presenter was knowledgeable and behaved in a professional manner.
3. I gained new knowledge from this training.

4. I learned enough to implement new skills in my home, school, or community.

Scoring options were numerically based 1-5 with one being Strongly Disagree and five being Strongly Agree.

Evaluation

Six teams completed an APERS Self-assessment in the first and last training sessions. Results of the self-assessments indicated that 4/6 teams felt their ASD programs had improved in key domains since the beginning of the training series. (See Figure 1) Participants demonstrated almost a 15% growth in ASD related knowledge as a result of this grant-funded project, as indicated by cumulative pre/post assessment data. (See Figure 5) The AARC received a cumulative satisfaction score of 4.7/5 for the three sessions, which indicates that the participants were highly satisfied with the training and support they received.

Figure 2. *Session One Knowledge Assessment*

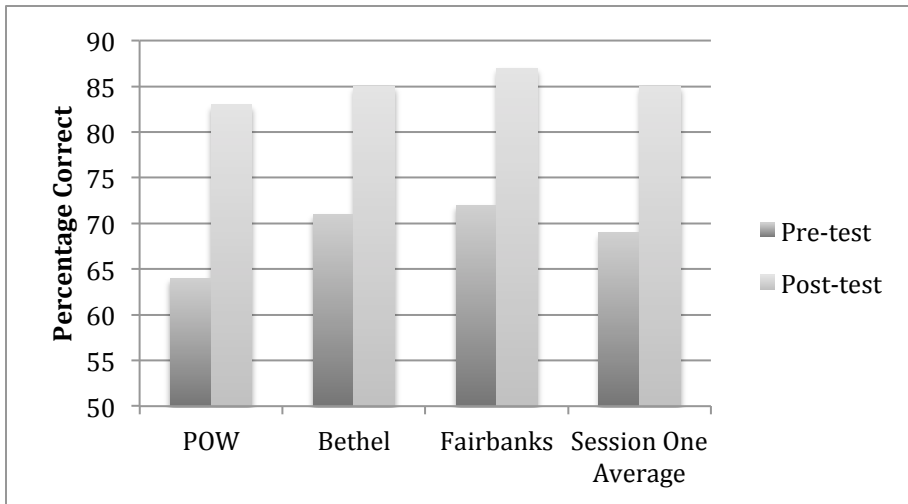


Figure 3. *Session Two Knowledge Assessment*

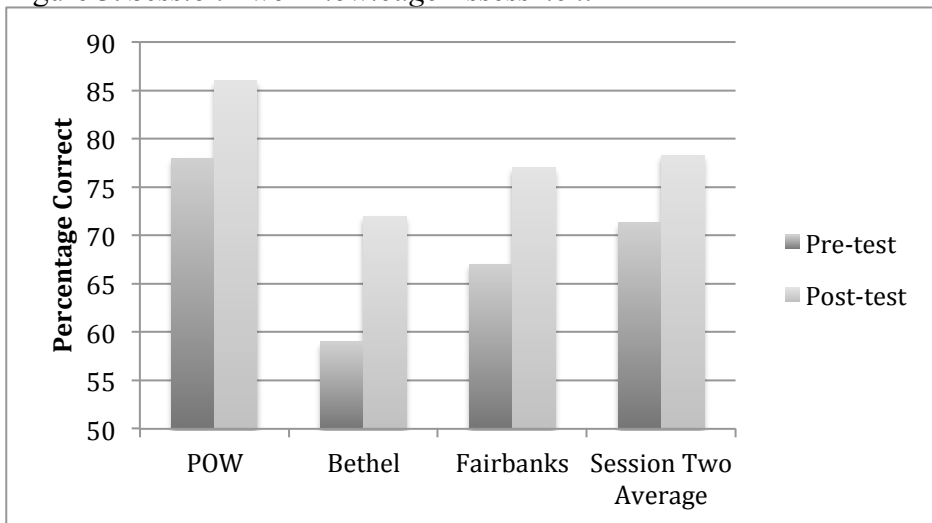


Figure 4. *Session Three Knowledge Assessment*

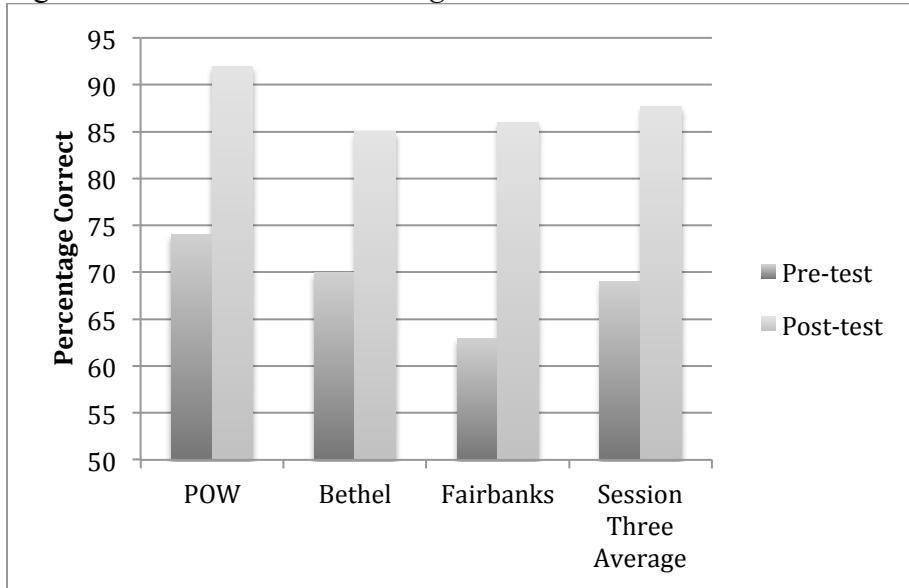
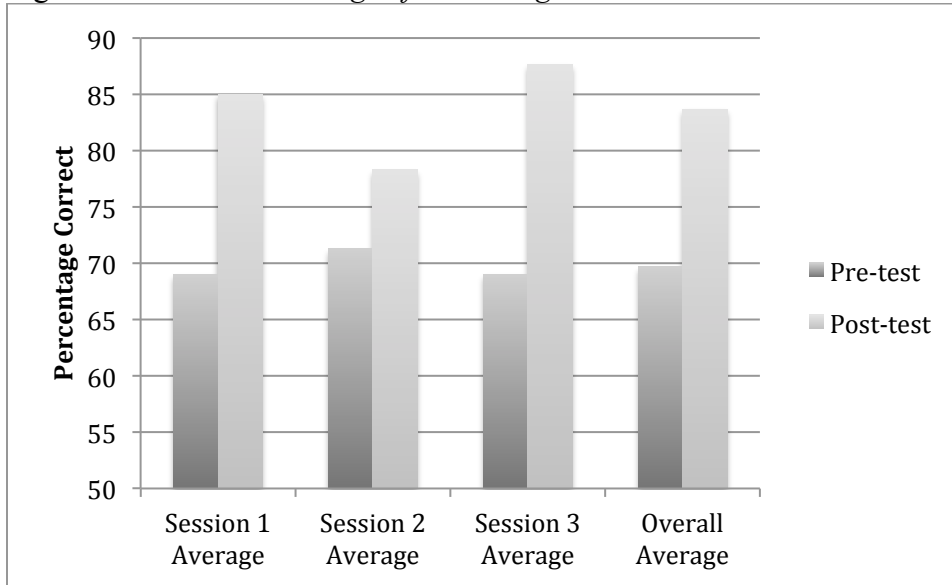


Figure 5. *Overall Percentage of Knowledge Gained*



Upon completion of this project, at least 110 people, in 20+ communities, in the State of Alaska have increased their understanding of ASD. Project participants are now equipped to serve as a resource in their

individual communities, and are able to better support individuals with ASD in these rural areas of the state.

Discussion

When beginning this project, the authors had lofty goals for what the program would achieve. We set out to build capacity in the villages that we serve by providing three highly trained individuals in each community who would be able to train, consult, and share resources with families, school staff, and community members in their area. They would become the first line of support for anyone supporting a person with autism.

We also sought to instill confidence, knowledge, and the ability to use reflective practice in the participants. They would then carry this into their villages creating a community support system for families, schools, and community members, in the hopes that we would impact the children these participants serve by having a collaborative, highly trained team supporting them and implementing culturally appropriate, best practice in their home and school settings.

Finally, we hoped to improve services so that children with ASD would be able to be served in their home communities instead of being sent out of state. They would stay in their villages and maintain their cultural and familial connections.

Limitations to continuation of this project are monetary, geographical, and turnover of personnel. The funding used to initiate this project expired after one year, but the model developed has been replicated on a smaller scale when working with other districts in the state. The geographical limitations tie into funding and personnel, because of the cost of rural travel and the time it takes to get out to the district in addition to the time needed to provide the services. This requires more qualified personnel to be hired in order to sustain the level of training and support as provided with this project. The turnover of district personnel trained during this project is still of high concern, but that is something that is being addressed across the board at the state level and within each district.

While there are still hurdles to overcome, we feel like this project has moved us towards meeting these goals in the districts with which we partnered. We still have a long way to go in order to reach this level statewide, but we are hoping to explore additional funding opportunities and partnerships, in order to make that happen. As with anything in education, our work will never be done, but we are on a path to reaching our goals.

References

- Goldring, R., Taie, S., and Riddles, M. (2014). *Teacher Attrition and Mobility: Results From the 2012–13 Teacher Follow-up Survey* (NCES 2014-077). U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Hirshberg, D., & Hill, A. (2006). Turnover among Alaska's teachers: how many leave their jobs? *Institute of Social and Economic Research Summary*, 66,
- Illinois Autism Training and Technical Assistance Project (2012). *IATTAP 2011 Annual Report*. Retrieved from <http://www.illinoisautismproject.org>
- Odom, S. L., Cox, A. W., & Brock, M. E. (2013). Implementation science, professional development, and autism spectrum disorders. *Exceptional Children*, 79, 233-251.

U.S. Department of Education, National Center for Educational Statistics. (2015). *Digest of Education Statistics, 2013* (NCES 2015-011), Chapter 2. p.87

Webmaster (2015). *Alaska's aviation system*. Retrieved from <http://alaskaasp.com>

Webmaster (2015). *Alaska department of education and early development special education child count by district*. Retrieved from <http://education.alaska.gov/tls/sped/>

Webmaster (2015). 2010 Census data. Retrieved from <https://www.commerce.alaska.gov/dcra/DCRAExternal/community>

Webmaster (2013). *Assessment and Accountability: District Enrollment as of October 1, 2012 FY2013*. Retrieved from www.education.alaska.gov/stats/DistrictEnrollment.2013DistrictEnrollment.pdf

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Identification and Labels for Young Tanzanian Children: An Examination of Labels for Children with Intellectual Disabilities Using the Capability Approach

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Abstract: This theoretical examination of how the capability approach can support identification and education of young children in Tanzania with disabilities uses two case studies to delve deeper into the cultural and practical understandings of disability in Tanzania. Tanzania is just beginning to grapple with assessment and identification of children with disabilities and what constitutes an equitable education and well-being for children and adults with disabilities. The current understanding of cultural beliefs and values about disability in Tanzania and East Africa offer mixed messages. This paper discusses two studies as evidence in the theoretical examination of the understanding and use of labels and terms about students which support and hinder identification and service delivery in different ways. The author examines two cases, an inclusive public primary school and a special needs faith-based school, where the setting (self-contained vs mainstreamed) does not determine acceptance, but rather the years of advocacy and demonstration of skills by individuals with disabilities influences the level of community participation. Finally, it also examines some of the ongoing challenges related to labels, disability advocacy, and current school practices in both school and community settings.

In Tanzania, children with disabilities are acknowledged as having the human right to an education and the right to participate in their communities as active members. At the same time, the Tanzanian National Disability Policy states that the government does not have the resources to provide the necessary services to people with disabilities (Ministry of Youth, Development and Sports, 2004). Since 2008, the Tanzanian government has been working with many local organizations and outside donors to develop more inclusive practices and strategies for addressing the needs of children with disabilities in public schools. “Solutions that incorporate native institutions, meanwhile acknowledging the imperative of global partnerships, appear to offer the greatest hope in addressing the problems that currently beleaguer schooling in Tanzania” (Ishengoma & Youngman, 1999, p. 72). Recent Tanzanian data show

between 2% and 40% of children with disabilities between ages 7-13 attend school, but Tanzania policy makers believe some of these estimates are very high (Ruyobya & Schneider, 2009). As of 2013, Tanzania had 21 self-contained primary schools and 377 inclusive primary schools (United Republic of Tanzania, 2013).

In the Tanzanian National Policy on Disability enacted in 2004, the government stated that people with disabilities have the right to an education and employment opportunities. Since 2009, officials from universities, non-governmental organizations, and government agencies dealing with education, health care, and social welfare have met to formulate a new inclusion policy for Tanzania, but it is still in draft form. The Persons with Disabilities Act of 2010 stated several basic principles including full and effective participation and

inclusion of persons with disabilities in all aspects of society, equality of opportunity and accessibility (United Republic of Tanzania, 2010). Specifically, regarding education the document stated that, “persons with disabilities [of] all ages and gender[s] shall have [the] exact same rights to education, training, and inclusive settings, and the benefits of research, as other citizens” (United Republic of Tanzania, 2010, p.23). Nevertheless, Tanzania is just beginning to grapple with assessment and identification of children with disabilities and what constitutes an equitable education and well-being for children and adults with disabilities. This question is especially complex when examining more *invisible* disabilities such as learning disabilities and mild intellectual disabilities.

In Tanzania, people often do not realize that children who do poorly in school and do not have obviously physical or sensory disabilities could still have developmental delays or disabilities. Tungaraza (2014) found that many Tanzanian teachers currently working in inclusive classrooms did not support inclusion because they believed that it would negatively impact the learning of children without disabilities and because teachers lacked the knowledge, training, and materials to effectively teach children with disabilities and create a productive inclusive environment. Tanzanians often attribute poor school performance from children with visible disabilities to laziness, foolishness, or poor behavior because they are unable to independently complete tasks of daily living or frequently need assistance and scaffolding (Stone-MacDonald, 2012a). The current understanding of cultural beliefs and values about disability in Tanzania and East Africa offer mixed messages, but typically argue that children with disabilities should be cared for, but not necessarily educated

and offered opportunities to participate in the community as other more typically developing members of society (Stone-MacDonald, 2014; Stone-MacDonald, 2012a).

Purpose

This paper is a theoretical examination of how the capability approach can support identification and education of young children in Tanzania with disabilities and an alternate way to look at labeling for children with mild intellectual disabilities and developmental delays. This paper discusses two studies as evidence in the theoretical examination of the understanding and use of labels and terms about students which support and hinder identification and service delivery in different ways. While data from two distinctly different studies is used to discuss how and why the capability approach would be a more practical and rights-based way to understand disability and education for children with disabilities in Tanzania, the purpose of this study is not to take the reader step-by step through the methodology and results of each study. The author examines two cases, an inclusive public primary school and a special needs faith-based school, where the setting (self-contained vs mainstreamed) does not determine acceptance, but rather the years of advocacy and demonstration of skills by individuals with disabilities influences the level of community participation. Finally, it also examines some of the ongoing challenges related to labels, disability advocacy, and current school practices in both school and community settings. The current understanding of cultural beliefs and values about disability in Tanzania and East Africa offer mixed messages. This paper offers data from a study at a special needs faith-based school and a second study at an inclusive public primary school to support

the use of the capabilities approach in labeling and identification.

In this paper, the author sought to answer the following research questions: 1) What role does language and terminology play in labeling and the understanding of disability? and 2) How does the capabilities approach apply to special education settings in Tanzania?

Models of Disability and their Role in Education

Models of disability shape the attitudes and beliefs of people about the care and education of individuals with disabilities. In the disability studies literature, there are typically three models of disability presented in a continuum: the medical, the rehabilitation, and the social. The medical model represents the view that disability is caused by a medical diagnosis and the goal of this model is to eliminate the impairment or return impaired bodies to societal normativity (Simmons, Blackmore & Bayliss, 2008). For people with intellectual disabilities, “the defects that [leads] to limitations in functioning [are] treated as the basis of the disability” (Parchomiuk, 2013, p. 125) and therefore create a negative deterministic fate. The rehabilitation model is commonly used in developing countries as a basis for services and many NGOs operate community-based rehabilitation programs based on this framework. Doctors, social workers, and educators work to *rehabilitate* the individual to be able to function within society through training and education based on societal norms (Kaplan, 1999; Werner, 1987). The rehabilitation model looks for the impairment or disability that needs to be rehabilitated. In that view, the disability occurs at the person level, rather than the societal level (Msall, Rogers, Ripstein, Lyon, & Wilczenski, 1997). On the other end of the continuum, the social model

regards disability as a normal aspect of life, not as a deviance (Peters, 1993; Shakespeare & Watson, 1997; Whyte & Ingstad, 1995) and rejects the notion that persons with disabilities are in some inherent way ‘defective’” (Kaplan, 1999, p.1). In most Northern countries, the medical and rehabilitation models of disability are employed to determine eligibility for services and prevalence statistics.

In the last fifty years in Tanzania, people have mostly stopped hiding children with disabilities, but have not yet started sending them to school when visible disabilities are present. In a recent study of Tanzanian teachers and principals in inclusive schools, Tungaraza found that teachers saw disability as both an “incapacity that renders one individual unable to lead a full and independent life” (2014, p. 119) and as “some deficiency in one or more of their organs” (p. 119). This group of teachers demonstrates beliefs that reflect both a physical understanding of disability and a functional understanding of the impact of disability, but both view it as a deficit. For children with learning disabilities or mild intellectual disabilities in a large classroom of 60-80 students completing didactic learning activities with one or two teachers, some parents and teachers in these studies used words such as *lazy* or *stupid* or a *troublemaker* to describe a student with a disability when they could successfully complete their work independently (Please note that these words were used in the data collected by the participants. While these words have negative connotations and do not meet the person first language, they are part of the data in the studies discussed. The words are part of the understanding the data and the context). The concept of disability for children with disabilities without any physical markers is still a new phenomenon and a concept that Tanzanians are wrestling

with within these paradigms. The capabilities approach offers an alternative way to view disability that may reflect larger societal conceptualizations of individuals' roles in society.

In East Africa, it is common for paradigm of disability to be socially constructed, but belief systems typically represent a melting pot of beliefs so that people's beliefs can represent both the social and medical models (Stone-MacDonald, 2012b). Isolating disability without considering a holistic view of well-being or "wholeness" may not be functional in Tanzania (Harknett, 1996). It is important to recognize in these communities that cultures, people with obvious physical disabilities may be seen as *normal* if they can participate in the daily activities of the society (Harknett, 1996; Wormnæs and Olsen, 2009), whereas people with no obvious disabilities may be conceptualized as *disabled* if she or he cannot participate in normal activities or bear children (Devlieger, 1995; Ingstad, 1995; Zhang, 2001).

The Capabilities Approach as a Theoretical Framework

This paper used a conceptual framework based on the capabilities approach (Terzi, 2005a, 2005b). For several years, the social model of disability has been the dominant paradigm in the disability studies literature and the medical or rehabilitation models have been the dominant paradigms in special education in the US and in East African countries (Peters, 1993; Stone-MacDonald & Butera, 2012). The capabilities approach is another way of looking at the individuals with disabilities in society that takes into account human diversity by using education to develop functioning and capabilities to be active members of their community. The capabilities approach (Nussbaum, 2006; Sen, 1999) views disability as just one of

many factors that contribute to the holistic person and promotes fair treatment in society, so that everyone, with and without a disability are treated as equal members of the society. The capabilities approach extends the social model by arguing for the just treatment of individuals with disabilities consistent with a rights model focus on substantive equality and real equality of opportunity (Terzi, 2005a, 2005b).

What is the Capability Approach?

The human capability approach has been defined and discussed by several scholars, beginning with Sen (1992) and Nussbaum (2006). Nussbaum's capabilities approach positions the "education of children with disabilities within the social justice debate as this diverse group has been excluded from other philosophical and political formulations of social justice (Terzi, 2008)" (Polat, 2011, p. 52). Nussbaum and Terzi view education as a fundamental human right for all children regardless of their abilities and education as the key to developing their capabilities and functionings (Terzi, 2010). Capability is defined as a person's freedom to achieve valuable functionings, which are the beings and doings of life: having self-respect, being well nourished, being well educated, and participating as an active member of your community (Nussbaum, 2006; Terzi, 2010). It is through education, in schools, with the family, and in the community that children learn the knowledge and skills necessary to participate in their communities as full and equal members and achieve their functionings (Taylor, 2012).

In education, equity is important, not being equal. Resources need to be equitably distributed to children with and without disabilities based on need. This means that for a child with a hearing loss, he/she may need certain materials, peer support or other

resources to meet the same level of achievement as a typically developing peer. Based on the capability approach, resources would be equitably distributed and the child with the hearing loss should receive more resources than the child who is typically developing. Resource distribution takes a view of people's functioning and capabilities as human diversity. When social systems create a disadvantage or children are unable to overcome their impairment, the capability approach argues for resources to support that child who needs additional investment to overcome that impairment. Nussbaum questions the idea of *normality*: "[I]t would be progress if we could acknowledge that there is no such thing as 'the normal child'; instead, there are children with varying capabilities and varying impediments, all of whom need individualized attention as their capabilities developed" (Nussbaum, 2006, p. 210).

Method

The data used in the two studies discussed in this paper were collected using primarily qualitative methods. Because this is a theoretical paper, the full methodology on each study will not be explained, but references to find the methodology are provided. The contexts will be explained further in the next section. The first study was conducted at a special needs school as an ethnography. The second study was a mixed methods single intrinsic case study collecting quantitative assessment data on grade 1 children and qualitative interview data from teachers and parents. In this paper, the qualitative data will be used to discuss the application of the capabilities approach to identification and labeling of children with disabilities in Tanzania.

Data Collection

The ethnographic case study aimed to explain how the school activities and

curriculum reflected local culture and needs in this rural Tanzanian community. To develop this ethnography, I observed and participated in the daily activities of the school and community for a total of 13 months over two research periods. I conducted interviews using a representative sampling of parents, teachers, and community members. It was a representative sample because there was representation in the sample of parents of students at the school from each class, each type of disability, each age group, and each socioeconomic group. I was also able to interview all teachers and administrators, except those (3 teachers out of 24) who started working at the school in the last two months of my study. In both studies, the interviews were conducted in Swahili. At the special needs school, the author has lived in the community for at least three months before starting interviews and conducted most interviews individually, but a few parent interviews were conducted with a teacher so that the parents could choose to respond in Swahili language or the tribal language, Kisambaa. All interviews with teachers were conducted by the author.

I collected documents relevant to daily work at the school, life in the community, and the development of the local and national curricula; and I used video and feedback interviews to record additional data at the school and check my understanding. For more information on methodology of this study, please see Stone-MacDonald, 2012b.

In the inclusive grade 1 assessment study, we collected quantitative data on all grade one students in this school who were tested for two consecutive years (286 children). Students identified as needing additional support received tutoring and additional medical or social service support (as needed). Students from year one who

with special needs (19) were reassessed at six months into the intervention period and one year into intervention. Students identified in from Year 2 (46) were retested after six months.

Qualitative data collection included classroom observation, document collection, and interviews with parents and teachers involved in the project. I collected data through direction observation in the grade 1 classrooms to gather information on the daily activities of the classroom, the curriculum, and the teacher/child interactions. Ethnographic notes were taken for a period of four to six weeks in the grade 1 classrooms. Interviews were conducted: 1) with parents and teachers to better understand children who were initially identified needing additional supports (30 parents) and 2) with teachers about beliefs about disabilities and supports (3 teachers). I also collected relevant documents to my study with permission of the school administration such as lesson plans, student work, and teacher training materials.

Data Analysis

In both studies, data analysis occurred throughout the study and interviews were transcribed quickly after they occurred. I used constant comparison method from the tradition of constructivist grounded theory for data analysis (Charmaz, 2005a, 2006; Glaser & Strauss, 1967; Strauss & Corbin, 1990). Grounded theory allows the researcher to develop categories and explain the experiences of the particular case under investigation and then make assertions that may be useful to other classrooms in similar situations. In the constant comparative method, the data is gathered and compared and the categories developed are put together to develop a theory that explains the phenomenon through the eyes of the participants.

Credibility

Both students used the same procedures for ensuring the validity and credibility of the data. I used five strategies across the two studies outlined by McMillan and Schumacher (2006): prolonged time in the field; in-depth interviews; triangulation of interviews, observation, and documents; member checks; and peer debriefing.

The Two Tanzanian Contexts

As previously stated, this paper draws on previously collected data from two different Tanzanian contexts to examine two applications of the capability approach for labeling and educating children with disabilities and developmental delays. The first setting is a special, segregated school for children with developmental disabilities run by a faith-based organization, but the children are included in their community through school, religious, and family activities (Stone-MacDonald, 2014). In the second setting, the school is inclusive because children attend classes with children with and without disabilities, but the community is only beginning to understand the differences between disability and disease and that children can have a disability without physical signs.

Special needs school in a rural area. The first context is a special needs school called the Rainbow School in Lushoto for children with developmental disabilities where children are segregated in their education, but are learning all the important skills for being part of the community. The Irete Rainbow School is located near Lushoto, Tanzania, a town of approximately 23,000 people in the Tanga region (United Republic of Tanzania, 2003). Lushoto is located twenty miles off the main road between Dar es Salaam (a six-to-seven-hour drive from Lushoto), the capital of Tanzania, and

Arusha (a five-hour drive from Lushoto), a large city where tourism is popular because of the city's proximity to Mount Kilimanjaro and several national game parks. Lushoto is the largest town in the Western Usambara Mountains, and three miles up the mountain is Irente, a small, rural village. Irente Rainbow School was founded in 2005 to provide educational opportunities to children with developmental disabilities who could not attend the local primary schools, or who had dropped out because the school did not know how to accommodate their needs in the large classes. It was started by the Evangelical Lutheran Church of Tanzania-Northeastern Diocese, which is based in Lushoto. This school is only for children with disabilities. While an inclusive school would be desired, this school helps prepare students for participation in the community in a way that the public schools currently cannot. It is not practical for children with intellectual disabilities to attend regular primary schools, where teachers do not have training in special needs and the student teacher ratio is 40:1 at best, with only one teacher in a classroom (Karakoski & Stroem, 2005; Stone-MacDonald, 2014; Tungaraza, 2014). Irente Rainbow School serves around 30 children, ages 6–25, with developmental disabilities such as intellectual disabilities, autism, and cerebral palsy.

Inclusive School in a Village Near a City.

The second context is a public primary school in Moshi where all children are attending school together, but some teachers do not believe that children have disabilities and all children receive the same instruction. The full study examines data from one case study of a non-governmental organization (NGO) to support Tanzanian communities in meeting the needs of all children and addressing the needs of children with disabilities. The hope is that if children can

be identified in grades 1 or 2 when they first start school, and curriculum modifications can be made and new teaching strategies can be introduced, children with learning disabilities will be more successful in school and have a better opportunity to move onto secondary school. The first step in understanding how to support the diversity of learners is to look at the data on the range of learners in a classroom and to observe the classes and the teachers to understand how the classroom, curriculum, and teachers function and the effects on the learning of the group of students. In the public primary school, there are approximately 70 students with a teacher and a teacher assistant in the morning session and another 70 students in the afternoon session. This is the format for grade 1 and 2.

The director of the NGO has been working with the school principal and teachers in grades 1 and 2 to support children who struggle in school when they enter. At the beginning of the school year, the NGO assesses and identifies children in grade 1 in a Tanzanian primary school who have learning disabilities, global developmental delays, or intellectual disabilities or autism and provides small group Tier 2 and 3 instruction over 6-18 months to support those students with increased intensive instruction and strategy instruction so that they can be more successful in their inclusive classroom. Small group instruction occurred in a pull-out model for approximately 30 minutes three or four times a week for each student in rotating groups. Teachers working for the NGO delivered the small group instruction in a ratio of 2-4 students to one teacher. The remainder of their instruction was delivered in the general education classroom by the classroom teacher. In this paper, only data from the qualitative interviews with parents and teachers and observations will be

discussed as it relates to the application of the capabilities approach. The other findings from this study on the results of students receiving small group instruction to improve educational outcomes indicated that all students in the program made statistically significant progress during their first 12 months in the program (Stone-MacDonald, 2015).

Results

Language Use and Terminology

At the special needs school, parents, teachers, and community members frequently participated in disability awareness and advocacy efforts. One parent stated, “the community truly is involved, the school is in the community. These children with problems are part of the community and the community has received the children.” Parents were more comfortable talking with community members and outsiders about disability because disability awareness was part of their work to support their children. A community leader stated,

The school pushes forward so that the teachers are given respect like other teachers and the school is recognized for the work they do in our district. The school serves our community to show that these students have the right to an education like all other students.

Parents and teachers knew that they were fortunate to have the school, but they had also worked for the school. One parent explained:

There are others in Tanzania with intellectual disabilities who need help. If the government was to improve, it would be able to help many other children with intellectual disabilities and bring them to Rainbow or other schools for children with disabilities. Children

with disabilities are human beings who should be given the opportunity to participate in the community and should be helped.

This parent went on to explain that she wanted her child in an inclusive school, but at that time the Tanzanian schools and teachers are not equipped to handle children with disabilities and provide sufficient resources and trained teachers. This is still the case in most of the country (Tungaraza, 2014). At the special needs school and in the Lushoto community, community members were generally aware of disability, the difference between disability and disease, and current terminology such as using *ulemavu* (disability) instead of *shida* (problem) and people first terminology.

In contrast, at the inclusive school, all parent interviews were conducted by a Tanzanian teacher working for the NGO. The author and/or other non-Tanzanian program staff were present to listen to the interview and ask additional questions, but the explanation of the NGO and their work with the children and the questions were all communication by the Tanzanian teacher. This was done for two reasons: 1) to use a cultural insider and 2) to use the common and accepted language and terminology around disability and disease that was known to parents and community members. First, the Tanzanian teacher served as a cultural insider and was able to gather additional information from the families that the author or other non-Tanzanian staff would not have been able to ask or learn. For example, the teacher was able to ask about drug and alcohol use during pregnancy or question a parent about why they never took a child to the doctor who the parent suspected has a hearing impairment. Parents were willing to share this information with the Tanzanian teacher. In addition, the Tanzanian NGO teacher is

also a community member and has personal and professional connections to families. This makes her both a cultural and community insider.

Second, our Tanzanian teacher used words familiar to families to describe school concerns and problems that were culturally appropriate. All of the Tanzanian teachers and parents used *shida* (problem) instead of *ulemavu* (disability) to talk about learning issues and problems in school. The Tanzanian NGO teacher never labeled children with a disability or delay and did not talk about disabilities, but asked about the health history and birth history and discussed the concerns we have as a team for the child. A dissonance existed between policy language and local terminology for disabilities and learning challenges. Terzi (2010) argues that the categorization of impairments and view of differences as impairments or deficits are necessary for people to judge and, therefore, allow people to discriminate based on those impairments. But with invisible disabilities such as learning disabilities or mild intellectual disabilities, if the child does not appear physically different then the child is assumed to be lazy or stupid; people use words like *problem* or *troublesome* to describe the child, not the disability. Disability as a term not is just not yet in the vocabulary of parents, teachers, and community members. They typically used *mbovu* (bad, defective, worthless), *mvivu* (lazy), *mpole* (stupid), *mzito* (troublesome), and *shida* (problem). Linguistically, all of the words above with the “M” indicate it is a person who is that way. These words were commonly used to describe children with disabilities and delays at the school, not because adults were intentionally using hurtful words, but because they had not been exposed to or learned the other language of disability awareness and advocacy.

Only in the last ten years have people in Tanzania started using the term *ulemavu* for disability in general and the terms *asiyeona* and *asiyesikia*, which mean a person who cannot see and a person who cannot hear, respectively. In Tanzania, an individual will hear the term *watoto wenye ulemavu*, meaning children with disabilities (e.g. people first language) (Author, 2014). In the past, people with disabilities were in the same linguistic class as chairs and dishes. These newer terms use person first language and move away from words in the ki-vi noun class that are not normally used for people, but for objects.

The Capability Approach

Special Needs School. During interviews in each context in Tanzania, the language used and not used by Tanzanians to discuss concerns, disability, and capabilities gave insights as to the approach or model of disability prevalent. In the ethnographic study at a special school for children with developmental disabilities, the social model and in some cases, the capabilities approach was evident. At the special school, participants used words that reflected the capabilities approach and social model and recognized the rights of individuals with disabilities to an education and quality life. Their education is increasing their capabilities, and the teachers and families work to educate the community about how children and adults with disabilities can participate in the community.

In Tanzania, the medical model, the rehabilitation model, and the capabilities approach were all apparent in the beliefs of local stakeholders. People recognized that medical causes existed for people’s disabilities, and that those disabilities could hinder their ability to participate in their community or do work. Teachers and

parents saw the school as a path to rehabilitation for their children. Rehabilitation would provide skills and knowledge to do work and participate socially in the community. Finally, some teachers and parents recognized the importance of their beliefs and how their local culture embraced these children and helped them to find their place through education and knowledge of cultural practices. This embodiment of the capabilities approach was expressed by teachers and a few parents who saw how the curriculum had given the students' skills and self-determination to be part of the community. Several models of disability are present in Tanzania because community members themselves have different beliefs about disability and different understandings of the role of people with disabilities in the community. At the Rainbow School, the teachers and active parents represented the capabilities approach, whereas the average citizen was more likely to accept the medical or rehabilitation model, according to their understanding of disability. Children with disabilities at the Rainbow School learned the knowledge and skills necessary to become part of the community, but the community still saw these individuals as problematic because some community members did not want to let them participate in the community. This is consistent with the social model where disability is based on discrimination despite their functionings.

Inclusive Setting Language. On the other hand, in the inclusive project at the public primary school, parents and teachers were not operating from the capabilities approach for the most part. They were operating from a medical model, because the teachers expressed that either there were no children with disabilities because that would be obvious or that the children with intellectual

disabilities had impairments and would not be about to overcome it.

After completing the assessments of all grade one students in the inclusive school, we conducted interviews with parents of all 21 students identified for additional supports. Through interviews, we learned that several students had experienced health issues. We connected with local health clinics and other NGOs to support these students. Three children were examined for hearing concerns, one child was referred for a speech and language concern, six students for a vision concern, two students for other neurological concerns, and three children saw a pediatrician for blood tests for concerns about anemia and malnutrition. Parents were grateful for the support, but much education on the differences between disability and disease are needed and staff at the rehabilitation centers need to work with parents to manage expectations about disabilities being cured and maintaining high expectations for their child's life in this society and culture. These conversations are more meaningful and powerful from Tanzanian to Tanzanian. The NGO facilitates the relationships and the NGO's Tanzanian staff works closely with staff at the various centers and hospitals where families are referred to offer comprehensive family support from the community.

In the inclusive school study, participants used language that reflected the paradigms of medical and rehabilitation models and saw disability as something very visible and physical, but did not recognize learning disabilities or other "invisible" disabilities. In many ways, it is a misnomer to call this an inclusive school, because in fact, it is inclusive only because the children have not yet been identified or labeled and/or they have not yet been excluded for poor performance in the classroom. Parents and

teachers are still just beginning to learn about disability and the differences between disability and disease. Parents of children with mild intellectual disabilities saw their children as completely different and unrelated to children with other developmental disabilities (e.g. cerebral palsy, autism). One might argue that this school is really mainstreaming because all children are being served together regardless of disability or needs, but without any additional support for children with additional needs.

In this study, Tanzanian primary classroom teachers did not have knowledge about students with special needs. Teachers thought of students with special needs as students with physical or multiple disabilities, or outward markers of cognitive disabilities. One teacher stated that there were no children with disabilities (*ulemavu*) in the school because there were no children with noticeable physical disabilities or other obvious signs such as unique facial features found in some genetic disorders. When specifically asked, she stated “I do not see mild intellectual disabilities or slow learners as a disability, but the child is just willfully acting out or being mischievous so that they do not have to do their schoolwork.” In analyzing the interviews, we found a lack of understanding amongst adults about disability and repeated use of words like *lazy* to describe children with suspected disabilities. Teachers did not have knowledge about students with disabilities and pictured those students as only students with physical or multiple disabilities or outward markers of intellectual disabilities.

On one visit to a local health clinic to have some of the children tested for hearing and speech issues, we accompanied several parents and waited with them in the lobby. On this day, the hospital neurologist was

also visiting the clinic. The neurologist mostly saw children with intellectual disabilities and/or cerebral palsy. All of the children at the clinic with a caregiver that day had outward signs of disability including difficulty walking, enlarged heads as a result of hydrocephalus, Down’s syndrome, or significant difficulty speaking or were non-verbal. These children mostly had moderate to severe disabilities and required a lot of care and support. The children and parents from our program watched the children and families and asked us many questions because they had never seen children with these types of noticeable moderate and severe disabilities. One mother asked me, “Are they going to die soon? How do they live and what is their health like?” Even one of our program staff seemed surprised and asked me how you teach these children. I encouraged the parents to talk to each other because they were all from the same set of surrounding communities, but this is not uncommon for children to be cared for but unseen in the community (Stone-MacDonald & Butera, 2012). The parents of the children with mild disabilities were surprised to talk to the other parents and learn that they shared some of the same struggles. These results are supported by existing research in Tanzania that demonstrate the need for continued disability awareness efforts (Kisanji, 1995; Tungazara, 2014; Stone-MacDonald, 2014).

Limitations

While this paper draws on data from two studies, both of these studies were undertaken originally to answer different research questions. More studies are needed to examine the presence and impact of the capability approach in the education of children with disabilities in Tanzania. More sites, parts of the country, and types of schools need to be examined to make

definitive conclusions about the use of the capability approach. It is also important to continue following the inclusive school setting to see if time, exposure, and the advocacy work of non-governmental organizations will make a difference in increasing the knowledge, awareness, and inclusion of children with disabilities. Finally, it would be helpful to conduct a mixed method study using a survey of larger numbers of stakeholders including both quantitative and qualitative questions to examine language use and beliefs about the education of children with disabilities.

Discussion and Implications

Tanzanian special education is the essence of community engagement because it is in its infancy and the government does not have the resources to fully implement their goals through the public system. The responsibility has fallen upon local community members and non-governmental organizations to create schools and provide accommodations for children with disabilities or delays. Parents respond best to local community partners discussing their children and issues of disability. Local collaborators can bridge the gap between the local colloquial terms about disease and disability and people first language. Parents can also serve as advocates and supportive resources for each other in working for services and education for their children. Inclusive education can help combat negative attitudes and support community membership for children with disabilities, but Tanzania also needs well-trained teachers with the resources necessary to provide a quality education to all students for beliefs to change (Hofman & Kilimo, 2014; Rakap & Kaczmarek, 2010; Tungaraza, 2014).

The capabilities approach (Nussbaum, 2006; Sen, 1999) views disability as just one of

many factors that contribute to the holistic person and promotes fair treatment in society, so that everyone, with and without a disability are treated as equal members of the society. The capabilities approach extends the social model by arguing for the just treatment of individuals with disabilities consistent with a rights model focused on substantive equality and real equality of opportunity (Terzi, 2005a, 2005b). A culture can support or deny the rights of individuals with disabilities, but shifts in approaches and access to rights are possible through individual and collective action. That shift was visible at the special needs school and in that community. I would also argue that the shift was beginning when parents of children in the inclusive school started talking to parents of children with moderate and severe disabilities and started to see them as children just like their own, and not as invisible children kept in their homes.

In the United States, the hierarchy of terminology finds that words such as lazy and troublesome are more disparaging than labeling children with a disability. On the other hand, in Tanzania, a disability is much more stigmatizing than laziness, because a disability is a deficit that cannot be overcome. At the present time, a disability is seen as a medical condition resulting in care, but not education and preparation for life. Various organizations like the special needs school and some other NGOs in the other areas of Tanzania are working on helping children learn the funds of knowledge to be part of their community, but not all children have the opportunity to attend school or participate in outreach community-based education programs to learn skills and knowledge to be an active member of their communities (Ruyobya & Schneider, 2009; Wickenhauser, 2013). Using the quantitative data from the inclusive school study, children in the program are improving on

the educational outcomes and parents and teachers are seeing progress to the point that they believe the children can learn and are not necessarily actually lazy (Stone-MacDonald, 2015). Therefore, what is the preference in labeling: laziness that can be overcome or a disability that is not understood or accepted? If we start talking about the children in terms of disability and differences in disability and disease, are we setting them up for more discrimination in a system where they are currently viewed as lazy as opposed to having a disability? Which label will better help them strive for success and acceptance within their culture, community, and dominant model of disability? While not labeling the children at all and only discussing their strengths and needs would be the preference, both the United States and Tanzanian education system use labels to categorize students and sort children based on those strengths and needs.

As stakeholders, parents and teachers in Tanzania all want young children starting school to start from a position of strength and build on those capabilities. The capability approach can support the holistic view of the child and support the growth of that child's knowledge, skills, and capabilities. In parents start their advocacy work from the perspective of the capabilities approach and teachers see children as inherently capable and work to increase their knowledge and skills through education, the stigma of both laziness and disability can be overcome. This is a long process and a difficult process that people in the United States are still fighting after many decades. At the special needs school, besides parents' vocal advocacy for the active participation of their children in the community and their action of bringing their children out in the community, attitudes started to shift as

community members were able to see for themselves that the children and young adults with disabilities were able to participate actively in their families and community and do the same tasks as their peers to support their families, such as farming, selling in the market, cleaning in the home, and caring for animals. While the children in the inclusive school setting could do those already, they needed to demonstrate their ability to participate in school settings with socially acceptable behavior and accurate and neat work in math, literacy, and science. The children were largely able to do this after receiving six to twelve months of tutoring and intervention from our program. Besides increased academic scores on the assessment, teachers and parents commented on the improved behavior in both our small group instruction groups as well as in the large grade 1 classroom. These children also demonstrated their abilities to community members, in this case their parents and teachers, and they were accepted by their community because of their skills and knowledge. The key is to provide the necessary support for children with disabilities so that they can improve their skills and knowledge and demonstrate their capabilities and therefore, social worth in the Tanzanian communities to be active and productive members. The interventions and services should be tied to ways to do this. Language and terminology has served as a vehicle in my research to better understand when and how children with disabilities are accepted and what type of supports contributes to their acceptance. In the future, it will be important to continue to monitor the children and their progress, but also how language, acceptance and advocacy changes and who are the voices of that advocacy for children and families with disabilities in Tanzania.

References

- Bickensack, J. E., Chatterji, S., Badley, E. M., & Ustun, T. B. (1999). Models of disablement, universalism, and the international classification of impairments, disabilities and handicaps. *Social Science and Medicine*, 48, 1173-1187.
- Devlieger, P. J. (1995). Why disabled? The cultural understanding of physical disability in African society. In B. Ingstad & S. R. Whyte (Eds.), *Disability and culture*. Berkley, CA: University of California Press.
- Harknett, S. G. (1996). Cultural factors in the definition of disability: A community study in Nyankunde, Zaire. *African journal of special needs education*, 01, 18-24.
- Harry, B. (2002). Trends and issues in serving culturally diverse families of children with disabilities. *Journal of Special Education*, 36, 131-138,147.
- Hofman, R. H., & Kilimo, J. S. (2014). Teachers' Attitudes and Self-Efficacy Towards Inclusion of Pupils With Disabilities in Tanzanian Schools. *Journal of Education and Training*, 1(2), 177-198.
- Ingstad, B. (1995). Mpho ya modimo-A gift from God: Perspectives on "Attitudes" toward disabled persons. In B. Ingstad & S. R. Whyte (Eds.), *Disability and culture*. Berkley, CA: University of California Press.
- Ishengoma, J. M., & Youngman, D. J. (1999). Educational Equity in Tanzania. *Journal of Education*, 181(1), 59-64.
- Kaplan, D. (1999). *The definition of disability*. Retrieved from <http://www.accessiblesociety.org/topics/demographics-identity/dkaplanpaper.htm>
- Karakoski, J., & Stroem, K. (2005). *Special needs education in Tanzania: A fact-finding mission final report*. Finland: Ministry of Foreign Affairs of Finland.
- Kisanji, J. (1995, April 10–13). *The relevance of indigenous customary education principles in the formulation of special needs education policy*. Paper presented at the International Special Education Congress, Birmingham, UK.
- McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence-based inquiry* (6th ed.). Boston: Pearson/Allyn and Bacon.
- Miles, M. (2002). Children with hydrocephalus and spina bifida in East Africa: Can family and community resources improve the odds? *Disability & Society*, 17, 643-658.
- Ministry of Labour Youth Development and Sports. (2004). *National policy on disability*. Dar es Salaam, Tanzania: United Republic of Tanzania.
- Msall, M. E., Rogers, B. T., Ripstein, H., Lyon, N., & Wilczenski, F. (1997). Measurements of functional outcomes in children with cerebral palsy. *Mental Retardation and Developmental Disabilities Research Reviews*, 3, 197-203.
- Nussbaum, M. (2006). *Frontiers of justice: Disability, nationality, species membership* Cambridge, MA: The Belknap Press of Harvard University Press.
- Parchomiuk, M. (2013). Model of intellectual disability and the relationship of attitudes towards the sexuality of persons with an intellectual disability. *Sexuality and disability*, 31, 125-139.
- Peters, S. J. (1993). An ideological-cultural framework for the study of disability. In S. J. Peters (Ed.), *Education and disability in cross-cultural perspective* (pp. 19-35). New York: Garland Publishing, Inc.
- Polat, F. (2011). Inclusion in education: A step towards social justice. *International Journal of Educational Development*, 31(1), 50-58.
- Rakap, S., & Kaczmarek, L. (2010). Teachers' attitudes towards inclusion in Turkey.

- European Journal of Special Needs Education*, 25, 59-75.
<http://dx.doi.org/10.1080/08856250903450848>
- Ruyobya, I. J., & Schneider, M. (2009). The Tanzanian Survey on Disability, from <http://www.statssa.gov.za/isi2009/ScientificProgramme/IPMS/1129.pdf>
- Sen, A. (1992). *Inequality reexamined*. New York: Russell Sage Foundation.
- Sen, A. (1999). *Development as freedom*. New York: Knopf.
- Shakespeare, T., & Watson, N. (1997). Defending the social model. *Disability and Society*, 12, 293-300.
- Simmons, B., Blackmore, T., & Bayliss, P. (2008). Postmodern synergistic knowledge creation: Extending the boundaries of disability studies. *Disability and Society*, 23, 733-745.
- Stone-MacDonald, A. (2015, January). *Identification and Labels for Young Tanzanian Children: An Examination of Labels for Children with Intellectual Disabilities*. Division on Autism and Developmental Disabilities International Conference, Clearwater, FL.
- Stone-MacDonald, A. (2014). *Community-based education for students with developmental disabilities in Tanzania*. Dordrecht, Netherlands: Springer.
- Stone-MacDonald, A. (2012a). Cultural Beliefs about Disability in Practice: Experiences at a special school in Tanzania. *International Journal of Disability, Development and Education*, 59, 393-407. doi: 10.1080/1034912x.2012.723947
- Stone-MacDonald, A. (2012b). Preparing children with developmental disabilities for life in the community: A Tanzanian perspective. *Education and Training in Autism and Developmental Disabilities*, 46, 255-268.
- Stone-MacDonald, A., & Butera, G. (2012). Cultural beliefs and attitudes about disability in Sub-Saharan Africa. *Review of Disability Studies*, 8, 62-77.
- Taylor, A. (2012). Addressing ableism in schooling and society? The capabilities approach and students with disabilities. *Philosophy of Education Archive*, 113-121.
- Terzi, L. (2005a). Beyond the dilemma of difference: The capability approach to disability and special educational needs. *Journal of Philosophy of Education*, 39, 443-459.
- Terzi, L. (2005b). A capability perspective on impairment, disability and special needs: Towards social justice in education. *Theory and Research in Education*, 3, 197-223.
- Terzi, L. (2010). *Justice and equality in education: A capability perspective on disability and special educational needs*. London: Continuum.
- Tungaraza, F. D. (2014). The Arduous March toward Inclusive Education in Tanzania: Head Teachers' and Teachers' Perspectives. *Africa Today*, 61(2), 109-123.
- United Republic of Tanzania. (2003). 2002 Population and housing census. Retrieved June 5, 2008, from <http://www.tanzania.go.tz/census/census/reports.htm>.
- United Republic of Tanzania. (2010). *The Persons with Disabilities Act, 2010*. Dar es Salaam, Tanzania: Government Printer.
- United Republic of Tanzania (2013). *Basic education statistics in Tanzania*. Dar es Salaam: MoVET.
- Werner, D. (1987). *Disabled village children*. Berkley, CA: The Hesperian Foundation.
- Wickenhauser, N. (2013). *A study of social workers' approach to their work with disabled children in Moshi, Tanzania*. (Master's Degree in Social Work), Aalborg University, Denmark.
- Wormnæs, S., & Olsen, M. (2009). Mothers' hearts speaking: Education enlightens, empowers and protects girls with disabilities. *International Journal of Special Education*, 24, 65-75.

- Whyte, S. R., & Ingstad, B. (1995). Disability and culture: An overview. In B. Ingstad & S. R. Whyte (Eds.), *Disability and culture* (pp. 3-32). Berkley, CA: University of California Press.
- World Health Organization. (1980). *International Classification of Impairments, Disabilities, and Handicaps*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2001). *International classification of functioning, disability and health*. Geneva, Switzerland: Author.
- Zhang, C. (2001). Multicultural views of disability: Implications for early interventionist professionals. *Infant-Toddler Intervention, 11*, 143-154.

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The Peer Assisted College Support Program: Supporting Students with Autism Spectrum Disorder in the University Setting

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Abstract: This paper provides descriptive information on a peer-assisted college support program for university students with autism spectrum disorder. Program development, aims, curriculum, implementation, and evaluative measures will be discussed for potential program dissemination to other universities.

Exiting the public school system and transitioning to post-secondary education poses specific challenges for individuals on the autism spectrum (Muller, 2004). The unique characteristics of autism spectrum disorder (ASD) helps contribute to poor post-school outcomes for adolescents (American Psychiatric Association, 2013; Henninger & Taylor, 2013) and impacts success for those entering institutions of higher education. Specifically, characteristics that make college more challenging for students with autism spectrum disorder include, but are not limited to, difficulties with: loneliness, generalization of skills, anxiety, communication, executive functioning, completing tasks, problem solving, social interactions, organization, stress, scheduling, and emotions (Gelbar, Smith, & Reichow, 2014). Additional traits consist of restricted patterns of behavior, interests and activities that are demonstrated by a number of students with ASD in post secondary education (VanBergeijk, Klin, & Volkmar, 2008). This finding is of high importance as students with ASD are entering the university setting at increasing rates. Recent statistics indicated that 47% of young adults with ASD enrolled in a post-secondary institution within six years of graduating high school and 35% of those attendees

earned their college degree (Sanford et al., 2011, USDOE, 2011). Although there are challenges to be faced, the experiences often associated with college life also benefit individuals with ASD in terms of personal skill building, self-advocacy and self-confidence (Hart, Grigal, & Weir, 2010). Nevertheless, in light of the unique characteristics associated with ASD and the propensity for this population to be involved in college settings, there is a need for university campuses to design and implement programs that increase successful college involvement for individuals with ASD (Cohen, & Oppenheimer, 2013; Zager & Alpern, 2010). As the distinct course of adolescent growth development differs, so may the support needed for individuals with ASD entering college programs (Gelbar et al., 2014; Zager & Alpern, 2010).

At least 18 states have ongoing support program for students with ASD in higher education. Notably, The West Virginia Autism Training Center at Marshall University runs The College Program for Students with Asperger's Syndrome (<https://www.autismspeaks.org/resource/west-virginia-autism-training-center>). All participating students must be accepted into Marshall University and receive supports in academics, socialization, and independent

living. The aim is to produce competent graduates who are competitive in the work force. In the state of Washington, Bellevue College instituted the Autism Spectrum Navigators Club where supports are designed around the social and diversity models (<http://www.bellevuecollege.edu/autismspectrumnavigators/>). Focus areas of instruction include executive functioning, social interaction, self-advocacy, and self-regulation. During the quarter, participants meet regularly with a peer mentor, enroll in a career preparation class, and receive supports on communicating with faculty and developing campus awareness. If students provide permission, parents are encouraged to attend quarterly meetings. While other programs exist nationwide, these two examples clearly provide comprehensive help to enrolled students with ASD.

While there are a variety of ways to introduce needed college supports to this population, establishing a peer-assisted model that utilizes a flexible curriculum provides a natural and social avenue for college students with ASD to gain additional, yet individualized support. Students with ASD at California State University Fullerton (CSUF) have access to the Office of Disability Support Services and the services of the professional staff. However, they have little structured support from college-aged peers who have current understanding of and success in attending college.

In response to the number of students with autism, the Center for Autism at CSUF began a Peer Assisted College Support (PACS) program. PACS was developed as an intervention to support college students with ASD. The intent of the PACS program was to provide practical assistance and support in facing issues involved within the college environment.

Program Information

Development of PACS

In order to facilitate the initial development of PACS, an intramural CSUF research grant was received in fall 2013. This funding provided the means to buy supplies for the program. A CSUF faculty member along with an undergraduate student researcher developed the PACS curriculum (see Table 1) based on literature describing needed supports for successful college attendance for students with ASD. This included research showcasing the perspectives of college students themselves with ASD, their families, and administrators supporting post-secondary transition.

Based on the time demands of college students, it was decided that meeting once every two weeks for 1.5-2 hours was realistic for the mentors and mentees. The semester is typically made up of 16 weeks, which supported embedding eight modules into the curriculum, with one module being reviewed per meeting. In order to increase comfort and sociability, “ice breaker” activities were included in the curriculum to start each module.

Once the curriculum was developed, a panel of CSUF students with and without ASD made revisions. Two whole group work meetings occurred, in addition to multiple small group meetings. The first whole group meeting was an overall review of the curriculum. Student participants broke into small groups and took sections of the curriculum to review and revise in depth. Once feedback was organized, a final whole group meeting was scheduled where teams reported on their suggested revisions and the group as a whole gave input. CSUF students with ASD were a part of this curriculum review process, which increased the social validity of the program.

PACS Overview

PACS pairs up a CSUF student with ASD to a veteran college student who has experienced success at the college level. These partners meet bi-weekly in order to discuss issues related to the transition to college (e.g., time management, organization, navigating the CSUF website, campus living options). PACS is directly tied to the campus environment where students may find the issues or topics directly helpful within that setting. All partners are supplied with a PACS packet, outlining each week's topic of discussion. The goal is for students with ASD to utilize the peer mentor as a resource, in addition to the available campus resources through the Office of Disability Support Services.

PACS Curriculum

As shown in Table 1, program curriculum was designed from current literature highlighting difficulties encountered for individuals with ASD in college environments (Freedman, 2010; Harpur, Lawlor, & Fitzgerald, 2004; Palmer, 2006; Zager, Alpern, McKeon, Maxam, & Mulvey, 2013). At the start of each meeting, partners complete an ice breaker activity to include fun and ease the transition to one on one time. The order of the modules may fluctuate during the semester based on student feedback and university activities, but typically, the first meeting provides an overview of the campus along with an activity to help the partners get to know one another. During the meeting, partners complete a self-guided walking tour and highlight locations that are popular among students and necessary for successful academic and social integration. The focus of the second meeting centers on navigating

the online resources available through the university and accessing the social opportunities on campus. Peers are shown specific university-based electronic applications that assist in plugging into the university's academic and extra-curricular functions. Notably, campus clubs are reviewed, ones of interest are noted, and follow up activities involve contacting club officers for information on how to be involved.

In order to support organization at the university level, partners review and download campus electronic applications, and discuss strategies for assembling paperwork and managing time. Furthermore, the various residence options (e.g., dorms, living at home, apartments) associated with college attendance are discussed. During a separate meeting, partners complete activities revolving around communication strategies with faculty via email, phone, and in-person. Another module's focus relates to managing hobbies and schoolwork. Participants learn about developing goals that are Specific, Measurable, Attainable, Realistic, and Timely (S.M.A.R.T.). PACS works collaboratively with CSUF's DSS and also encourages participants to access the Career Center in order for students with ASD to best determine their professional path. Informally, participants in PACS also explore options for the future via structured discussion questions and utilization of resources from the Career Center. One of the final meetings occurs prior to finals and partners work together to learn about studying tips in relation to completing final exams and create a study schedule. The final meeting is a group party on campus where students bowl and eat pizza.

Table 1. *PACS Curriculum Content Overview*

Module	Topic Covered in PACS Meetings
1	<ul style="list-style-type: none"> • PACS overview • Getting to know you activity • Campus tour with checklist • Exchange of contact information
2	<ul style="list-style-type: none"> • Navigating the CSUF website • CSUF campus clubs
3	<ul style="list-style-type: none"> • College living options • Explore housing, transportation options • Organizing course materials • Daily time management
4	<ul style="list-style-type: none"> • Tips on emails, phone calls, and effective office hours
5	<ul style="list-style-type: none"> • Balancing schoolwork with personal interests and activities • Create S.M.A.R.T goals
6	<ul style="list-style-type: none"> • Choosing a major • Exploring the future activity • Career exploration
7	<ul style="list-style-type: none"> • Preparing for finals • Discuss studying tips and finals schedule
8	<ul style="list-style-type: none"> • What to do during the break • Identify off campus activities • Pick two in the area and commit to attend

PACS Participants

Participants in this program consist of college students with and without ASD. Participants may be male or female, any ethnicity, come from any SES background, and must currently be enrolled in courses at CSUF. Due to their acceptance and participation in a college setting, it is implied that the participants with ASD are on the high functioning end of the autism spectrum. Participants referred from CSUF’s Office of Disability Support Services have required documentation verifying ASD.

All peer mentors must complete a 60-minute training prior to being connected with a

student with HFA/AS. Once connected, partners must be available to meet once for two hours every other week. Partners are encouraged to bring their PACS packet to each meeting to enhance the engagement of the interaction.

Participant Recruitment

Several avenues for recruitment and selection occur. First, the Office of Disability Support Services sends information about PACS to all CSUF students with ASD who are registered with DSS. Second, the Center for Autism at CSUF has a website and Facebook page that promotes the program. The center directors

also speak at various events and discuss the PACS program with audience members. Third, the PACS program director emails local high schools to promote the program so that incoming college students with ASD are aware of the service.

Students who want to participate in PACS as mentors must have a GPA above 3.0 and be enrolled as an undergraduate or graduate student. They are required to complete a brief interview process and attend a training that educates on ASD, reviews the PACS curriculum, and discusses the requirements of being a mentor. College students with disabilities like ADHD or Learning Disabilities are not eligible for the program. The PACS content was created with the specific intent to support students with ASD and address the unique challenges that occur from being on the spectrum and attending college.

Meeting the Need for Support

A unique strength of PACS is the peer support model, which helps students absorb and retain the multitude of skills needed to successfully transition into post-secondary education. While group-oriented approaches are utilized in other institutions of higher learning, they are limited in that their focus emphasizes a specific skill or set of skills. PACS offers more comprehensive assistance by helping students acquire a variety of necessary skills, attitudes and behaviors.

By utilizing peers as mentors in a 1:1 setting, CSUF students with ASD have the opportunity to interact with others who personally experience the content discussed. Additionally, the students with ASD have the access to socially interact with typical peers on a college campus. Based on the post-secondary status of our participants with ASD, this format is also age-appropriate and more naturalistic as partners

meet together on campus at locations of their choosing, rather than interacting in a clinic setting. Through meeting on campus, students with ASD are further immersed in the campus life, increasing their awareness of the different educational and social activities available campus-wide.

Another value of the PACS peers support model is the increased awareness that peer mentors receive through their interactions with students with ASD. Peer mentors are typically undergraduate students who have a personal connection to ASD or plan on entering into professions where they will work with individuals on the autism spectrum, as demonstrated by the fact that the largest number of mentor applications comes from students majoring in Child and Adolescent Studies and Communicative Disorders. Through their participation, mentors gain practical experience working with diverse populations, often reporting that they grew in their perceptions and openness to individuals with ASD. This model provides the opportunity to expose individuals in our community to the needs, constraints, and strength of the ASD community and is valuable in helping to raise awareness and understanding of those individuals who live with ASD.

Programmatic Barriers

The main barrier the PACS program has experienced is the recruitment of participants with ASD. There were 26 students registered with DSS who had ASD; of that number, five previously participated in the PACS program (i.e., 19% of the population on campus). CSUF students with ASD often contact the PACS program personnel to indicate their interest in participating, but do not follow up with the necessary steps to enroll in the program. If more students with ASD participated, PACS could easily accommodate the increase, as

there is currently a waitlist of 10 students who would like to be mentors to students with ASD.

To reduce potential attrition, the PACS program coordinator regularly checks in with the mentor and mentee to assess if they enjoy the program and to see if additional support is needed. The PACS party at the end of the year acts as an incentive to encourage participants to complete the program.

In order to increase recruitment, communication with transition specialists at local high schools and at local community colleges is encouraged to promote the program to incoming CSUF students with ASD, as well as their parents. The participants who have followed through with the program have parent support and encouragement that helps them take the initiative to start the program and to complete it.

PACS Operation Supports

Currently, a tenured faculty member acts as PACS program director and utilizes this role as a service opportunity to her university with no funding or course releases provided. The director role includes curriculum development, curriculum revisions, training the mentors and mentees, program maintenance, and exit interviews.

The PACS mentors enroll in a three-unit course through the Department of Special Education. Mentors attend an initial training about the program and meet bi-weekly for four hours a month with their partner. In addition, they take notes on module improvement ideas after each meeting session that are turned in at the end of the semester. PACS mentors also participate in an exit interview to help assess the effectiveness of the program.

Students working with the Center for Autism help prepare the PACS materials each semester. This includes creating the binders, updating dates in the curriculum, gathering specific handouts and fliers across campus offices to include in the handbook (e.g., semester specific events through the rec center, activities through Associated Students), and revising the program at the end of the semester. During the revision process, students break up into teams, review each module over a two-week period, and provide specific feedback on module improvement based on their perceptions and the notes made by the PACS mentors in the binder during the semester. Once the PACS director approves the suggested revisions, the students make the revisions in the curriculum.

Several CSUF students with ASD, who did not participate in the program, volunteered their time to be on the revision board. They attended meetings and provided feedback on the program content and structure.

Program Evaluation

Many components of the program contribute to a model geared for success. First, PACS staff coordinates student partners who are matched based on their similarities in interests and personalities. This helps ease potential problems that may occur in the future. During the training sessions, both partners are informed that they can contact PACS staff at any time if they feel like an alternative partner may be a better fit. In addition, the following activities were developed to ensure success: (a) PACS staff regularly check in with participants, (b) post-surveys measure program effectiveness, and (c) the process for curriculum revision is aligned with the most recent and current support practices/services available at CSUF.

Campus Impact

The overall anticipated impacts of the PACS program are that students with ASD: (1) will improve in the academic skills necessary for college success, and (2) will increase their comfort level interacting with peers on campus and better navigate the campus environment (e.g., feel more a part of

CSUF). A further impact is that PACS mentors will gain experience with diverse populations, enabling them to increase their leadership skills. Tables 2 and 3 lists the Short and Long-Term Impacts with Outcomes for students with ASD and PACS Mentors who participate in the program.

Table 2. *Short-term Impacts with Outcomes for Students with ASD*

Outcome Goal 1	<ul style="list-style-type: none">• Increased competency in interacting with campus peers
Outcome Goal 2	<ul style="list-style-type: none">• Increased knowledge of available resources on campus
Outcome Goal 3	<ul style="list-style-type: none">• Increased participation in on-campus events (including clubs)
Outcome Goal 4	<ul style="list-style-type: none">• Increased feeling of connection to others on campus
Outcome Goal 5	<ul style="list-style-type: none">• Increased feeling of being more equipped as a college student

Table 3. *Long-term Impacts with Outcomes for Students with ASD and PACS Mentors*

Outcome Goal 1	<ul style="list-style-type: none">• Increase in the graduation rate for participating students
Outcome Goal 2	<ul style="list-style-type: none">• Enhanced knowledge and skills to prepare for employment
Outcome Goal 3	<ul style="list-style-type: none">• For PACS mentors, experience working with diverse populations

PACS Sustainability

The long-term sustainability of the program is enabled by several factors. Foremost, volunteer PACS mentors dedicate hundreds of hours each semester to facilitate students with ASD success and the PACS program. The nature of the program (i.e., volunteer student mentors helping their mentees) ensures PACS will have low overhead costs. Too, PACS can be easily replicated at other

colleges and universities, thus increasing the success of students with ASD on a much broader basis.

PACS Next Steps

Currently, the CSUF Center for Autism student associates are reviewing recommendations gathered from participants from the program's previous years and making recommended program revisions.

Furthermore, stronger research methodology protocols are being developed with plans to submit to CSUF's Institutional Review Board in order to investigate the short and long-term impact of PACS.

Conclusion

Individuals with HFA/ASD attending institutions of higher education may experience significant challenges or issues unlike neurotypical college students (Nagler, & Shore, 2013). These can include issues with navigating the new college environment, social interactions, organizational/study skills, attending to academic demands, working with disability support services, developing and maintaining friendships, interacting with the opposite sex, managing anxiety and stress, and developing a social and extracurricular life (Adreon & Durocher, 2007; Cohen, & Oppenheimer, 2013; Zager, & Alpern, 2010). Due to the social deficits associated with HFA/ASD, typical college rituals such as joining a club, engaging in group work, living in the dorms, or communicating with professors may be problematic (Adreon & Durocher, 2007).

Young people with HFA/ASD can struggle with time management and attending to the high expectations of the academic world (Robertson & Ne'eman, 2008). The classroom environment may expose the sensory processing and social differences associated with HFA/ASD (Hart et al., 2010; Nagler & Shore, 2013; Robertson & Ne'eman, 2008). Some can be challenged by the changes and requirements associated with transitions and the greater independence experienced (Mitchell & Beresford, 2014).

Furthermore, faculty working with students with ASD described specific academic challenges found in the classroom surrounding poor social skills in the classroom, critical thinking challenges, and anxiety that interfered with learning (Gobbo & Shmulsky, 2014). However, students' personal interests and adherence to rules were discussed as an asset to classroom instruction. Instructionally, faculty reported that embedding structure and attending to the emotional climate of the classroom facilitated greater instructional success (Gobbo & Shmulsky, 2014). In addition, the adaptation to a new schedule and environment may invoke anxiety for adults with HFA/ASD and their parents (Wenzel & Rowley, 2010).

The importance of interventions/programs for college students with ASD cannot be overemphasized. Clearly, more students with ASD are attending college campuses and specialized supports need to be made available to encourage collegiate success (Cohen & Oppenheimer, 2013; Graetz & Smampinato, 2008). A college initiated support program, that is PACS, has implications for students with ASD. A step-by-step task analysis should be followed when implementing PACS on a different campus (See Table 4).

The described program may make easier the navigation of the environment and lessen the challenges for these students on other college campuses. This information is offered as a guide for readers from other universities to use in support, as the PACS model may be especially important for college students with ASD.

Table 4. PACS Task Analysis

Identification	<ul style="list-style-type: none"> Recruit PACS mentors utilizing social media Recruit students with ASD in collaboration with university DSS
Interview	<ul style="list-style-type: none"> Interview PACS mentors
Training	<ul style="list-style-type: none"> PACS program coordinator provide PACS mentors with training PACS program coordinator provide PACS mentees with a PACS overview
Commitment	<ul style="list-style-type: none"> PACS program coordinator seek PACS mentor commitment PACS program coordinator seek PACS mentee commitment PACS program coordinator distributes PACS packets
Implement	<ul style="list-style-type: none"> PACS mentors contact mentees to arrange first meeting PACS mentors and mentees meet bimonthly
Feedback	<ul style="list-style-type: none"> PACS program coordinator checks in with participants PACS programs coordinator distributes post-survey
Revisions	<ul style="list-style-type: none"> PACS program director meets with team and makes revisions based on feedback

References

- Adreon, D., & Durocher, J. S. (2007). Evaluating the college transition needs of individuals with high-functioning autism spectrum disorders. *Intervention in School Clinic* 42, 271-279.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Autism Speaks. (2015). *West Virginia Autism Training Center*. Retrieved from: <https://www.autismspeaks.org/resource/west-virginia-autism-training-center>.
- Bellevue College. (2015). *Autism Spectrum Navigators*. <http://www.bellevuecollege.edu/autismspectrumnavigators/>
- Cohen, M. R., & Oppenheimer, E. (2013). Finding the best fit: Exploring college and vocational options. *Autism Spectrum News*, 5(3), 14, 36.
- Freedman, S. (2010). *Developing college skills in students with autism and Asperger's syndrome*. Philadelphia, PA: Jessica Kingsley Publishers.
- 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.
- Gobbo, K., & Shmulsky, S. (2014). Faculty experience with college students with autism spectrum disorders: A qualitative study of challenges and solutions. *Focus on Autism and Other Developmental Disabilities*, 29, 13-22.
- Graetz, J. E. & Smampinato, K. (2008). Asperger's Syndrome and the voyage through high school: Not the final frontier. *Journal of College Admission*, Winter Issue, 19-24.
- 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.

- Harpur, J., Lawlor, M., & Fitzgerald, M. (2004). *Succeeding in college with Asperger syndrome*. Philadelphia, PA: Jessica Kingsley Publishers.
- Henninger, N. N., & Taylor, J. L. (2013). Outcomes in adults with autism spectrum disorders: A historical perspective. *Autism, 17*, 103-116.
- Mitchell, W., & Beresford, B. (2014). Young people with high-functioning autism and Asperger's syndrome planning for and anticipating the move to college: what supports a positive transition? *British Journal of Special Education, 41*, 152-171.
- Muller, E. (2004). *Autism: Challenges relating to secondary transition* (Project Forum at NASCE USDOE). Retrieved from <http://www.nasdse.org/publications577/autism-challenges-relating-to-secondary-transition.aspx>.
- Nagler, M., & Shore, S. M. (2013). Supporting students on the autism spectrum in higher education. *Autism Spectrum News, 5*(3), 1-7.
- Palmer, A. (2006). *Realizing the college dream with autism or Asperger syndrome*. Philadelphia, PA: Jessica Kingsley Publishers.
- Robertson, S., & Ne'eman, D. (2008). Autistic acceptance, the college campus, and technology: Growth of neurodiversity in society and academia. *Disability Studies Quarterly, 28*(4). Retrieved from <http://dsq-sds.org/article/view/146/146>.
- Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A-M., & Shaver, D. (2011). *The post-high school outcomes of young adults with disabilities up to 6 years after high school: Key findings from the National Longitudinal Transition Study-2 (NLTS2)* (NCSE 2011-3004). Menlo Park, CA: SRI International. Retrieved from www.nlts2.org/reports.
- USDOE. (2011). *Transition of students with disabilities to postsecondary education: A guide for high school educators*. Retrieved from: <http://www2.ed.gov/about/offices/list/ocr/transitionguide.html>
- VanBergeijk, E., Klin, A., & Volkmar, F. (2008). Higher education experiences of students with autism spectrum disorder: Challenges, benefits, and support needs. *Journal of Autism and Developmental Disorders, 38*, 1359-1370.
- Wenzel, C., & Rowley, L. (2010). Teaching social skills and academic strategies to college students with Asperger's syndrome. *Teaching Exceptional Children, 45*(5), 44-50.
- Zager, D., & Alpern, C. (2010). College-based inclusion programming for students with autism. *Focus on Autism and Other Developmental Disabilities, 25*, 151-157.
- Zager, D., Alpern, C., McKeon, B., Maxam, S., & Mulvey, J. (2013). *Educating college students with autism spectrum disorders*. New York, NY: Taylor & Francis.

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