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Education and Training in Autism and Developmental Disabilities

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# Education and Training in Autism and Developmental Disabilities

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

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## Education and Training in Autism and Developmental Disabilities

*The Journal of the Division on Autism and Developmental Disabilities,*

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# Education and Training in Autism and Developmental Disabilities

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<b>Participation of Students with Intellectual and Developmental Disabilities in Extracurricular Activities: Does Inclusion End at 3:00?</b>	<b>3</b>
MARTIN AGRAN, ANDREW WOJCIK, IRINA CAIN, COLLEEN THOMA, EDWIN ACHOLA, KIRA M. AUSTIN, CYNTHIA ALLEN NIXON, and RONALD B. TAMURA	
<b>Character Strengths and Intellectual and Developmental Disability: A Strengths-Based Approach from Positive Psychology</b>	<b>13</b>
RYAN M. NIEMIEC, KARRIE A. SHOGREN, and MICHAEL L. WEHMEYER	
<b>Predictors of Competitive Employment for Students with Intellectual and/or Developmental Disabilities</b>	<b>26</b>
JULIE D. SOUTHWARD and KATHLEEN KYZAR	
<b>Students with Intellectual Disability: Predictors of Accountability Test Participation</b>	<b>38</b>
COURTNEY CHAMBERLAIN and SARA WITMER	
<b>Embedded Shared Reading to Increase Literacy in an Inclusive English/Language Arts Class: Preliminary Efficacy and Ecological Validity</b>	<b>51</b>
ANDREA L. RUPPAR, KEMAL AFACAN, YEUWN-LANN (RAY) YANG, and KELLY J. PICKETT	
<b>Utilizing Primary Tier Intervention to Enhance Reciprocal Turn-Taking of Children with Autism in Taiwan</b>	<b>64</b>
HUI-TING WANG	
<b>Effectiveness of Teaching Café Waitering to Adults with Intellectual Disability through Audio-Visual Technologies</b>	<b>77</b>
ATILLA CAVKAYTAR, AHMET TURAN ACUNGIL, and GÖZDE TOMRIS	
<b>Comparing Error Correction Procedures for Children Diagnosed with Autism</b>	<b>91</b>
DONNA TOWNLEY-COCHRAN, JUSTIN B. LEAF, RONALD LEAF, MITCHELL TAUBMAN, and JOHN McEACHIN	
<b>Manuscripts Accepted for Future Publication in Education and Training in Autism and Developmental Disabilities</b>	<b>2</b>

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# Manuscripts Accepted for Future Publication in Education and Training in Autism and Developmental Disabilities

June 2017

Supported decision making: A synthesis of the literature across intellectual disability, mental health, and aging. **Karrie A. Shogren**, Michael L. Wehmeyer, Heather Lassmann, and Anjali J. Forber-Pratt, University of Kansas, 1200 Sunnyside Ave., Rm. 3136, Lawrence, KS 66045.

Comparison of mathematics performance of children and adolescents with and without Down syndrome. **Seth King**, Sarah R. Powel, Christopher J. Lemons, and Kimberly A. Davidson, Department of Curriculum and Instruction, Tennessee Technological University, 1 William L. Jones Dr., Cookeville, TN 38505.

Understanding participation: Secondary students with autism spectrum disorder and the accountability system. **Emily C. Bouck**, 349A Erickson Hall, 620 Farm Lane, Michigan State University, East Lansing, MI 48824.

Use of a creative dance intervention package to increase social engagement and play complexity of young children with autism spectrum disorder. **Catherine Nelson**, Kristen Paul, Susan S. Johnston, and Jaimee E. Kidder, University of Utah, Department of Special Education, 1721 Campus Center Drive, Room 2285, Salt Lake City, UT 84112.

Use of video modeling to teach adolescents with an intellectual disability to film their own video prompts. **Sally B. Shepley**, Katie A. Smith, Kevin M. Ayres, and Jennifer L. Alexander, The University of Kentucky, 229 Taylor Education Building, Lexington, KY 40506.

Let's go under! Teaching water safety skills using a behavioral treatment package. Kimberly M. Levy, **Susan A. Ainsleigh**, and Melissa L. Hunsinger-Harris, School of Education, Human and Health Sciences, Bay Path University, 123 Cambridge Street, Burlington, MA 01803.

"I've always had big dreams": A qualitative case study of alternatives to guardianship. **Kate MacLeod**, School of Education, Syracuse University, 150 Huntington Hall, Syracuse, NY 13244-2340.

Teacher perception of the importance of friendship and other outcome priorities in children with autism spectrum disorder. **Neysa Petrina**, Mark Carter, and Jennifer Stephenson, Macquarie University, Special Education Centre, Sydney, NSW 2109 AUSTRALIA.

Developing friendships and an awareness of emotions using video games: Perceptions of four young adults with autism. **Jennifer Gallup** and Barbara Serianni, College of Education, Idaho State University, 921 S. 8th Avenue, Pocatello, ID 83201.

## **Participation of Students with Intellectual and Developmental Disabilities in Extracurricular Activities: Does Inclusion End at 3:00?**

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*Abstract: Although participation in extracurricular activities for students with intellectual and developmental disabilities has been advocated, a limited number of students appear to be involved in such activities. Further, there is little empirical research on how extracurricular activities are valued, supported, and encouraged. This study surveyed a sample of special educators across five states to learn about their opinions regarding extracurricular activities. As reported in other research, the findings confirm that few students participated in these activities; few parents requested these services for their children; and few teachers believed that planning them is their responsibility, despite the fact that they thought these activities were of value and provided several benefits. The implications of these findings are discussed.*

The purpose and value of inclusive education has been well extolled by researchers. McDonnell and Hunt (2014) argue that inclusive school communities provide students with ongoing and structured opportunities to promote membership and achievement for all students, recognize all student accomplishments (typical students and students with support needs), and provide contexts for all students to be valued and respected. Furthermore, inclusive education provides students with disabilities a supportive environment to access the general education (Ryndak, Moore, Orlando, & Delano, 2010), interact with and establish social networks with typical peers (McDonnell & Hunt, 2014), achieve desired learning outcomes (McDonnell, et al., 2003), and

receive instruction from highly qualified teachers (Copeland, Keefe, Calhoun, Tanner, & Park, 2011). In all, inclusive education provides a potentially rich and supportive environment in which students can learn, develop, connect, and build community.

An assumption regarding an inclusive school is that it provides a variety of contexts and experiences for students to learn and develop positive relationships with other students. Typically, there is a sequence of well-structured instructional and social activities in which students are engaged in meaningful (and, hopefully, enjoyable) tasks. But at the end of a given day, these activities are curtailed. Regrettably, many students with intellectual and developmental disabilities are socially isolated, with few friends or social activities outside of school (Chung, Carter, & Sisco, 2012; Kemp & Carter, 2002; Sheppard-Jones, Prout, & Kleinert, 2002). For example, Wagner, Cadwallader, Garza, and Cameto (2002) reported that parent interview findings revealed that 17% of children with intellectual

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disability and 32% of children with autism had never visited with friends outside of school during the previous year, and 50% of children with intellectual disability and 81% of children with autism never or very infrequently received telephone calls from friends. In this respect, the end of the school day may serve as an antecedent to the student's continued social isolation and alienation—a situation all committed educators seek to correct. This is a regrettable situation, but limited research has been done to determine why this is occurring or what can be done to ameliorate this situation.

Carter, Swedeen, Moss, and Pesko (2010) reflected that “the most memorable and enjoyable experiences from high school” for many students was their participation in extracurricular activities (p. 275). Extracurricular activities can potentially provide students with a wealth of positive experiences: opportunities to engage in sports and other recreational activities with friends, pursue preferred interests (e.g., clubs, music groups), be involved in and plan social events, and make new friends and socially network, among others. Such active engagement may add much to a student's school experience and allow him or her to feel connected to a community. As noted by Shogren (in press), students with intellectual disability value a sense of belonging and a positive school culture—they want to be included in “everything” at their respective schools.

The value of extracurricular activities has recently begun to receive more attention (Chung et al., 2012; Kleinert, Miracle, & Shepard-Jones, 2007; Pence & Dymond, 2015). Participation in these activities allow students with intellectual and developmental disabilities to explore and identify personal interests and preferences; to practice academic, functional, and social skills learned during the day; to develop and refine social relationships; to respond to opportunities to develop and apply self-determination and self-advocacy skills; and, most importantly, to feel like a valued member of the school community (Kleinert et al., 2007; Pence & Dymond, 2015). It goes without saying that a primary goal of school is to encourage and support acceptance (Hunt, Farron-Davis, Beckstead, & Goetz, 1994). Extracurricular activities provide a means in which the values and relationships shared and

promoted during the day receive additional support and reinforcement—a continued experience of belonging. Although most inclusion research has focused on general education classroom settings, student involvement in extracurricular activities represents an authentic extension of inclusive practice, albeit in a different choice of settings. If, as McDonnell and Hunt (2014) suggest, the intent of education is to support students' personal growth and development, extracurricular activities serve this purpose well. They provide students with additional opportunities to practice new and acquired skills in a natural setting with natural occurring reinforcement.

Because there is general agreement that extracurricular activities represent valued school practices, the U. S. Department's Office for Civil Rights has mandated under Section 504 of the Rehabilitation Act that school districts must offer equal access to extracurricular activities to students with disabilities and provide, as necessary, appropriate accommodations and modifications. Refusal to provide such services is in violation of a student's rights; however, the number of parents who are aware of this right is open to question.

Additionally, participation in extracurricular activities provides a meaningful measure of social acceptance and involvement in inclusive practices (Mahoney, Cairns, & Farmer, 2003). Schools that make committed efforts to encourage, recruit, and support students with intellectual and developmental disabilities to participate in extracurricular activities have available to them compelling evidence that they are accepting of all students and value the contributions of all participants.

Nevertheless, despite current interest in promoting extracurricular activities for students with intellectual and developmental disabilities, available research suggests that few students with intellectual disabilities do indeed participate. For example, based on National Longitudinal Transition Study-2 data, Wagner et al. (2004) reported that only 33% of students with intellectual and developmental disabilities participated in any extracurricular activities. Further, Simeonsson, Carlson, Huntington, McMillen, and Brent (2001) indicated that students with intellectual and developmental disabilities, when compared to students with other disabilities, participated

far less in these activities. Last, Powers et al. (2005) reported that only 11% of IEPs in a sample included any reference to extracurricular activities.

A number of reasons have been suggested to explain this failure. As described by Carter et al. (2010), these include: lack of activities, lack of transportation, ignorance about school activities, lack of teacher and/or administrative support, limited and/or challenging social and communication skills, student lack of interest, and lack of parent support. Failure to participate in extracurricular activities may also be exacerbated by the fact that the students may not be placed in their neighborhood schools, which may cause further alienation and lack of friendships, and, specifically, lack of supports at extracurricular activities (Hughes & Carter, 2008).

Despite increased attention to the need to provide extracurricular activities for students with intellectual and developmental disabilities, the research about student involvement in extracurricular activities remains limited. In particular, there is little research about its perceived value by teachers and the extent to which such participation is included in IEPs. If such involvement is included in IEPs, what information is provided? Do teachers regard planning extracurricular activities their responsibility? To address these questions, we conducted a survey, which involved a sample of teachers across five states. Our intent was to better understand the opinions of teachers regarding extracurricular activity and what role they believed they had in planning and supporting these activities. We also wanted to determine the types of extracurricular activities students with intellectual and developmental disabilities participated in and the types of support they were provided.

## **Method**

### *Participants*

A sample of K-12 special education teachers who served students with intellectual and developmental disabilities from a mix of rural, urban, and suburban environments across five states served as participants for the investigation. Most of the teachers served students with significant needs (i.e., were given alternate

assessments). The researchers obtained Institutional Review Board approval prior to recruitment of participants and survey distribution. To recruit participants, the researchers invited a selective sample of special education directors from school districts in Connecticut, South Carolina, Virginia, Washington, and Wyoming. Purposively, the researchers used preexisting contacts to select a mix of small and large districts.

### *Survey Instrument*

Using the Research Electronic Data Capture (REDCap, 2015) software, a survey originally created and used by Kleinert et al. (2007) to measure teachers' opinions related to extracurricular activities for students was utilized with slight modifications in the current study. The survey included 13 questions. The questions included: how often did their students participate in extracurricular activities; what type of support they received when they participated; were extracurricular activities included in IEPs; what types of activities did they participate in; what were the benefits of participation; and what barriers existed that prevented their involvement? The REDCap system helped researchers to develop and securely deliver web-based surveys. The modifications to the survey included adding additional demographic questions related to the teachers' experience. For example, one item requested information related to the years of educational work, and another asked if the teacher taught a group of students participating in a state alternative assessment program. Email addresses were gathered to verify the uniqueness of each participant. A small pilot sample was conducted at a single school district. The pilot study yielded feedback that was used to improve the survey delivery system and the wording of a few questions. Descriptive data were calculated to report the findings.

### *Dissemination*

Directors opting to participate in the study were instructed to distribute an email invitation to the districts' special education teachers. Directors sent a follow-up invitation two months after the initial invitation. The email contained a link to a website that displayed the research project infor-



**TABLE 1**

**Participation in Extracurricular Activities**

<i>Activity</i>	<i>n</i>	<i>At Least 1 Student Participates (%)</i>	<i>Rank Order of Activity (Frequency of Participation by %)</i>
Sports	106	69.3	30.7
Clubs	71	46.4	11.2
Music	68	44.4	11.2
Social activities	38	24.8	11.4
4H clubs	8	5.2	2.6
Special Olympics	79	51.6	32.5
Other	23	15.0	41.2

mation and informed consent. After receiving the consent of the participant, the computer administered the REDCap survey.

**Results**

*Participants*

The original sample ( $n = 153$ ) included a range of individuals, including special education teachers (96%), related service providers (1.3%), and paraprofessionals (1.3%), who work with students with intellectual and developmental disabilities. However, given our interest in examining opinions of teachers regarding extracurricular activities and, especially, the roles that they believed they had in supporting these activities, we limited our analysis to participants who self-identified as serving in the role of special education teachers ( $n = 146$ ). Over half of the special education teachers indicated that their primary caseload consisted of students who were eligible for alternate assessments ( $n = 80, 52\%$ ), and less than half ( $n = 68, 44\%$ ) reported that their students were eligible for standard assessments with accommodation. A few responding teachers ( $n = 4, 2.6\%$ ) indicated a primary caseload of students eligible for standard assessment. Teacher experience ranged from 1-42 years (mean = 16 years; SD = 10.6).

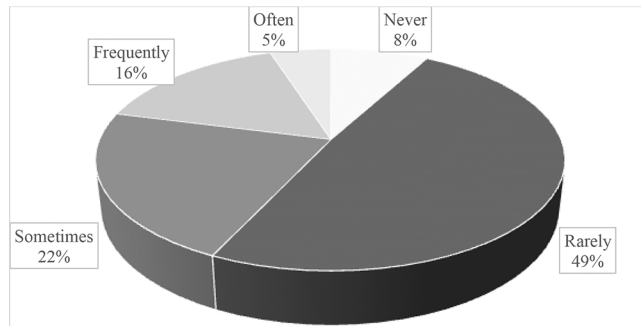
*Participation in Extracurricular Activities*

Table 1 represents participation of students in extracurricular activities. The majority (62% and 52%, respectively) of teachers reported that students with intellectual and develop-

mental disabilities rarely participated in either school-based extracurricular activities or in community recreation or social activities. The largest single reported school activity was sports (69%), followed by Special Olympics, clubs, music, social activities and 4H clubs, respectively. However, when teachers were asked to rank order the in-school activities based on frequency of participation, the majority (42%) indicated that their students participated more often in activities other than the six included in this survey. As noted in Table 1, the second most frequently utilized in-school activity was Special Olympics (32.5%), followed by sports, social activities, music, clubs, and 4H, respectively.

Teachers generally agreed that although their students' participation is important, they were not in the position to monitor after-school activities as part of their responsibilities. One teacher noted: "It occurs beyond the school day. I do support the activities, but don't think you can require teachers to do so." However, the teacher added that teachers could get involved in extracurricular activities on a volunteer basis "only if the teacher is willing to do this type of volunteer work." Also, the teacher mentioned that teachers could get involved in planning for extracurricular activities, even if that teacher was not the person carrying out the plan. As the teacher commented: "certainly offering recommendations along with researching options is part of the team process."

When teachers were asked how often a student and/or his or her parent or guardian had expressed an interest in participating in extracurricular activities (either at an IEP



**Figure 1. Percentage of Parents Requesting Assistance for Extracurricular Activities. During IEP Meetings.**

meeting or another time), the majority (47.7%) reported that students and parents rarely expressed an interest in such activities (see Figure 1). Furthermore, the teachers indicated that students or parents sometimes (22.2%), regularly (15.7%), or frequently (5.9%) expressed an interest in extracurricular activities. Additionally, 73.9% of the teachers included in this study reported that typical peers or buddies (those without disabilities) rarely or never expressed an interest in inviting a student with an intellectual disability to participate in extracurricular activities. Similarly, the majority (68.6%) of the teachers indicated that students with intellectual and developmental disabilities rarely or never expressed an interest in inviting peers without disabilities to participate in extracurricular activities.

#### *Perceived Value of Extracurricular Activities*

Descriptive analysis showed that the majority of special education teachers did not feel that planning for or monitoring extracurricular considerations was part of their job description. More than half (74%) selected “No” in response to the question, “Do you see planning and monitoring of extracurricular activities as your responsibility?,” compared to the 26% who said it was their responsibility.

#### *Information about Activities in IEPs*

When asked what information was provided when extracurricular activities were included in IEPs, 45% reported describing the type of activity, 21% said the type of support provided, 16% stated the amount of time

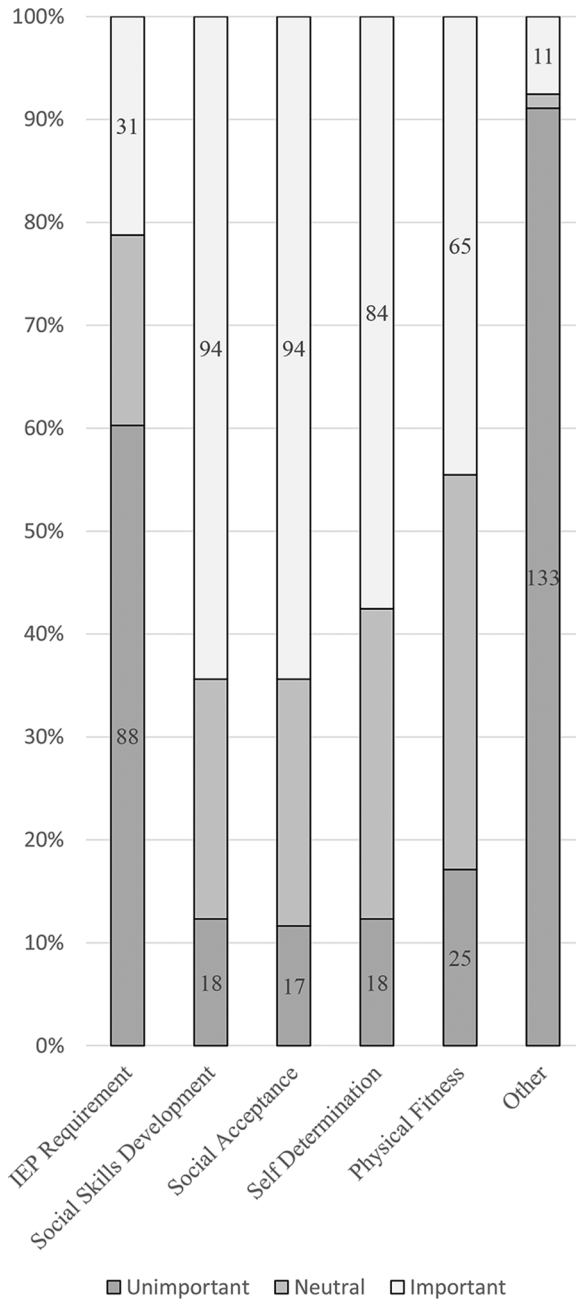
per week, and 10% indicated whether the activity was listed as a measurable instructional goal.

#### *Encouraging Participation in Extracurricular Activities*

Teachers indicated that they encouraged participation in extracurricular activities for a number of reasons (see Figure 2). Many ranked promoting social skill development (46.3%), promoting social acceptance by peers (43.9%), and encouraging self-determination (38.8%) as the most important reasons for including extracurricular activities in students’ IEPs. On the other hand, 56.2% of the teachers ranked IEP requirements as the least important reason for including extracurricular activities in student IEPs. Additionally, several teachers acknowledged the potential benefits associated with participation in extracurricular activities (see Figure 3). The most important benefits associated with participation in extracurricular activities included: practicing social communication and functional skills (56.3%), improving quality of life (51%), facilitating acceptance into community (40.5%), and making new friends (40.3%). However, improving academic skills (27.2%) was ranked as the least important benefit of participation in extracurricular activities.

#### *Obstacles to Participation*

Participants in this study were asked to rank order potential barriers to participation in extracurricular activities for students with disabilities. The most frequently mentioned barriers

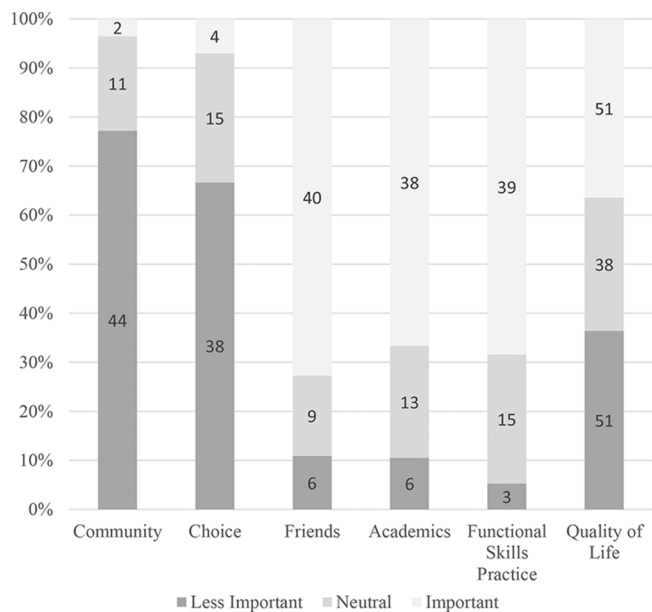


**Figure 2. Teachers' Rankings of Reasons to Promote Extracurricular Activities.**

included lack of transportation (49.7%), lack of opportunity, and lack of student and parent interest. Conversely, the least frequently mentioned barrier was resistance from or lack of support from general educators and/or administrators.

**Discussion**

This study attempted to explore the degree to which students with intellectual and developmental disabilities are included in ex-



**Figure 3. Teachers' Rankings of Benefits of Extracurricular Participation.**

tracurricular activities in their school and home communities. A survey was used to collect information from special educators in five states across the U.S. to determine the degree to which students with ID are included in school- and community-based activities after school hours. There are some limitations to this study that should be acknowledged prior to discussing the implications of these findings.

One of the limitations of this study is that the information collected is the self-report of individuals, with no opportunity to verify the accuracy of the information provided. Furthermore, because we used a web-based survey, we were unable to estimate the respondent pool sample size and consequent response rate. Nevertheless, we believe the number of completed responses received was adequate for analysis. Despite the missing data regarding the sample size, the use of web-based surveys do provide several advantages such as eliminating geographic boundaries, increasing the potential sample size, and increasing participant anonymity (Gosling, Vazire, Srivastava, & John, 2004). Another limitation of this study was the purposeful sampling method used rather than a completely random sample (i.e., the survey was initially

sent to directors of special education, who then forwarded to teachers who serve students with intellectual and developmental disabilities). Although we specifically asked the directors to forward the survey to teachers of students with severe disabilities, we do not know what criteria they used to identify potential respondents; hence, there may be great variability in the directors' perceptions regarding students with severe disabilities. The researchers were also limited in their ability to recruit a completely random sample by the research policies of local school districts and district administrators who wanted to review the proposed research protocol to determine whether they would agree to share the opportunity to participate in the study with the special educators in their individual district. These special educators self-selected to participate, and so their characteristics and, in particular, their views about the participation of students with intellectual and developmental disabilities in extracurricular activities might be different from the views of a randomly selected population. Furthermore, we did not ask the respondents to specify the characteristics of the students that they served, and so there may be great variability here, too.

An additional limitation is that we did not

disaggregate data relative to gender, ethnicity, or socio-economic, cultural, and linguistic background of the respondents or the students that they served. These differences may shape responses and future research is needed to better understand their influence on survey responses. Differences across grade levels were analyzed but proved to be insignificant; nevertheless, further research on the relationship between extracurricular activities and grade level is warranted.

Last, the intent of this study was to obtain input from teachers. Consequently, input was not obtained from students or parents. Our justification to ask only teachers was based on our confidence that they would be cognizant of the students' involvement in extracurricular activities and willing to provide input. That said, students and/or their parents would of course know best about their or their children's participation in extracurricular activities, and such research is needed.

Despite these limitations, the findings of this study provide information that expands our knowledge about student participation in extracurricular activities, which has implications for practice, policy, and future research. As stated earlier, this study used a slightly modified version of the Kleinart et al. (2007) study that collected information from special educators in one state. Their study found that students with moderate to severe disabilities were more likely to participate in community-based afterschool activities, including church youth groups, than in school-based ones. They also found that transportation, lack of parental support/resources, lack of opportunities, and student support needs were identified as challenges to student participation in extracurricular activities. Although the intent of the present study was not to compare our findings to those reported by Kleinert et al. (2007), the respondents in this study also reported similar participation patterns and similar barriers to student participation.

One particularly noteworthy finding from this study is that participating special educators held strong beliefs regarding the benefits of participation in extracurricular activities, yet they also held equally firm beliefs that it is not their responsibility to facilitate access to this component of the general education curriculum. Furthermore, they held this belief

despite the ruling of the U.S. Department of Education's Office of Civil Rights that school districts must ensure access to extracurricular activities for students with disabilities and must provide appropriate accommodations to support their participation. This discrepancy has important policy implications for our field: What must school districts do to ensure access? What kinds of supports are sufficient to facilitate the participation of students with ID in extracurricular activities? And if these supports are provided, how does that impact current barriers to participation including "lack of transportation," "lack of opportunity," and "lack of parent support/resources"?

#### *Implications for Research*

This survey provides a starting point for research designed to explore participation in extracurricular activities by students with ID. This study expanded on the original study by Kleinart et al. (2007) by extending participation of special educators beyond one state. We do not claim that the sample in the present study represents a national sample, but suggest that our inclusion of respondents across several states contributes to the emerging evidence that few students with intellectual and developmental disabilities are participating in extracurricular activities, despite the clear benefits of such participation. Future studies could focus on collecting qualitative data from a range of participants to provide more detailed information about the current state of participation, as well as barriers and facilitators of participation in extracurricular activities. For example, it would be important to determine the nature of parent and student interest in these activities, as well as what they believe would be sufficient supports and services that would facilitate participation. As the IEP process was developed to facilitate an interdisciplinary approach to educational planning, it would seem to be a natural fit to use the IEP process to plan access to extracurricular activities that are part of the educational experiences available at school. However, participants described minimal information about extracurricular activities being included in student IEPs. If special educators do not view their responsibilities as including planning and organizing student involvement in

extracurricular activities, it makes sense that this would not become part of the discussion during educational planning meetings. In this respect, we found it a bit surprising that special educators did not view administrators or general educators as barriers to the participation of students with ID in extracurricular activities. More information about why that was the case is needed as a number of hypotheses could result in this outcome. Since participation in Special Olympics was the most common extracurricular activity identified for this group of students, one possible explanation could be that extracurricular involvement for students with intellectual and developmental disabilities still is viewed as involvement in separate rather than inclusive activities in schools and/or communities, hence general educators did not participate in this planning. A more positive hypothesis, however, could be that students with intellectual and developmental disabilities were viewed as members of the school community so that participation in extracurricular activities was not unexpected or unattainable. A third possible explanation could be that other barriers to participation were so significant that the views of general educators and/or administrators were inconsequential. Clearly, more information is needed to gain a clearer understanding of the barriers to participation so that strategies to overcome the barriers can be identified and evaluated.

Finally, research on extracurricular involvement for students with intellectual and developmental disabilities should address the overall impact of participation in various activities. For the general population, participation in extracurricular activities is highly valued for the social and interpersonal skills that are developed and refined (Gardner, Roth, & Brooks-Gunn, 2008; Mahoney, Larson, & Eccles, 2005). Likewise, for students with intellectual and developmental disabilities, it is believed that involvement in these activities is essential for developing skills that will improve postschool success including establishing friendships, increasing community engagement, and improving the overall quality of life (Heward, 2006; Modell & Valdez, 2002). Also, extracurricular activities can provide opportunities to improve academic skills through hands-on learning programs. How-

ever, despite these claims of positive impact, there are very few research studies that have systematically examined whether they have the intended outcome.

Clearly, U.S. educational policy has guided schools to provide access to the general education curriculum for students with disabilities, including students with intellectual and developmental disabilities. Yet, the focus on teaching academic content may have redirected the focus of educators away from addressing the non-academic learning needs, such as social skills and self-determination of students with and without disabilities. This is all in spite of research showing students with intellectual and developmental disabilities are frequently socially isolated with limited social networks (Chung, et al., 2012; Kemp & Carter, 2002; Sheppard-Jones et al., 2002). While it may not be practical to fit this more functional skill development into the school day, there may be an under-utilized opportunity to address these learning goals through supporting participation in extracurricular activities. We encourage further research to determine whether this is a viable option, and whether it will have the anticipated positive impact on the lives of students with intellectual and developmental disabilities.

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# Character Strengths and Intellectual and Developmental Disability: A Strengths-Based Approach from Positive Psychology

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*Abstract: There has been limited focus in the disability field on assessing and intervening to promote strengths of character. However, character strengths have received significant attention in the broader field of positive psychology. This paper provides an overview of the growing science of character strengths and explores why and how character strengths are relevant to people with intellectual and developmental disabilities and a strengths-based perspective in the disability field. We offer key concepts, research findings, and interventions from the science of character that can provide a framework for the intellectual and developmental disabilities field to begin to build on strengths of character to enhance the systems of supports and quality of life outcomes experienced by people with intellectual and developmental disabilities.*

The study of character strengths has emerged within the field of positive psychology as a means of classifying and building on positive traits that reflect universal capacities for thinking, feeling, and behaving in ways that benefit oneself and others, and enhance valued life outcomes (Peterson & Seligman, 2004). This paper will provide an overview of the growing science of character and critically examine the relevance of the science of character for people with intellectual and developmental disabilities. Specifically, we will offer key concepts, research findings, and interventions from the science of character that can provide a framework for future research and applications of character strengths to people with intellectual and developmental disabilities.

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## *The Science of Character*

Beginning in the early 2000s, researchers began to focus on developing a scientific understanding of character. While the importance of character had been acknowledged throughout history, there had not been systematic attention to developing frameworks to identify, assess, and capitalize on strengths of character (Peterson & Seligman, 2004). Since this time, however, significant scholarship has been devoted to this topic and research has established the role of character strengths in understanding people and in promoting positive outcomes, including well-being, achievement, and leadership (Park, Peterson, & Seligman, 2004; Seligman, 2011). Further, a classification system for defining and categorizing character strengths emerged and provided guidance for researchers and practitioners working to build character strengths. This classification, the *VIA Classification of Strengths* (Peterson & Seligman, 2004) (formerly referred to as the “Values in Action Classification”) was developed to provide a consensual nomenclature or descriptive “language” for understanding components of character and organizing them. Specifically, the *VIA Classification of Strengths* emerged from a three-year project involving 55 social scien-



tists designed to identify positive personality characteristics, organize them into a conceptual framework, and create valid instruments to assess them (Peterson & Seligman, 2004). The VIA Classification of Strengths includes 24 character strengths (see Table 1) organized into six overarching virtues (i.e., wisdom, courage, humanity, justice, temperance, and transcendence) that researchers have suggested are universal across time and cultures (Biswas-Diener, 2006; Dahlsgaard, Peterson, & Seligman, 2005). Assessment tools, including the VIA Inventory of Strengths (VIA-IS) and the VIA Inventory of Strengths–Youth Version (VIA-Youth) ([www.viacharacter.org](http://www.viacharacter.org)), have been developed and studied across cultures (McGrath, 2014; Park & Peterson, 2006b; Shryack, Steger, Krueger, & Kallie, 2010; K. Singh & Choubisa, 2010; van Eeden, Wissing, Dreyer, Park, & Peterson, 2008).

Within the science of character, character strengths have been defined as positive, trait-like capacities for thinking, feeling, and behaving in ways that benefit oneself and others (Niemiec, 2014), and also as “a family of positive characteristics . . . each of which exists in degrees” (Park & Peterson, 2009, p. 3). Virtues are viewed as core characteristics valued by moral philosophers and religious thinkers throughout time and, character strengths are seen as the specific psychological processes or mechanisms that define these virtues (Peterson & Seligman, 2004).

*Emergence of the science of character.* The study of character strengths and virtues emerged with the development of the field of positive psychology, which developed as an alternative to the historical focus in the field of psychology on the disease model of human functioning (Linley, Joseph, Harrington, & Wood, 2006). The disease model has been described as focusing primarily on curing mental illness, whereas positive psychology emphasizes positive experiences, traits, and institutions and how strengths and capacities can be leveraged to make life more fulfilling and meaningful (Lopez & Snyder, 2011; Seligman, 2011). Just like the study of character strengths, the field of positive psychology has seen significant growth, with more than 20,000 articles published under this paradigm in the last two decades (Hart & Sasso, 2011). The mission of positive psychology has been described as

measuring, understanding, and building on human strengths and virtues (Seligman & Csikszentmihalyi, 2000).

Critiques of positive psychology have been voiced, particularly related to concerns about an inadequate emphasis on negative experiences that people encounter in life (Held, 2004; Lazarus, 2003) or inadequate consideration of the range of virtues that define morality and moral behavior (Fowers, 2008). Diener (2009) argued that “positive psychologists do not ignore the negative in life. However, they maintain that often one form of solution to problems, and in some cases the most effective one, is to build on the positive rather than directly work on the problem” (p. 10). Positive psychologists hold that their goal is not to replace other lines of inquiry or to disregard challenging environmental circumstances, but instead to explore possible alternative solutions. Positive psychologists emphasize not only positive traits and experiences, but also ways that such traits and experiences can be used for addressing problems that are encountered, providing an alternative to the disease model of human functioning that has dominated the broader field of psychology through modern times (Seligman, 2011; Seligman & Csikszentmihalyi, 2000). Further, although there has been an explosion of research in positive psychology, there is an acknowledgement that further work is needed to fully capture the range of positive traits, experiences, and institutions that fall within the parameters of positive psychology in future research and practice (Lopez & Snyder, 2011), and that current conceptualizations of character strengths and virtues may need to be further developed as new knowledge emerges (McGrath, 2014).

#### *Applications to Practice*

Despite the acknowledged limitations of the science of character, researchers have found that multiple positive outcomes are predicted by character strengths (Harzer & Ruch, 2014; Vertilo & Gibson, 2014; Weber, Wagner, & Ruch, 2014), suggesting the potential utility of the approach. For example, academic achievement is predicted by temperance and perseverance. People who report higher zest for life, curiosity, and hope report greater life

TABLE 1

The VIA Classification of Character Strengths and Virtues

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- **Wisdom** – cognitive strengths that entail the acquisition and use of knowledge
    - **Creativity** [originality, ingenuity]: Thinking of novel and productive ways to conceptualize and do things; includes artistic achievement but is not limited to it
    - **Curiosity** [interest, novelty-seeking, openness to experience]: Taking an interest in ongoing experience for its own sake; finding subjects and topics fascinating; exploring and discovering
    - **Judgment** [open-mindedness; critical thinking]: Thinking things through and examining them from all sides; not jumping to conclusions; being able to change one’s mind in light of evidence; weighing all evidence fairly
    - **Love of Learning**: Mastering new skills, topics, and bodies of knowledge, whether on one’s own or formally; related to the strength of curiosity but goes beyond it to describe the tendency to add systematically to what one knows
    - **Perspective** [wisdom]: Being able to provide wise counsel to others; having ways of looking at the world that make sense to oneself/others
  - **Courage** – emotional strengths that involve the exercise of will to accomplish goals in the face of opposition, external or internal
    - **Bravery** [valor]: Not shrinking from threat, challenge, difficulty, or pain; speaking up for what’s right even if there’s opposition; acting on convictions even if unpopular; includes physical bravery but is not limited to it
    - **Perseverance** [persistence, industriousness]: Finishing what one starts; persevering in a course of action in spite of obstacles; “getting it out the door”; taking pleasure in completing tasks
    - **Honesty** [authenticity, integrity]: Speaking the truth but more broadly presenting oneself in a genuine way and acting in a sincere way; being without pretense; taking responsibility for one’s feelings and actions
    - **Zest** [vitality, enthusiasm, vigor, energy]: Approaching life with excitement and energy; not doing things halfway or halfheartedly; living life as an adventure; feeling alive and activated
  - **Humanity** - interpersonal strengths that involve tending and befriending others
    - **Love** (capacity to love and be loved): Valuing close relations with others, in particular those in which sharing & caring are reciprocated; being close to people
    - **Kindness** [generosity, nurturance, care, compassion, altruistic love, “niceness”]: Doing favors and good deeds for others; helping them; taking care of them
    - **Social Intelligence** [emotional intelligence, personal intelligence]: Being aware of the motives/feelings of others and oneself; knowing what to do to fit into different social situations; knowing what makes other people tick
  - **Justice** - civic strengths that underlie healthy community life
    - **Teamwork** [citizenship, social responsibility, loyalty]: Working well as a member of a group or team; being loyal to the group; doing one’s share
    - **Fairness**: Treating all people the same according to notions of fairness & justice; not letting feelings bias decisions about others; giving everyone a fair chance
    - **Leadership**: Encouraging a group of which one is a member to get things done and at the same time maintain good relations within the group; organizing group activities and seeing that they happen
  - **Temperance** – strengths that protect against excess
    - **Forgiveness** [mercy]: Forgiving those who have done wrong; accepting others’ shortcomings; giving people a second chance; not being vengeful
    - **Humility** [modesty]: Letting one’s accomplishments speak for themselves; not regarding oneself as more special than one is
    - **Prudence**: Being careful about one’s choices; not taking undue risks; not saying or doing things that might later be regretted
    - **Self-Regulation** [self-control]: Regulating what one feels and does; being disciplined; controlling one’s appetites and emotions
  - **Transcendence** - strengths that forge connections to the universe & provide meaning
    - **Appreciation of Beauty and Excellence** [awe, wonder, elevation]: Noticing and appreciating beauty, excellence, and/or skilled performance in various domains of life, from nature to art to mathematics to science to everyday experience
    - **Gratitude**: Being aware of and thankful for the good things that happen; taking time to express thanks
    - **Hope** [optimism, future-mindedness, future orientation]: Expecting the best in the future and working to achieve it; believing that a good future is something that can be brought about
    - **Humor** [playfulness]: Liking to laugh and tease; bringing smiles to other people; seeing the light side; making (not necessarily telling) jokes
    - **Spirituality** [religiousness, faith, purpose]: Having coherent beliefs about the higher purpose & meaning of the universe; knowing where one fits within the larger scheme; having beliefs about the meaning of life that shape conduct and provide comfort
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satisfaction and well-being (Park & Peterson, 2006b; Park et al., 2004). And, because of these associations, researchers have developed strategies to apply the descriptive framework of the VIA Classification to interventions to promote positive outcomes. Researchers have examined the impact of interventions designed to boost individuals' signature strengths—those strengths that are ranked highest by the person on character strength assessments. For example, one of the most researched interventions to emerge in the last 10 years from the positive psychology literature is the strategy “use your signature strengths in new ways each day.” This exercise involves people taking the VIA-IS assessment that measures the 24 character strengths (see Table 1) and then choosing one of their highest ranking strengths in their results profile and use it in a new way each day for one week. In randomized, controlled trials, this exercise leads to increases in happiness and decreases in depression for six months (Gander, Proyer, Ruch, & Wyss, 2012; Seligman, Steen, Park, & Peterson, 2005). This exercise has been validated across a number of populations which have found benefit from it, including youth (Madden, Green, & Grant, 2011), older adults (Proyer, Gander, Wellenzohn, & Ruch, 2014), employees (Forest et al., 2012), people with traumatic brain injuries (Andrewes, Walker, & O'Neill, 2014) as well as across various cultures (Duan, Ho, Tang, Li, & Zhang, 2013; Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009; Mongrain & Anselmo-Matthews, 2012).

Researchers have also developed interventions that focus on character strengths generally, rather than specific signature strengths. For example, studies of kindness have found exercises around “counting kindness” (counting the number of kind acts performed each day) increase happiness (Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006) and offering “gifts of time” (helping/supporting three different people you would not have otherwise helped by giving the gift of your time) increases happiness and lowers depression (Gander et al., 2012). An intervention that targets the strengths of hope and perspective is called “one door closes, another door opens” in which individuals write about a moment in their life when a negative event led to unforeseen positive consequences, and also

led to increases in happiness and decreases in depression (Gander et al., 2012). The targeting of the strengths of humor and gratitude, have also revealed strong benefits, in which subjects either think of three funny things that happened to them each day and write about why they occurred (for the strength of humor) or three things they are grateful for and why they occurred (for the strength of gratitude) (Gander et al., 2012; Proyer, Gander, et al., 2014; Seligman et al., 2005). One study targeted those character strengths that have been found to correlate highly with life satisfaction (Park et al., 2004) and found that the training of curiosity, gratitude, hope, humor, and zest led to increases in life satisfaction relative to a group that focused on character strengths that correlate lower with life satisfaction and relative to a control group (Proyer, Ruch, & Buschor, 2014). A focus on enhancing lower strengths in one's VIA Survey rank-order profile has also revealed positive results (Rust, Diessner, & Reade, 2009).

Another application of character strengths is strengths-spotting, which involves the careful, intentional observation of character strengths within the stories, interactions, and behaviors of others or within the cognition, affect, or behavior of oneself. Strengths-spotting occurs on two levels—oneself and others—and involves the labeling of the character strength(s) observed and the offering of a rationale or evidence for how each strength was expressed (Niemic, 2014). Strengths-spotting is generally recommended as an initial step for practitioners and parents new to strengths-based approaches and assists in the building of a vocabulary or language of strengths and facilitates the creation of a “strengths mindset.”

Another strategy, the Aware-Explore-Apply model (Niemic, 2013, 2014) is a 3-phase approach to using character strengths. In the first phase, practitioners begin with helping the person build a general awareness of character strengths, breaking through strengths blindness and general unawareness. The next phase involves connecting the character strengths with previous experiences so that people understand how the character strengths contributed to positive and fulfilling events and accomplishments as well as in facilitating the management of problems and difficulties. This explore phase involves the individual understand-

ing how they use their character strengths in everyday life, from task to task, and from conversation to conversation. The explore phase also involves the individual looking to the future to consider ways the strengths might connect with future goals or future resolution of stressors and challenges. The final phase of this model, apply, is the action-oriented phase in which the individual behaviorally activates with their character strengths in a way that is meaningful to their life and/or aligns with their goals. These phases are viewed as an ongoing process that repeats, builds, and fosters an upward positive spiral of insight and growth (e.g., Fredrickson, 1998).

### **Applying Character Strengths and Virtues to People with Intellectual and Developmental Disabilities**

#### *Parallel Movements and Establishing a Need for Character Strengths and Virtues*

The emergence of the science of character as an area of focus within the field of positive psychology mirrors, in many ways, shifts that have occurred within the disability field. Just as in the broader field of psychology, in the disability field there have been shifts from deficit-based models that focused on identifying limitations in functioning (Wehmeyer et al., 2008) to strengths-based approaches that recognize that people with disabilities have personal competencies that also need to be understood and leveraged to guide supports planning (Buntinx & Schalock, 2010). For example, the Individuals with Disabilities Education Act (2004) specifically states that transition services provided to youth ages 16 and over to support the transition from school to the adult world must take into account the “child’s *strengths*, preferences, and interests.” This mandate is driven by a growing body of research that documents strengths that are present in youth with disability that can inform the transition process (Carter, Brock, & Trainor, 2014) and be used to develop meaningful IEP and transition goals informed by strengths based assessment tools (Epstein, 2004). Similarly, researchers have asserted that systems of supports and individualized supports plans for adults with disabilities

should be driven by a strengths perspective that presumes competence and designs supports accordingly, considering the person’s strengths, interests, preferences, and life goals (Buntinx, 2013).

However, only a small body of literature has investigated specific traits and experiences associated with a strengths-based approach in youth and adults with intellectual and developmental disabilities (Shogren, Lopez, Wehmeyer, Little, & Pressgrove, 2006; Skotko, Levine, & Goldstein, 2011; Wehmeyer, 2013), and rarely have people with intellectual and developmental disabilities been included in research in the broader field of positive psychology. For example, Shogren, Wehmeyer, Pressgrove and Lopez (2006) reviewed the application of positive psychology constructs to research in the intellectual disability literature between 1975 and 2004. Of these articles, only 15% included a construct associated with positive psychology as a primary focus although the percentage of articles examining a positive psychological construct increased over time. Further, Shogren (2013) reviewed articles published in the field of positive psychology to determine the degree to which disability (in general, not specific to intellectual disability) was represented in that literature base. She found only a limited focus on disability issues within *The Journal of Positive Psychology* where, from among 162 articles published between 2006 and 2011, only six articles (4%) explicitly mentioned people with disabilities or people with health related issues that could be associated with disability. Of the six articles, the majority focused on specific health related conditions that may or may be associated with disability (e.g., asthma, chronic illness, and cancer).

Although there is a growing theoretical emphasis on strengths-based perspectives in the disability field, there is a clear need for more specific examination of the application of approaches developed in the broader field of positive psychology to the disability field. While there are existing and emerging approaches in the disability field including educational interventions [e.g., positive behavior supports (Sailor, Dunlop, Sugai, & Horner, 2009; Sugai & Horner, 2010)], psychological interventions (e.g., interactive behavioral therapy (IBT); Tomasulo, 2014), and mindfulness in-

terventions (Niemiec, 2014) that emphasize the importance of proactive intervention that enhances personal competencies; minimal substantive attention has been given to strengths of character. Instead this work tends to focus more on interests (e.g., hobbies, activities individuals enjoy doing), resources (e.g., external supports such as friendships, community support, therapeutic support), and skills (e.g., positive behavioral skills, communication skills). Each of these categories of strength are very important for people with disabilities, however, we are arguing for scientists, educators, and practitioners to place greater attention on those qualities most central to the individual's identity—his or her character strengths—as this is an area that research in positive psychology suggests can enable people to thrive in their day-to-day lives. To do this, work is needed to take the assessments and interventions developed to address character strengths in the broader positive psychology field and examine and modify these approaches, as needed, for people with intellectual and developmental disabilities. Further, the related constructs across fields, such as thriving (Seligman, 2011) in positive psychology and quality of life (Schalock, Gardner, & Bradley, 2007) and self-determination (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015) in intellectual and developmental disabilities, need to be examined across populations. However, there still are not enough assessment and intervention development frameworks that specifically focus on character strengths that have been applied to people with intellectual and developmental disabilities, enabling the assessment of character strength interventions and their impact on outcomes. In the following sections we will summarize the work that has been done on applying strengths of character to people with intellectual and developmental disabilities as well as explore the potential applications of what has been done in the broader field of positive psychology to people with intellectual and developmental disabilities. Finally, we will discuss future research and practice directions for strengths-based assessment and intervention for people with intellectual and developmental disabilities.

## **Applying the Science of Character to People with IDD**

### *Character Strengths-Based Assessment*

A critical starting point for understanding character strengths in those with and without disabilities is having validated measures of character strengths and virtues. As mentioned previously, assessment tools, including the VIA Inventory of Strengths (VIA-IS) and the VIA Inventory of Strengths–Youth Version (VIA-Youth), have been developed and studied across cultures (McGrath, 2015; Park & Peterson, 2006a; Peterson & Seligman, 2004) although the majority of work has focused on people without disabilities. Preliminary work (Shogren, Wehmeyer, Lang, & Niemiec, 2014) has begun examining the use of the VIA-Youth in adolescents with disabilities, including youth with intellectual and developmental disabilities. Specifically, researchers have found that across youth with and without disabilities the same set of items can be used in meaningful and reliable ways, although specific modifications to the wording of questions and supports for responding may be needed for some youth with intellectual disability (Shogren, Wehmeyer, Forber-Pratt, & Palmer, 2015). However, youth with disabilities, across the board, rated themselves lower on each character strength (see Table 1) than youth without disabilities. While we would expect each student to demonstrate different profiles of character strengths, the finding that students with disabilities score less adaptively across all character strengths suggests that specific environmental factors may be influencing the beliefs youth with disabilities hold about themselves and their strengths. This replicates other research on constructs like self-determination that has also found that youth with disabilities rate themselves lower than their peers without disabilities (Shogren, Lopez, et al., 2006; Shogren et al., in press). Although the exact mechanisms for these effects are not understood, one hypothesis is that youth and adults with disabilities, particularly young people with intellectual and developmental disabilities, are not given the experiences and supports to develop adaptive understandings of their self-determination and character strengths. Research in the area

of self-determination, for example, has found that if interventions to promote self-determination are implemented with adolescents with intellectual and learning disabilities, their self-determination levels increase (Wehmeyer et al., 2012).

Another assessment tool that examines character strengths is the Assessment Scale for Positive Character Traits - Developmental Disabilities (ASPeCT-DD; Woodard, 2009). This tool was developed for parents and support providers to complete, and assesses 10 character strengths, including empathy and courage, displayed by a person with intellectual or developmental disabilities. This tool differs from the VIA-IS and VIA-Youth as parents or support providers report, rather than the individual themselves. Further, it predates the VIA Classification of 24 strengths therefore is based on a literature review of positive traits discussed in the early years of the positive psychology field. The ASPeCT-DD has shown strong psychometrics, and provides a means for parents and support providers to understand character strengths. Further, when used in conjunction with the VIA-IS or VIA-Youth, both self- and other-report on character strengths are available and can be used to develop and evaluate strengths-based interventions.

Overall, further validation of character strengths assessments is needed, particularly with adults with intellectual and developmental disabilities. Additionally, training and support is needed to enable educators and support providers to understand the potential of character strengths assessment, particularly given the tradition of using assessment to identify and define deficits in functioning to compartmentalize people into diagnostic categories that omit strengths (Rashid & Ostermann, 2009; Wright & Lopez, 2002). Further work is needed to validate and test the predictive validity of such tools, and explore their use across populations and after assessment tools for character strengths and virtues are validated with this population, a critical next step will be to determine how to effectively intervene to increase awareness of character strengths, and to promote the use of character strengths to enhance outcomes, as described in the next section.

### *Character Strength-Based Interventions*

The previous section described the small, but growing, body of research on character strength assessment in people with intellectual and developmental disabilities. Less work has been done on using information from character strength assessment tools to develop and test the efficacy of interventions to use character strengths to inform supports planning to promote valued outcomes, including quality of life outcomes. However, a number of interventions have been developed in the broader field of positive psychology, as described in earlier sections. These interventions focus on building on character strengths in the context of day-to-day life in the general population and need to be further examined to determine the appropriateness and needed modifications for the contextual demands experienced by people with intellectual and developmental disabilities, namely the application of such interventions to supports planning and efforts to enhance quality of life outcomes (Shogren, Luckasson, & Schalock, 2014; Shogren, Luckasson, & Schalock, 2015).

In the general population, researchers have suggested that the use of character strengths by people in their daily lives has been associated with many positive outcomes and that understanding one's character strengths can serve as a means to build systems of supports to overcome barriers. Work is needed to develop strategies to enable people with intellectual and developmental disabilities to understand their character strengths and to embed these character strengths in educational and support provision. For example, existing exercises like strengths-spotting, "use your signature strengths in new ways each day" (Seligman et al., 2005), "counting kindness" (Otake et al., 2006), and "gifts of time" (Gander et al., 2012), could easily be integrated into educational and community contexts particularly if resources for educators, support providers, and family members were developed. Although research is needed, such interventions may address provide a way to address issues commonly identified related to building relationships between people with intellectual disability and their peers, as people with disabilities are often cast in roles of needing help, rather than giving help, limiting reciprocal

relationships (Snell & Brown, 2010). However, by creating structured ways for people with intellectual disability to use their strengths to contribute to the lives of their peers, the reciprocity of peer relationships could be enhanced.

Further, such approaches could be embedded in existing interventions in the field, for example, as part of person-centered planning process, people with disabilities (using the VIA) and their support providers (using a checklist of the 24 character strengths or an instrument like the ASPeCT-DD) could identify their signature strengths as part of a process of understanding themselves and their strengths and support needs. In positive behavior support interventions, people with intellectual and developmental disabilities could use self-monitoring strategies to count acts of kindness. As part of transition planning, youth with intellectual disability can explore what strengths give each person the greatest sense of hope (i.e., instillation of hope), how the person might use his or her strengths to navigate barriers, and how the strengths could be used to generate and implement possible solutions using the Aware-Explore-Apply model (Niemic, 2013, 2014).

Woodard (2009) observed that “quality of life may be less determined by what you have, and more determined by what you choose to do with what you have” (p. 435). Thus, it might be that taking action with, and making the most of, one’s internal character strengths is a key pathway, especially around navigating problems. Research has shown that for some outcomes it is the use of character strengths, over and above simply endorsing character strengths, that is most important (Littman-Ovadia & Steger, 2010). Research in the intellectual disability field suggests that setting goals is one way to take immediate action for the short-term or long-term, and that people with intellectual and developmental disabilities can learn to engage in self-regulated problem solving to set and attain goals leading to enhanced self-determination and quality of life outcomes (Shogren, Wehmeyer, Palmer, Rifenshark, & Little, 2015; Wehmeyer et al., 2012).

Interventions to promote character strengths could be embedded in self-determination interventions, for example, goals can be created

around character strengths in at least two general ways: the character strength could be the “means” to getting to a goal (i.e., the pathways) or the “ends” (i.e., the goal itself) (Niemic, 2014). For example, if a person with an intellectual disability has a goal of attaining meaningful work, support providers could work with them to consider how each of the person’s top character strengths can serve as direct pathways to reaching that goal, such as using curiosity to explore different avenues, social intelligence in connecting and developing relationship with people connected to job searches, and gratitude in the offering of appreciation for those that have given ideas and support. An example of the latter is if the person wants their goal to be “to boost their zest strength” or to “to improve upon their strength of self-regulation.” In this case, one positive psychology exercise to support goal-setting and goal attainment is the “best possible self” exercise which has been associated with boosting the strength of hope/optimism (Meevissen, Peters, & Alberts, 2011). This exercise can immediately facilitate goal awareness and expression in that the individual is to imagine a designated point in the future (one month, one year, five years) in which they have reached their goal or vision of how they’d like their life to be; one variation of this exercise introduces a second step in which the individual then imagines the various character strengths they will need to use in order to make that best possible self a reality (Niemic, 2014). Exploring ways to make these activities concrete and to use evidence-based supports from the disability field (e.g., pictures, self-management strategies) to promote self-direction are directions that need to be explored in future research. A variety of exercises designed to boost a handful of character traits in people with severe autism have been described by Groden, Kantor, Woodard, and Lipsitt (2011), such as modeling appropriate laughter to boost the strength of humor and the direct encouragement of the strength of kindness through a kind deeds program at school.

Another approach may be exploring character strengths overuse and underuse (Niemic, 2014). This approach has been applied to people without disabilities, for example, a person might have a difficulty with procrastinating

nating on a paper they are writing, and upon further investigation, it is determined that the person is overusing their curiosity and love of learning strengths (e.g., doing Internet searches and exploring new areas rather than writing) and underusing their prudence and self-regulation strengths (e.g., not making a paper outline and struggling with resisting the temptation to do the Internet searches). The individual then explores how they might “temper” the overused strength with one of their signature strengths or “build up” one of their underused strengths. This conceptualization of strengths overuse and underuse applies to each of the 24 character strengths (see Grant & Schwartz, 2011, for a review) and offers a framework to explain or partially explain how problems and conflicts occur and persist. This approach could be embedded within positive behavior supports, focusing specifically on identifying strengths that may be overused or underused. Character strengths over and underuse has been examined in people with autism spectrum disorders (ASD). Samson and Antonelli (2013), in a study of 33 people with ASD, discovered humor to be a lower or underused strength, ranking 16<sup>th</sup> out of 24, whereas in a matched group of people without ASD it was 8<sup>th</sup>. Since the strength of humor is linked with hedonic happiness and positive emotions, an intervention such as “three funny things” for those people interested in boosting this lower strength might be considered. Such reframing was found to be useful not only for the participants with ASD, but also for people that supported them. Each of the 24 character strengths can serve as tools for reframing or what some scientists refer to as positive reappraisal (Garland, Gaylord, & Park, 2009). For example, stubbornness might be reframed as someone being perseverant and sticking with their idea while hyperactivity might be reframed as the strength of zest and curiosity. These reframes do not replace stubbornness or hyperactivity, rather they offer unique, positive perspective to help the support provider and the individual to view themselves from a different angle. New lines of questioning, strategizing, and interventions can then unfold from these reframes, including new ways of building support and instructional plans that capitalize on strengths.

Strengths-spotting is another approach that

has been identified in the broader field of positive psychology, and this approach could be made concrete by taking examples from the lives of people with intellectual and developmental disabilities and creating scenarios that explicate character strengths, particularly as research has found when using the VIA-Youth that concrete descriptions of the character strengths make the assessment more meaningful for people with intellectual and developmental disabilities (Shogren, Wehmeyer, et al., 2014). This approach could be used by educators, family members, and support providers to label and provide opportunities for the naming of character strengths, which may enhance people with intellectual and developmental disabilities understanding of strengths in themselves and others. This understanding could then be linked with interventions to use understanding of one’s strengths to overcome barriers and go after valued life goals.

Overall, there are multiple applications of strategies that build on character strengths that can enhance the systems of supports and outcomes experienced by people with intellectual and developmental disabilities. The preceding examples offer several ways that activities and research in positive psychology and related fields could be adapted and applied to the contexts within which people with intellectual and developmental disabilities live their lives. However, systematic development and evaluation of these approaches is needed in the intellectual and developmental disability field, and guidelines developed and evaluated to adapt such approaches to people with varying ranges of support needs. For example, as described previously, a guide for administering the VIA-Youth for adolescents with intellectual disability has been developed, drawing on research with youth with intellectual and developmental disabilities to make recommendations for how to modify questions to ensure valid responding (Shogren, Wehmeyer, Forber-Pratt, et al., 2015). Similar tools are needed for character strengths-based interventions.

### **Directions for Future Research and Practice**

Focusing on character strengths has the potential to broaden the perspective of people



with intellectual disability, their families, and people that provide support regarding positive traits and attributes and the use of these traits and attributes in pursuing valued life outcomes. As mentioned previously, work has begun to validate character strength assessments in people with intellectual and developmental disabilities, however, more work is needed and assessment alone will not be sufficient to change the context of education and supports planning, interventions that build on character strengths will also be needed. Existing frameworks and tools, developed in the field of positive psychology, provide a basis upon which to modify and adapt existing interventions to make them relevant for people with intellectual and developmental disabilities. Further, there are natural opportunities to embed character strengths in existing approaches in the field (e.g., positive behavior interventions, self-determination interventions, transition planning, supports planning). It will be critical to contextualize such interventions in the lives and support needs of people with intellectual and developmental disabilities, particularly related to ongoing efforts to promote strengths-based assessment and effective supports planning to enhance quality of life outcomes. Character strengths assessment and interventions has much to offer to these efforts. Preliminary research suggests that tools to assess character strengths are equally reliable and valid for those with disabilities, including those with intellectual and developmental disabilities, and that modification (e.g., wording changes, cognitive supports) can be used to enable people with intellectual and developmental disabilities to understand character strengths. This preliminary work provides a strong framework that the field can build on to further explore and modify the application of methodologies for defining, assessing, and classifying character strengths. Having a common language of character strengths, relevant for those with and without disabilities, provides a means to provide universal interventions, with additional support as needed for those with intellectual and developmental disabilities. This common language of strengths, easily applied across disciplines and practices, broadens and deepens the dialogue from strengths approaches that solely focus on skills and re-

sources to include the value of understanding strengths of character and virtues for enhancing systems of supports and personal outcomes. This is particularly important for those with intellectual and developmental disabilities who have traditionally been viewed through a deficit lens and not taught or supported to identify and build on their strengths, as reflected in low scores on assessments of character strengths.

Further, an emphasis on character strengths also has implications for those that support people with intellectual and developmental disabilities. For example, researchers have found that promoting mindfulness in support providers, a strengths-based approach, can significantly and positively impact the provision of supports (N. N. Singh et al., 2009), changing the dynamic of the support relationship to one that is strengths-based. Overall, emphasizing character strengths can create a new framework for understanding and supporting people with intellectual and developmental disabilities. This framework has the potential to lead to greater awareness of strengths, and greater understanding of how to identify and build on strengths, in addition to improving outcomes people with disabilities. Understanding strength profiles can lead to interventions that might be helpful for enhancing specific strengths for people with intellectual and developmental disabilities and those that support them. Moving forward, we recommend the field expand its focus beyond the assessment and remediation of deficits to approaches that give priority to the study and practice of character strengths in assessment and intervention.

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## Predictors of Competitive Employment for Students with Intellectual and/or Developmental Disabilities

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*Abstract: The purpose of this literature review was to examine transition related activities that are associated with securing competitive employment upon graduation from high school for transitioning youth with I/DD. Studies included in this review met the following required criteria: (a) participants were transition-aged individuals with I/DD and (b) studies examined competitive employment outcomes after exiting transition services. Across all 13 studies, we identified a total of seven unique transition-related predictors of post-secondary competitive employment for people with I/DD. These included: (a) paid employment while attending high school, (b) vocational skills instruction, (c) family expectations, (d) high school completion, (e) Individual Educational Plan (IEP) goals relating to competitive employment, (f) self-determination, and (g) participating in post-secondary education. Results of this literature review inform practice and research regarding transition to employment for students with I/DD.*

Transitioning into adulthood is “a change in status from being primarily a student to taking on adult roles including a) being employed, b) undertaking post-secondary education, c) having a home, d) becoming involved in the community, and e) having satisfying personal relationships” (Schwartz, Mactavish, & Lutfiyya, 2006, p. 75). Research indicates that students with an intellectual disability and/or developmental disabilities (I/DD), however do not achieve transition outcomes at the level students without disabilities achieve them (Wehman, Chan, Ditchman, & Kang, 2014). A large number of adults with I/DD continue to live with their parents after high school (Ross, Marcell, Williams, & Carlson, 2013), with limited friends and few employment opportunities (Luftig & Muthert, 2005).

According to the 2010 FINDS National Survey (Anderson, Larson, & Wuorio, 2011), 85% of adults with I/DD were unemployed. Of the 15% of participants who reported having employment, only 48% received competitive wages, with 57% earning minimum wage. A second national survey (National Core Indicator, 2014);

( $N = 12,392$ ) examining employment outcomes for people with I/DD reported similar rates of employment (i.e., 15% of participants were employed). Additionally, of those participants who were employed, the average salary was \$7.82 per hour, and only 24% received job benefits such as paid vacation or sick leave.

The National Post-School Outcomes defines competitive employment as work “. . . for pay at or above the minimum wage in a setting with others who are nondisabled for a period of 20 hours a week for at least 90 days at any time in the year since leaving high school” (IDEA Leadership Conference, 2013, SPP/APR Analysis-Parts B and C, p. 96). Competitive employment helps people with I/DD to develop and enhance new skills, offers opportunities for new social relationships (Shandra & Hogan, 2008), provides a structured daily routine, and has been associated with greater life satisfaction (Stephens, Collins, & Dodder, 2005). Yet, their employment settings are often not competitive in nature; research indicates people with I/DD are more likely to work in sheltered or in segregated entry-level positions (Simonsen & Neubert, 2013), earning lower wages, and working fewer hours than their peers without disabilities (Carter, Austin, & Trainor, 2012; Gold, Fabian, & Luecking, 2013; Shandra & Hogan, 2008).

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Provided adequate supports and training are in place, people with I/DD have significant long-term potential for securing competitive employment and living independently (Siperstein, Heyman, Stokes, 2014; Wehman et al., 2014). Through the provision of transition services, mandated by the Individuals with Disabilities Education Act of 2004 (IDEA), public schools have the opportunity to address these pervasive post-school employment issues for people with I/DD while they are still school-aged. Such services include transition plans that must include a coordinated set of activities focused on supporting students' transition to post-secondary settings such as college or technical training, competitive employment, adult services, independent living, and community participation (Kim & Dymond, 2010; Shogren & Plotner, 2012).

Transition programs that allow for strong vocational skills instruction and work experience show promise in addressing employment outcomes for students with I/DD (Gold et al., 2013; Hartman, 2009; Neubert & Moon, 2006; Shandra & Hogan, 2008). However, the Elementary and Secondary Education Act (ESEA) (most recently authorized as the Every Student Succeeds Act) has for the greater part of the last two decades, placed heavy emphasis on academics which leaves little room in the curriculum for teaching functional and job-specific skills needed to secure and maintain post-secondary competitive employment (Bouck, 2010; Kim & Dymond, 2010). Moreover, research indicates that individualized transition plans for students with I/DD focus more on functional skills for independence and building social relationships than on gaining employment or pursuing post-secondary education (Bouck, 2010; Shogren & Plotner, 2012; Zhang, Zhang, Ivester, & Katsiyannis, 2005).

Based on the findings of two large-scale literature reviews on evidence-based transition practices (Test, Fowler et al. 2009; Test, Mazzottie et al., 2009), Test, Fowler, Kohler, & Kortering (2010) reported 16 transition practices that correlated with post-secondary employment: career awareness, community experience, high school completion, inclusion in general education, interagency collaboration, occupational courses, paid employment/work experience, parental involvement, program of study, self-advocacy/self-determination, self-

care/independent living, social skills, student support, transition program, vocational education, and work study. This report however, was not specific to I/DD or *competitive* employment. A number of disability categories (e.g., learning disabilities, emotional/behavioral disorders, sensory impairments, physical disabilities) were included in the literature reviews providing the basis for the report, and the outcome for employment was general in nature, which could include employment in segregated settings such as sheltered workshops or employment with less pay or benefits for people with I/DD. Therefore, the purpose of this literature review, which is being conducted 5 years after the publication of the Test et al. (2010) report, is to add to this body of knowledge by reporting what transition-related factors current research indicate are predictors of post-secondary competitive employment, specifically as they relate to people with I/DD.

## Method

To obtain studies for this review, we conducted keyword searches in the following social science and medical databases: CINAHL Complete, Education Source, ERIC, Family and Society Studies Worldwide, Google Scholar, MEDLINE, PsycARTICLES, PsycINFO, Psychology and Behavioral Sciences Collection, Research Starters-Education, Sage journals online, and Vocational and Career Collection. Search terms included "employment", "competitive employment", "community-based transition instruction", "transition", "transitioning youth", and "vocational instruction" paired with "intellectual disability", "mental retardation", or "developmental disability". Initial searches were limited to peer-reviewed studies published between 2005 and 2015, and included individuals with I/DD. A manual search of relevant journal articles published in the *Career Development and Transition for Exceptional Individuals*, and the *American Journal on Intellectual and Developmental Disabilities* from 2010 to 2015 was also conducted to further locate relevant articles.

As an initial screening, we retained all articles that included any of the search terms in the article, abstract, or title. Then, we carefully examined the remaining articles according

to the following criteria: (a) participants included transition-aged youth with I/DD and/or their parents/guardians (reviews that included samples of individuals older than transition-aged were included if predictor variables were related to transition practices prior to high school completion); (b) study reported quantitative findings with competitive employment (after exiting high school) as an outcome variable; (c) study was published in a scholarly, peer-reviewed journal; and (d) study was conducted within the United States with findings reported in English. We excluded articles reporting outcomes for a specific developmental disability only, such as autism, to help ensure results were representative of the broader population of I/DD. We examined each article for (a) the number of participants, (b) type of disability, (c) predictor variable, and (d) key findings.

We recorded study-specific terms for each variable, and any explicit definitions or descriptions of characteristics described in the literature. Table 1 illustrates the definitions and/or conceptualizations of each predictor variable and the instrument used to collect data. Next, we present results followed by a discussion of the results and study limitations.

## Results

Thirteen studies met the inclusion criteria and thus constitute the sample for this review. Table 2 is to illustrate predictor variables examined among the 13 studies; note several studies examined more than one predictor. All studies were conducted in the United States, published between 2005 and 2015, and included participants with a range of severity of intellectual disability (mild, moderate, or severe). While not all studies included in this literature review referred specifically to the category of I/DD, all included students with ID (intellectual disability). Seven of the 13 articles included participants with developmental or other disabilities, in addition to intellectual disability. Four articles in this review (Bouck & Joshi, 2012; Carter et al., 2012; Joshi, Bouck, & Maeda, 2012; Papay & Bambara, 2011) conducted a secondary analysis of the National Longitudinal Transition Study - 2 (NLTS-2). One study (Shandra & Hogan, 2008) conducted a secondary analysis of the National

Longitudinal Survey of Youth (NLSY97). All other studies utilized original data collected by the respective study authors.

In conducting this literature review, we were interested in predictors of competitive employment and the outcome of competitive employment in the research literature. Across all 13 studies, we identified a total of seven unique transition-related predictors of post-secondary competitive employment for people with I/DD. These included: (a) paid employment while attending high school, (b) vocational skills instruction, (c) family expectations, (d) high school completion, (e) Individual Educational Plan (IEP) goals relating to competitive employment, (f) self-determination, and (g) participating in post-secondary education. Key findings of each study for predictors of competitive employment are displayed in Table 3.

### *Paid Employment While Attending High School*

Paid employment experience while attending high school was the most heavily researched predictor of post-secondary competitive employment with seven of the 13 articles incorporating this variable in their analysis. All studies measuring this variable reported paid work experience during high school was significantly and positively related to post-secondary competitive employment (Carter et al., 2012; Gold et al., 2013; Joshi et al., 2012; LoBlanco & Kleinert, 2013; Papay & Bambara, 2011; Simonsen & Neubert, 2013; Siperstein et al., 2014). In fact, four of the seven studies suggested paid work experience more than doubles the likelihood of post-secondary competitive employment outcomes for people with disabilities (Joshi et al., 2012; LoBlanco & Kleinert, 2013; Papay & Bambara, 2011; Simonsen & Neubert, 2013).

### *Vocational Skills Instruction*

The next substantiated predictor variable is vocational skills instruction with six studies in this literature review researching the relationship between participation in a vocational skills program that includes job-specific skills education/training, career assessment and counseling, internships, apprenticing, job shadowing, and placement support as a

**TABLE 1**

**Study-Specific Terms with Definitions or Conceptualization and Instrument Used In Study for Identified Predictors**

<i>Study-Specific Term</i>	<i>Definition/Conceptualization</i>	<i>Instrument</i>
	<b><i>Predictor category: Paid work</i></b>	
• Previous work experience	• Paid employment outside school/worked during the summer and/or school year <sup>3</sup>	• Survey
• Prior paid employment	• “. . . any gainful employment, competitive or not” (p.35) <sup>5</sup>	• Interview
• Paid work experiences while in school	• “Work in which the student is paid that is not secured by school personnel” (p.7) <sup>7</sup>	• Survey
• Paid high school employment	• “. . . paid work opportunities” (p.3) <sup>8</sup>	• Interview
• Work experience	• Work experience during high school <sup>9</sup>	• Survey
• Work experience	• “Paid work experience during secondary school” (p.193) <sup>12</sup>	• Survey
• Work experience	• Part-time after school job during high school <sup>13</sup>	• Interview
	<b><i>Predictor category: Vocational skills education</i></b>	
• Career-technical education/work study	• Students received three or more semesters of career/technical classes/participated in any work study program <sup>1</sup>	• Interview
• School programs	• Prevocational/vocational classes, in-school work experience, IEP prevocational/vocational goals, job-related and career experiences/supports <sup>3</sup>	• Survey
• Career-technical education/work study	• “Students received three or more semesters of career and technical classes” (p.86)/participated in any work study program <sup>4</sup>	• Interview
• Employment-related transition activities	• Career assessment, career counseling, prevoc. education, prevoc. training/job readiness training, specific job skills training, instruction in finding jobs, job shadowing, job coach, internship/apprenticeship, and placement support <sup>7</sup>	• Survey
• School-to-work	• School-based-sequence of courses based on occupational goal, academic and vocational studies with job in related field, school-sponsored enterprises, and technical prep. Work-based-job shadowing, mentoring, internship or apprenticeship <sup>10</sup>	• Survey
• School-to-work programs during H.S.	• Some form of job training in high school <sup>13</sup>	• Interview
	<b><i>Predictor category: Family expectations</i></b>	
• Parent expectations	• Parents’ expectation that their child would ever have a paying job or be self-supporting <sup>5</sup>	• Survey
• Parent expectations	• Parents’ expectation that their child would be employed after high school <sup>9</sup>	• Survey
• Family preference	• “. . . family expressed preference for paid work in the community” (p.193) <sup>12</sup>	• Survey
	<b><i>Predictor category: High school completion</i></b>	
• Exit/graduated	• “. . . graduating with a diploma” (p.2) <sup>8</sup>	• Interview
• High school completion	• Completed high school <sup>9</sup>	• Survey
• High school degree	• Whether or not the youth received a high school degree as of their last year of high school enrollment <sup>10</sup>	• Survey
	<b><i>Predictor category: IEP competitive employment goal</i></b>	
• Transition goals	• Transition goal of competitive employment <sup>2</sup>	• Survey
• IEP includes full-time work goal	• IEP goal of work <sup>8</sup>	• Interview
	<b><i>Predictor category: Self-determination</i></b>	
• Youth involvement	• Youth involvement in their own transition planning <sup>9</sup>	• Survey
• Self-determination	• “. . . autonomy, self-regulation, psychological empowerment, and self-realization” (p.258) <sup>11</sup>	• Survey
	<b><i>Predictor category: Post-secondary education</i></b>	
• Postsecondary Ed.	• Attending a 2- or 4- year college <sup>6</sup>	• Survey
• Post-high school enrollment	• Student was enrolled in some type of education any year after high school or received a college degree <sup>10</sup>	• Survey

*Note.* Numbers next to definitions refer to the study number listed in Table 2. Predictors are listed in order of most heavily researched.



**TABLE 2**

**Identified Predictors of Post-Secondary Competitive Employment**

Study	Author(s) and Publication Years	Paid Work	Vocational Ed	Family Expectations	High School Completion	IEP Goal Competitive Employment	Self-Determination	Post-Secondary Education
1	Baer et al., 2011		X					
2	Bouck & Joshi, 2012					X		
3	Carter et al., 2012	X	X	X				
4	Flexer et al., 2011		X					
5	Gold et al., 2013	X						
6	Grigal et al., 2011							X
7	Joshi et al., 2012	X	X					
8	LoBlanco & Kleinert, 2013	X			X	X		
9	Papay & Bambara, 2011	X		X	X		X	
10	Shandra & Hogan, 2008		X		X			X
11	Shogren et al., 2015						X	
12	Simonsen & Neubert, 2013	X		X				
13	Siperstein et al., 2014	X	X					

method of gaining required skills for obtaining and maintaining employment (Baer, Daviso, Flexer, Queen, & Meindl, 2011; Carter et al., 2012; Flexer, Daviso, Baer, Queen, & Meindl, 2011; Joshi et al., 2012; Shandra & Hogan, 2008; Siperstein et al., 2014). However, only five of the six articles researching outcomes related to participating in a vocational skills program reported a positive relationship with post-secondary competitive employment for people with I/DD (Carter et al., 2012; Flexer et al., 2011; Joshi et al., 2012; Shandra & Hogan, 2008; Siperstein et al., 2014). Baer et al. (2011) suggested no significant relationship for students with ID exiting high school in an urban area of a Great Lakes state. However, they reasoned career and technical education programs in their study occurred in an inclusive setting, of which a small portion of students with I/DD (21%) participated in; thus affecting their study outcome. Yet, Flexer et al. (2011) utilized participants in this same urban area and reported students with I/DD “who completed three or more semesters of career and technical education were significantly more likely to be working full-time by 1 year after exiting high school” (p. 91). Flexer and colleagues went on to suggest those who participated in vocational skills training were 1.5 times more likely to secure competitive employment upon completion of high school.

*Family Expectations*

While not the most heavily researched predictor, all three studies researching this predictor suggested family expectations of the student with I/DD securing competitive employment upon completion of high school were significantly associated with post-secondary competitive employment (Carter et al., 2012; Papay & Bambara, 2011; Simonsen & Neubert, 2013). In fact, Papay and Bambara (2011) reported students with ID whose parents expected they would be employed upon graduation of high school are “58 times more likely to be employed up to 2 years out of high school and 50 times more likely to be employed between 2 and 4 years out of high school than youth whose parents did not expect they would be employed” (Papay & Bambara, 2011, p. 145).

*High School Completion*

The next substantiated predictor variable included in this literature review is high school completion with all three studies reporting a positive relationship with post-secondary competitive employment (LoBlanco & Kleinert, 2013; Papay & Bambara, 2011; Shandra & Hogan, 2008). Indeed, LoBlanco and Kleinert (2013) reported students with ID who completed high school and obtained their high school diploma were 4.07 times more likely to

**TABLE 3**

**Summary of Results and Key Findings**

<i>Reference</i>	<i>N</i>	<i>Predictor Variable</i>	<i>Disability</i>	<i>Statistical Analysis</i>	<i>Key Findings</i>
Baer et al. (2011)	409	Voc. skills instruction	ID	Bivariate correlations/ Logistic regression	<ul style="list-style-type: none"> <li>No significant correlation of vocational skills instruction and post-secondary employment.</li> </ul>
Bouck & Joshi (2012)	32,239	IEP goal of competitive employment	ID	Frequency distributions	<ul style="list-style-type: none"> <li>98.4% of students with an IEP transition goal reported securing competitive employment within 2 years of high school completion.</li> </ul>
Carter et al. (2012)	450	Paid work Voc. skills instruction	I/DD	Logistic regression	<ul style="list-style-type: none"> <li>Students who had paid work while still in high school had significantly higher rates of competitive employment after high school.</li> </ul>
Flexer et al. (2011)	1540	Voc. skills instruction	I/DD and other disabilities	Logistic regression	<ul style="list-style-type: none"> <li>Students whose family had expectations for a paying job upon completion of high school were five times as likely to secure post-secondary competitive employment.</li> </ul>
Gold et al. (2013)	5847	Paid work	ID and other disabilities	2 level generalized linear mixed	<ul style="list-style-type: none"> <li>Students who attended three or more semesters of vocational skills instruction were 1.5 times as likely to secure competitive employment upon high school completion.</li> </ul>
Grigal et al. (2011)	520	Post-secondary education	ID	Cohen effect size <i>h</i>	<ul style="list-style-type: none"> <li>Students with prior work experience had a job placement rate of 80.7% compared to 76.0% of students who did not.</li> </ul>
Joshi et al. (2012)	62,513	Paid work Voc. skills instruction	ID	Multiple regression	<ul style="list-style-type: none"> <li>Students reporting ever attending post-secondary education had higher rates of competitive employment.</li> </ul>
LoBlanco & Kleinert (2013)	4504	Paid work IEP goal of competitive employment High school completion	ID and other disabilities	Logistic regression	<ul style="list-style-type: none"> <li>Students with paid work outside of a school-sponsored job and school-sponsored work experience had higher rates of post-school employment.</li> </ul>
Papay & Bambara (2011)	490	Paid work Self-determination Family expectations	ID	Logistic regression	<ul style="list-style-type: none"> <li>Students who worked while in high school were 3.18 times more likely to be employed than students who did not.</li> <li>Students having a goal of full-time employment were 1.58 times more likely to be employed.</li> <li>Students who graduated from high school were 4.07 times more likely to be employed.</li> <li>Students who participated in paid employment while in high school were five times more likely to be employed between 2-4 years after high school.</li> <li>Students who were involved in transition planning were five times more likely employed between 2-4 years after HS.</li> <li>Students whose family had expectations for employment after high school were 58 times more likely to be employed after high school.</li> </ul>
Shandra & Hogan (2008)	2,254	Voc. skills instruction High school completion Post-secondary education	ID and other disabilities	Generalized estimating equations	<ul style="list-style-type: none"> <li>Students who participated in work-based and school-based vocational training had a 1.2 times higher odds of employment, and were more likely to have benefits offered through their employer.</li> <li>Students who graduated with a high school degree were 2.02 times more likely to have stable employment.</li> <li>Students who participated in post-secondary education were 1.87 times more likely to have stable employment with benefits.</li> </ul>

**TABLE 3—(Continued)**

<i>Reference</i>	<i>N</i>	<i>Predictor Variable</i>	<i>Disability</i>	<i>Statistical Analysis</i>	<i>Key Findings</i>
Shogren et al. (2015)	779	Self-determination	ID and other disabilities	Generalized estimation equations	<ul style="list-style-type: none"> <li>• Students with increased levels of self-determination at their final year of high school had higher rates of employment outcomes one-year post school and were more likely to have jobs with benefits.</li> </ul>
Simonsen & Neubert (2013)	338	Paid work	ID	Multinomial logistic regression	<ul style="list-style-type: none"> <li>• Students who participated in paid work during high school were 4.33 times more likely to be employed after high school.</li> </ul>
Siperstein et al. (2014)	1055	Family expectations Paid work Voc. skills instruction	ID	Multinomial logistic regression	<ul style="list-style-type: none"> <li>• Students whose families expressed preference for work within the community were 6.48 times more likely to be employed after high school.</li> <li>• 73% of students who were competitively employed after high school received some form of job training while in school.</li> <li>• 62% of students who received job training while in high school have held their current job for three or more years.</li> </ul>

secure competitive employment than those students who did not.

*IEP Relating To Competitive Employment Goal*

Two studies included in this literature review examined the relationship of students' IEP goals and competitive employment outcomes (Bouck & Joshi, 2012; LoBlanco & Kleinert, 2013). Both studies suggested students with I/DD who had IEP goals relating to gaining paid employment had a greater chance of securing competitive employment upon completion of high school. In fact, Bouck and Joshi (2012) reported 98.4% of students in their study who had an IEP goal of competitive employment were employed within two years of high school graduation.

*Self-Determination*

Two studies included in this literature review reported students with disabilities who participated in the development of their IEP goals and helped monitor progress were more likely to secure competitive employment upon high school completion (Papay & Bambara, 2011; Shogren, Wehmeyer, Palmer, Rifenburg, & Little, 2015). Papay and Bambara (2011) reported those students who took part in their transition planning were five times more likely to be employed up to four years after graduation from high school.

*Post-Secondary Education*

Two articles that researched the relationship of post-secondary education and employment for people with I/DD reported a positive relationship and a greater chance of securing competitive employment (Grigal, Hart, & Migliore, 2011; Shandra & Hogan, 2008). Indeed, Shandra and Hogan (2008) reported those students who participated in post-secondary education were almost two times more likely to secure competitive employment than those who did not pursue post-secondary education.

**Discussion and Implications**

The purpose of this literature review was to report predictors that are associated with post-

secondary competitive employment as they relate to people with I/DD. This literature review is unique in its focus on the I/DD disability category. Out of the 13 studies that were included in this review, a total of seven distinctive independent variables were identified as predictors of post-secondary competitive employment. These included: (a) paid employment while attending high school, (b) vocational skills instruction, (c) family expectations of competitive employment upon graduation, (d) high school completion, (e) IEP goal of competitive employment (f) self-determination, and (g) participating in post-secondary education.

Of the variables that were identified in this literature review, paid work experience while attending high school was the predominant variable researched and consistently identified as a significant predictor of post-secondary competitive employment for people with I/DD. Paid work experience while in high school is most important for students with I/DD as it emphasizes work experiences in natural settings strengthening work-related skills such as social skills, self-determination, and job-specific skills (Carter et al., 2012; Hartman, 2009). Additionally, it helps to raise expectations of teachers, parents, and the students themselves regarding their abilities to obtain and maintain competitive employment (Carter et al., 2012). Moreover, Siperstein et al. (2014) reported 72% of adults with ID in their study held their first jobs while still in high school and only 2% secured their first job after the age of 30 suggesting competitive employment is uniquely inclined toward the younger worker. Siperstein and colleagues (2014) reported the likelihood of competitive employment significantly decreases with each passing decade: “. . . for every decade over the age of 21, the odds of an individual with ID being employed in a competitive setting were 1.3 times less likely” (Siperstein et al., 2014, p. 171). They added, the majority of adults in their study (62%) who were currently employed held their jobs for three or more years indicating adults with ID are capable of maintaining stable competitive employment once secured.

According to a 2011 report by the National Secondary Transition Technical Assistance Center (NSTTAC), students with disabilities

who participated in training and instruction in a non-school, natural environment focusing on development of social skills, domestic skills, accessing public transportation, and on-the-job training, are more likely to be competitively employed upon graduation from high school. The findings of this literature review provide additional support for these data. Further research has indicated that participation in vocational skills instruction helps to develop adaptive skills, build work ethic, professionalism, teamwork, and helps to train students with disabilities how to handle different situations with natural supports and encouraging generalization of new skills (Hartman, 2009; Kim & Dymond, 2010; Neubert & Moon, 2006; Stephens et al., 2005). Studies also suggest individuals with I/DD who participate in vocational skills training programs are more likely to value their jobs (Wehmeyer, Garner, Yeager, & Lawrence, 2006), have a desire to earn a living (Stephens et al., 2005), are more likely to find competitive employment after graduating from high school (Hartman, 2009; Landmark, Ju, & Zhang, 2010; Neubert & Moon, 2006; Simonsen & Neubert, 2013) and earn a higher income (Domin & Butterworth, 2013; Landmark et al., 2010; Shandra & Hogan, 2008). Within an educational climate that is focused heavily on academic standards, the findings of this review underscore the importance of vocational skills instruction in addition to academic instruction for students with I/DD to enable them to reach the important goal of competitive employment.

While participating in vocational skills training is essential to the development of job skills that may help an individual with I/DD secure competitive employment, family expectations of post-secondary employment is reportedly significantly more important. In fact, Papay and Bambara (2011) reported people with ID “were 58 times more likely to be employed up to 2 years out of high school and 50 times more likely to be employed between 2 and 4 years out of high school than youth whose parents did not expect they would be employed” (p. 145). Family is essential to successful transition from school to work by assisting in developing the student with I/DD’s role as a worker. Family members offer career-related advice, help the student find jobs, shape aspirations, and can offer practical and moral sup-

port to maintain employment (Holwerda, van der Klink, de Boer, Groothoff, & Brouwer, 2013). However, special education professionals have little guidance from the field on how to support families in increasing their expectations for their son or daughter's employment upon high school completion. In order to support families in having high expectations, professionals should listen to families' concerns that may be impacting their preferences or expectations for competitive employment. Families may be concerned about their son or daughter's safety in the workplace or about the impact of wages on their child's financial disability benefits (Heslop & Abbott, 2007; Luftig & Muthert, 2005).

In terms of family research in the special education field, a significant focus has been placed on examining family-professional partnerships (Blue-Banning, Summers, Frankland, Nelson, & Beegle, 2004; Summers et al., 2005). This research suggests that families' satisfaction with the partnership they have with professionals is related to their involvement in their child's education (Zuna, 2007) and, for families of children with low incidence disabilities, satisfaction with partnership has been shown to be related to outcomes such as reduced maternal stress (Burke & Hodapp, 2014) and family quality of life (Kyzar, Brady, Summers, Haines, & Turnbull, 2016). However, in the studies that met our review criteria, the examination of partnership was absent. It seems that a next step in the line of family research within the transition field is to measure the impact of family expectations and family-professional partnerships on competitive employment.

Earning a high school diploma indicates an individual has met graduation requirements as set by state and local education agencies. According to the 2010 FINDS National Survey (Anderson et al., 2011), 10% of caregivers indicated their son or daughter with I/DD did not complete high school; 48% reported the student received a certificate of completion rather than a diploma. In 2012, the U.S. Department of Education reported 40.3% of students with ID graduated with a diploma, with a drop-out rate of 18.8%. Research has shown that with instructional focus shifting from life skills to academic skills, dropout rates have increased (Bouck, 2010). Yet, studies included

in this literature review indicate high school completion is positively and significantly associated with post-secondary employment (Lo-Blanco & Kleinert, 2013; Papay & Bambara, 2011; Shandra & Hogan, 2008). In fact, Papay and Bambara (2011) reported students with disabilities were 5.68 times more likely to secure post-secondary competitive employment by meeting high school completion criteria and earning a diploma. Dropout prevention initiatives are prevalent. These may include mentors to help address academic and social needs, academic support within the classroom to improve student engagement, and access to career and technical education that offer real world and field-based experiences (Dynarski et al., 2008). The findings of this review support these initiatives as they have the potential to impact students' abilities to be competitively employed.

According to the findings of this review, students with I/DD who have an IEP transition goal relating to obtaining competitive employment experience higher rates of competitive employment after high school. In order to accomplish this, students with I/DD must take part in the planning and have a voice in goal development. Yet, according to a recent study by Shogren and Plotner (2012) 10 out of every 100 students with I/DD do not attend their own transition planning meeting; of those students who did attend, only three percent took a leadership role in the development and decision making. This is particularly concerning given research indicating that goal setting is motivating (Zhang et al., 2005) and is associated with students' increased perceptions of independence and self-determination (Wehmeyer et al., 2006). Embedding choice by taking into consideration the individual's strengths, needs, preferences, vision, and available resources increases ownership, self-determination, and motivation to pursue goals which the student helped to develop (Kim & Turnbull, 2004; Wehmeyer et al., 2006; Zhang et al., 2005). Educators should seek out professional development regarding strategies to support students' meaningful participation in their IEP. Transition specialists could guide them through the process of research-based programs. However, in order to address barriers to students' participation in IEP meetings at a systemic level, further

research is needed to identify the barriers at the classroom, campus, district, and state levels.

### Limitations

There were several limitations to this literature review. First, studies defined and measured the predictor variables inconsistently. We attempted to make clear the categories of predictor variables based on the definitions and measurements within each study for the reader (see Table 2), however, the reporting is still somewhat subjective. We see that this review contributes important knowledge in this area for future research—in order to clarify the weight each of these predictors holds in a statistical model predicting competitive employment from transition-related variables, researchers should begin to develop and validate measures and terminology used consistently across studies.

Four of the studies included in this review utilized a secondary analysis of National Longitudinal Studies, which resulted in overrepresentation of that study (i.e., participants, variables) in the findings of the current review. Third, although we attempted to utilize only those studies that measured post-secondary outcomes for people with I/DD, there were not enough studies with this sole focus to conduct a robust review of the literature. Therefore, we opened up the review criteria to include studies in which samples included people with other disabilities. It is important to note that although some studies included in this review involved people with other types of disabilities in the sample, *all* studies included people with I/DD or ID as well.

Although it is difficult to obtain sample sizes necessary to run robust statistical analyses on studies that include participants with low incidence disabilities such as I/DD, we see that researchers must undertake this task. Although we cast a wide net in our searching (multiple databases, journals, and keywords), over the last 10 years, only 13 studies have been conducted that met our review criteria; and, as we mentioned, a number of them did not focus solely on people with I/DD. As we have reported, data indicate that only 15% of people with I/DD are employed, and fewer than half of those 15% receive competitive

wages. These dismal outcomes are unacceptable and further research is needed on this specific population to gain a deeper understanding of the variables influencing the post-secondary employment experiences of people with I/DD in order to move forward with developing an effective agenda to address them.

### Conclusion

When a student graduates from high school, they may have dreams that include finding a job and becoming self-sufficient. However, post-secondary outcomes for students with I/DD may not be as optimal. Giving students the tools they need to pursue competitive employment is one way school systems can help people with I/DD meet those individual and personal goals. This review has identified seven research-based transition practices that, if implemented, increase students' likelihood of obtaining competitive employment after exiting special education. Previous reviews of the literature on competitive employment have failed to examine this issue as it relates specifically to students with I/DD. Findings indicate the need to focus on seeking out paid employment for students while in the high school setting, providing students with direct and explicit instruction on vocational skills, ensuring students graduate with a high school diploma, and supporting families in having high expectations for their son or daughter to be competitively employed.

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## Students with Intellectual Disability: Predictors of Accountability Test Participation

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*Abstract: Legislation mandates that students with disabilities be included in achievement testing for accountability purposes, with only a few participating in an alternate assessment (Individuals with Disabilities Education Improvement Act [IDEA], 2004). The current study utilized data from the Special Education Elementary Longitudinal Study (SEELS) to determine both the extent to which such students participate and whether the amount of time spent in general education settings or provision of read-aloud accommodations during instruction predicted their participation in general statewide accountability testing. Regression analyses indicated that percent time in general education significantly predicted participation but read-aloud accommodation provision did not. The implications of the results for research and educational practice are discussed.*

Federal legislation stipulates the inclusion of students with disabilities in educational testing for the purpose of accountability. The Individuals with Disabilities Education Improvement Act (IDEA, 2004) is the latest reauthorization of the special education law that reflects the importance of maintaining high standards for students with disabilities via its principle of least restrictive environment. This principle mandates educating students with disabilities to the greatest extent feasible in settings with their nondisabled peers. By extension, having students with disabilities participate in general statewide accountability tests demonstrates the expectation that students have the potential to perform at comparable levels to students without disabilities (Ysseldyke et al., 2004) and the expectation of meeting grade-level performance standards.

The focus of such legislation on the participation of all students is important. If students with disabilities are not included in accountability testing, valid conclusions cannot be drawn regarding overall student achievement, and decisions that are made may not reflect

the academic needs of this population. With the current focus on educational accountability via assessment programs, it is intended that all students, including those with disabilities, will experience an environment in which there are high standards for what they will learn and that school resources will be allocated to ensure that all students experience academic success.

Although positive consequences have been associated with the inclusion of students with disabilities in accountability tests (Ysseldyke et al., 2004), recent research has largely reflected a lack of participation in general statewide accountability tests for students from several disability groups. In their study on the accountability test participation of students with emotional and behavioral disorders, Carr-George, Vannest, Willson, and Davis (2009) found only 56% of such students participated in such testing. Witmer and Ferreri (2014) examined how students with Autism Spectrum Disorder (ASD) were included in the general education environment and how they participated in accountability tests. Many participated in alternate tests as opposed to general statewide accountability tests, and some were reported to not participate in accountability testing at all. Additionally, in Bouck's (2013) analysis of the test participation of secondary students with mild intellectual disability, the majority either took alter-

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nate assessments or were not included in the accountability assessment system at all (58%). The literature thus reflects a disconnect between educational policy, which mandates the participation of all students in accountability systems and practice.

The inconsistency between legislation and practice is notable given the purpose of accountability programming. Such programming is designed to ensure that all students, including students with disabilities, are achieving at a level commensurate with state standards (National Center on Educational Outcomes [NCEO], 2003). Accountability testing is a means of measuring whether schools are successful in fostering students' skills to meet these standards. How students participate in such testing also serves as an indicator of whether their needs are being attended to through this system. The purpose of the current study is to both examine inclusion of one important group of students with disabilities, students with intellectual disability, and to examine factors associated with their inclusion in general statewide accountability testing.

#### *Participation of Students with Disabilities in Accountability Testing*

It is important to recognize that stipulations in federal legislation regarding student participation in accountability tests are somewhat recent phenomena in the history of public education in the United States. In a review of educational assessment practices, Linn (2000) noted that both the practice of holding schools accountable for student achievement and the inclusion of all students (including students with disabilities) in large-scale assessment and accountability systems via standards-based reform are relatively new concepts. Students with disabilities have historically been excluded from testing for a myriad of reasons (McGrew, Thurlow, & Speigl, 1993; Ysseldyke, Thurlow, McGrew, & Vanderwood, 1994). Some of these reasons include concerns about the following: students not receiving adequate instruction in the content included on accountability tests; students with disabilities lowering the average scores of schools; negative emotional experiences for students with disabilities, such as undue stress and anxiety; and inaccessible test formats and a lack of

appropriate accommodations. In their investigation of accountability testing practices in the early years of standards-based reform, McGrew et al. (1993) found that 40 to 50% of students with disabilities were excluded from testing. Many who were excluded could have feasibly been included, particularly given the development of appropriate modification and accommodation tools. In a review of literature on the standards-based reform movement, Thurlow, House, Scott, and Ysseldyke (2000) cited increased student retention, exclusion from the general education curriculum, and diminished focus on students with disabilities in education reform as possible negative consequences of their exclusion from accountability testing.

Contrary to some commonly held beliefs that accountability test participation may be inappropriate for students with disabilities, accountability test participation could in many ways be beneficial for students with disabilities. Aligned with the notion that inclusion had the potential to improve the educational opportunities of students with disabilities, Ysseldyke et al. (2004) indicated several positive outcomes of accountability testing for students with disabilities. These outcomes included increased student achievement; higher educational expectations; enhanced instruction; access to the general curriculum and educational accommodations; increased continuity between IEP expectations and assessment; and better alignment of educational standards, assessment, and curriculum.

However, many concerns remain about the participation of students with disabilities in accountability programs. For instance, the format of a test may present potential barriers to students with disabilities, which may make it difficult for these students to demonstrate their skills. Despite increases in computerized testing (Zinesky & Sireci, 2002), it can be difficult for many students with disabilities to complete general statewide accountability tests in the way they are originally designed (Bolt & Thurlow, 2004). The improper fit of test format to the needs of students with disabilities can impede their ability to properly participate in these tests, which conflicts with federal law stipulating their participation (IDEA, 2004). For example, students with reading-related disabilities who need to read

in order to complete certain mathematics problems may experience unnecessary challenges in demonstrating the associated math skills (Thurlow, Lazarus, & Hodgson, 2012). Math test sections may include lengthy word problems, which may prevent students with reading difficulties from appropriately accessing the actual content of the math problem. Additional concerns arise when one considers whether students with disabilities have appropriate access to instruction of academic content that is ultimately tested (Katsiyannis, Zhang, Ryan, & Jones, 2007). Furthermore, in order to access both instruction and testing, alignment in the accommodation supports provided across these environments is needed as well (Johnson & Thurlow, 2003), but does not necessarily consistently occur.

#### *Factors That May Contribute to General Statewide Accountability Test Participation*

*Accommodation provision.* One way in which many students with disabilities may be appropriately included in general statewide accountability testing is through accommodation use. Noted as a “critical” recommendation for increased accountability test participation (McGrew et al., 1993, p. 350), accommodations are changes that assist students with disabilities in accessing the content of whatever is being taught or assessed (National Dissemination Center for Children with Disabilities [NICHCY], 2010). For instance, accommodations commonly allowed by states for use in accountability testing include large print, extended time, Braille, sign language interpreters, and dictated response (Bolt & Thurlow, 2004). Another commonplace educational accommodation is the read-aloud accommodation (RAA; Thurlow et al., 2012).

Research has illustrated the benefit of increased testing accommodations allowance. In their report for the National Center on Education Statistics, Olson and Goldstein (1997) described efforts at the national level to increase students with disabilities’ participation on a nationwide accountability test, the National Assessment of Educational Progress (NAEP). They focused in particular on accommodation allowances on the test. Findings indicated that the more accommodations allowed on the NAEP, the more students with

disabilities participated on the test. Further, Lazarus, Cormier, and Thurlow (2011) found that the more accommodations states allowed, the less likely they were to develop modified accountability tests, making students with disabilities more likely to participate in general statewide accountability tests. Conversely, restrictions in accepted test accommodations have been demonstrated to negatively influence the participation of students with mild disabilities on general statewide accountability tests (Cho & Kingston, 2012).

Additional research on accountability tests at the state level yielded similar results. Yseldyke et al. (2004) indicated accommodation allowance by state boards of education related to greater participation of students with disabilities in accountability tests. Further, test accommodation use was associated not only with increased student participation but subsequent pursuance of “diploma options that were otherwise unavailable to them” (p. 83). In fact, they noted one possible reason students with disabilities underperform on accountability tests is that they have lack of access to proper accommodations. The authors concluded that meaningful student participation (via high expectations and inclusion in accountability testing) supported by necessary accommodation use could promote students with disabilities’ academic achievement.

Relatedly, receipt of instructional accommodations may also be associated with general statewide accountability test participation. In their study on the educational experiences of students with emotional and behavioral disorders, Carr-George and colleagues (2009) identified associations between receipt of in-class support during instruction, such as accommodations, and general accountability test participation for this group. Although it seems logical that accommodations provided during instruction should be provided during testing (and thus instructional accommodations should be associated with test participation), Shriner and Destefano (2003) reported a misalignment between instructional and test accommodations. This is further complicated by a general dearth of research on associations between instructional accommodations and general statewide accountability test participation (Bottsford-Miller, 2008).

*General education participation.* Another promising avenue for general accountability test participation is participation in general education. A research review by Freeman and Alkin (2000) illustrated the benefits of instructional inclusion for students with intellectual disability. Although they observed mixed results in their review of studies assessing academic and social outcomes for students with intellectual disability, one finding was consistent: overall, students educated in general education settings experienced significantly greater gains in academic achievement when compared to their peers in self-contained settings. Further, the authors noted high expectations in general education might influence the achievement gains of included students.

Studies have also investigated the association between general education participation and general accountability test participation more directly. Results of the Carr-George et al. (2009) study suggested associations between participation in general education and subsequent participation in accountability testing for students with emotional and behavioral disorders. Witmer and Ferreri (2014) found that students with ASD who had access to the general education curriculum participated more often in general statewide accountability testing. Further, the findings of Bouck (2013) suggested positive correlations between high school students with mild intellectual disability that were included in the general education curriculum and participation in general statewide accountability tests.

#### *Specific Concerns for Students with Intellectual Disability*

Although much progress has been made in recent decades to include students with disabilities in the general curriculum and accountability testing, one group of students with disabilities that may be difficult to include are those who have intellectual disability. This group may be challenging to effectively include due to the nature of the disability, which includes deficits in adaptive and intellectual functioning (American Psychiatric Association, [APA], 2000). Despite trends toward including more students with intellectual disability in general education classrooms, Williamson, McLeskey, Hoppey,

and Rentz (2006) still identified that over half of students with intellectual disability were educated in more restrictive settings. Restrictive educational placements may be indicative of potentially low expectations for student achievement, which may be associated with the assignment of students with intellectual disability to alternate or functional tests. However, research has indicated the increasing feasibility of including students with intellectual disability in general education instruction, specifically those with mild intellectual disability, given the increasing prevalence of technological supports (Patton, Polloway, & Smith, 2000).

At the same time, it is important to point out that a variety of difficulties may impede the engagement of students with intellectual disability in the general curriculum. Intellectual disability is characterized by global developmental deficits; however, reading difficulties may especially plague the academic progress of this group. In their study on the secondary disorders of intellectual disability, Koritsas and Iacono (2011) sampled 659 caregivers whose reports suggested that reading difficulties were the second most prevalent disorder across the sample of individuals with intellectual disability (67%), just behind communication difficulties (68%). If these students are to be included in general education and general statewide accountability testing, read-aloud accommodations may serve as integral tools for their engagement across settings.

It is important to acknowledge that some students with intellectual disability may be unable to participate in general statewide accountability tests even with accommodations that target their needs. Alternate assessments, which measure progress according to alternate achievement standards, are typically created to handle this concern. These assessments differ from general statewide accountability tests in that they tend to assess less content, require less depth of knowledge for students to score high, and generally are of lower difficulty level than the general statewide tests. In order to prevent the alternate assessment option from lowering educational standards for students with disabilities, previous federal legislation limited the proportion of students who could be considered proficient on an

alternate assessment. More specifically, according to the No Child Left Behind Act (2002), only one percent of all students could be considered proficient based on such an alternate assessment; furthermore, alternate assessments were to be given only to students with significant cognitive disabilities. Although such specific guidelines are not yet spelled out as a part of the most recent reauthorization of the Elementary and Secondary Education Act (i.e., the Every Student Succeeds Act of 2015), it is anticipated that state accountability programs will be expected to document high levels of participation in the general test and very low levels of participation in alternate testing among students with disabilities in order to be promoting high standards for all.

### *Current Study*

Literature on the importance of having high expectations for student learning has prompted legislation requiring nearly all students to participate in general statewide accountability testing. However, research has indicated that many students with disabilities, including secondary students with mild intellectual disability (Bouck, 2013), are not being included in these tests. A need exists for greater understanding of what factors may facilitate accountability test participation in earlier grades for students with intellectual disability. Currently, it appears that time in general education settings may facilitate older students' participation in general statewide accountability tests. Further, although limited, research on instructional accommodations and testing suggests that appropriate instructional accommodation provision may help students with disabilities be included in general accountability testing (Carr-George et al., 2009). As many students with intellectual disability have specific difficulties with reading, read-aloud accommodations in particular may facilitate greater inclusion in general accountability testing for this group. The research questions for this study are therefore as follows:

1. Do the instructional placements of third through eighth grade students with intellectual disability relate to their participation in general statewide accountability

tests, when controlling for broad achievement levels?

2. Does the provision of instructional read-aloud accommodations relate to the participation of third through eighth grade students with intellectual disability in general statewide accountability tests, when controlling for broad achievement levels and percent of time in general education?

### **Method**

This study involved analysis of data from the school program survey and the language arts teacher survey of the Special Education Elementary Longitudinal Study (SEELS). Funded by the Office of Special Education Programs (OSEP) as part of an evaluation of IDEA (1997), SEELS resulted in the development of a national data set that includes information collected via survey, interviews, and direct assessment on students with disabilities who were receiving special education services (SRI International, 2002). The current study involved analysis of information collected via surveys of special education program coordinators and language arts teachers about the educational experiences of students with intellectual disability. Specifically, reading achievement goals, instructional placement, and instructional read-aloud accommodation provision were analyzed to assess whether or not these variables predicted student participation in general statewide accountability tests. The sample used for this study included students identified as having intellectual disability in grades 3 through 8.

### *Participants*

The sampling method for the SEELS data set is described below, and additional related information can be found at the SEELS website (SRI International, 2002) and in published papers that have described the design of SEELS data collection efforts (e.g., Wagner, Kutash, Duchnowski, & Epstein, 2005). First, stratified random sampling was used to select local educational agencies (LEAs) from a nationally representative population. LEAs comprising the population were those private or public school systems within the U.S. that had more than 10 students with disabilities within

the desired 6- to 12-year-old age range. Student participants were sampled to allow analyses to be completed by disability group such that the results can be considered representative of each disability group at a national level. Participating schools were sent mailings with the associated surveys in them across three waves of data collection.

The current study involved data obtained as part of the third and final wave of SEELS data collection in the 2003–2004 school year. It was limited to students identified by their program coordinators as having intellectual disability, who were in the age range for which participation in accountability programs is expected (i.e., grades 3-8). Only those for whom mandated testing was available at their grade level were included in the present study. The resulting sample included 600 students. Of the 580 participants whose gender was reported, 59% were male. For the 594 participants whose ethnicity was reported, 59% were White, 25% were African American, 13% were Hispanic, 2% were Asian/Pacific Islander, and 1% were identified as “Other.” Of the 494 participants whose household income was reported, 41% earned \$25,000 or less and 31% earned over \$50,000. For urbanicity, 50% of all participants ( $n = 600$ ) were reported as living in suburban communities, 35% in urban communities, and 15% were in rural communities. Participants ranged in age from 10 to 17 years.

### *Measures*

Three predictor variables – reading achievement goal, educational placement, and instructional read-aloud accommodation provision – were analyzed to determine the extent that they predicted general statewide accountability test participation. This information was obtained from program coordinator survey data (accommodation, placement, and test participation information) and language arts teacher survey data (reading achievement goal).

*Reading achievement goal.* Due to the lack of direct achievement measures for all participations, reading achievement goals served as broad measures of achievement in order to control for their possible influence on the type of accountability tests to which students were assigned. More specifically, within the

language arts teacher survey, respondents were asked to report which reading achievement goal participants were expected to achieve. Response options included “reading at grade level,” “improving general reading skills (but not necessarily to reach grade level),” “developing functional reading skills (such as word recognition for daily living),” “building pre-reading skills (i.e., letter recognition, auditory discrimination of sounds, matching words, etc.),” or “no goals regarding reading achievement.”

*Educational placement.* Within the school program survey, respondents reported how many classes participants spent in a variety of educational placements, including: general education classrooms; resource rooms; special education self-contained classrooms; or individual, homebound, or other instruction. The percentage of classes students were reported to experience in general education classrooms was calculated by dividing the total number of general education classes taken by the sum of classes taken. The resulting variable was continuous, ranging from 0% to 100% participation in general education classrooms.

*Instructional read-aloud accommodation provision.* Within the school program survey, respondents were asked to report which accommodations were reported on participating students’ IEPs or 504 plans. For the purposes of the current study, a response of “yes” to the “reader or interpreter” item was used as an indication that the participant received the read-aloud accommodation during instruction.

*General statewide accountability test participation.* Within the school program survey, respondents were asked to report how participants would participate in mandated testing for the school year. Response options included “there is no such testing at this grade level”; “student does not take such tests”; “student participates in an alternative assessment”; “student participates in most or all of the testing program with accommodations or modifications”; or “student participates in most or all of the testing program without accommodations or modifications.” Due to study inclusion criteria, students whose program coordinators indicated that no such testing was available at the students’ grade level

were excluded from the study. Therefore, only the latter four responses were used. Responses indicating the student did not take an accountability test or participated in an alternative test were recoded as one value indicating the student did not participate in general statewide accountability testing. Responses indicating the student participated in the testing program with or without accommodations or modifications were recoded as one value indicating that the student participated in general statewide accountability testing. Data were then recoded into a binary variable, with 1=participation in general statewide accountability test and 0=participation in alternate test or no test participation.

#### *Data Analyses*

Data analyses involved the calculation of descriptive statistics as well as a series of binary logistic regression analyses to determine whether certain educational factors – educational placement and instructional read-aloud accommodation provision – predicted participation in general statewide accountability tests. General statewide accountability test participation, the dependent variable, was binary. Order of entry was as follows: reading achievement goal, educational placement, and read-aloud accommodation provision. As each additional variable was entered, the variation associated with the prior variables was controlled to allow for determination of the extent to which the added variable improved predicted test participation outcome.

### **Results**

#### *Descriptive Statistics*

The descriptive statistics for variables used in the binary logistic regression analysis are as follows. For reading achievement goal, of all participants ( $n = 600$ ), 10% had no reading achievement goal, 14% were building pre-reading skills, 34% were developing functional reading skills, 35% were improving general reading skills (not necessarily toward grade level), and 7% were working toward reading at grade level. Of the 595 participants for whom instructional read-aloud accommodation provision was reported, 16% received

the accommodation. Of all the participants, 34% participated in the general statewide accountability test. Participants spent 0% to 100% of their time in general education. On average, they spent approximately 26% of their time in general education settings.

#### *Binary Logistic Regression Analysis*

A series of binary logistic regression analyses was conducted. To describe the results, the Model Chi-Square statistic, the Block Chi-Square statistic, Log Odds statistic, and Odds Ratio statistic are reported. The Model Chi-Square statistic indicates whether the overall model was significant in predicting the binary outcome. The Block Chi-Square statistic indicates whether the variables that were added to the model made a significant change in the model's predictability above and beyond the previous block of variables. The Log Odds statistic ( $\beta$ ) indicates the log odds of the outcome variable given a predictor variable. The Odds Ratio statistic, an exponent of the Log Odds statistic, indicates the likelihood of the outcome variable occurring given a predictor variable.

The first block contained only reading achievement goal as a predictor of general statewide accountability test participation. This block served as a control for later variables added to the equation. The model significantly predicted students' participation in testing: Model Chi-Square,  $\chi^2(4, n = 595) = 209.99, p < .001$ . Two of the reading achievement goals were significant predictors of the odds of participating in general accountability tests: developing pre-reading skills and improving functional reading skills. Students developing pre-reading skills were .05 times as likely, or 95% less likely, to participate in general statewide accountability tests as students whose goal was to read at grade level,  $\beta = -2.97, \chi^2(1) = 27.94, p < .001$ . Students improving their functional reading skills were .10 times as likely, or 90% less likely, to participate in general statewide accountability tests as students whose goal was to read at grade level,  $\beta = -2.26, \chi^2(1) = 25.21, p < .001$ . The reading achievement goals of no reading goals ( $p = 1.00$ ) and improving general reading skills ( $p = .06$ ) did not signifi-

**TABLE 1**

**Predictors for General Statewide Accountability Test Participation**

<i>Predictor</i>	$\beta$	<i>S.E.</i>	<i>Exp</i> ( $\beta$ ) <sup>a</sup>
General Education (Percent)	.04	.01	1.04*
Constant	-.21	.42	.81
Block $\chi^2$ <sup>b</sup>	85.05, 1*		
Model $\chi^2$ <sup>c</sup>	269.08, 5*		
<i>n</i>	Included = 595, Excluded = 5, Total = 600		

*Note.* Reading achievement goal controls are reading at grade level, improving reading skills, functional reading skills, pre-reading skills, and no reading skills (omitted from the table).

<sup>a</sup> *Exp*( $\beta$ ) = exponentiated  $\beta$ . <sup>b</sup> Block  $\chi^2$  indicates whether general education participation makes a significant change to the model. <sup>c</sup> Model  $\chi^2$  indicates whether the overall model is significant.

\*  $p < .001$ .

cantly predict the odds of participating in general statewide accountability tests.

The second block contained reading achievement goal and percent participation in general education as predictors of general statewide accountability test participation (Table 1). Its Model Chi-Square,  $\chi^2$  (5,  $n = 595$ ) = 269.08,  $p < .001$ , and Block Chi-Square,  $\chi^2$  (1,  $n = 595$ ) = 85.05,  $p < .001$ , were both significant. The significance of the block suggests that the addition of percent time spent in general education significantly contributed to the model's predictability of general statewide accountability test participation above and beyond reading achievement goal alone. For every 1% increase in general education participation, students with intellectual disability were 1.04 times more likely, or 4% more likely, to participate in general statewide accountability tests,  $\beta = .04$ ,  $\chi^2(1) = 70.02$ ,  $p < .001$ , controlling for the influence of reading achievement goal on prediction.

The third block contained reading achievement goal, percent participation in general education, and instructional read-aloud accommodation provision as predictors of general statewide accountability test participation. The Model Chi-Square was  $\chi^2$  (6,  $n = 595$ ) = 269.38,  $p < .001$ . This indicated the model was significant overall. However, as the Block Chi-Square statistic was not significant,  $\chi^2$  (1,  $n = 595$ ) = .32,  $p = .57$ , the third block was not significant above and beyond the second block. That is, adding instructional read-aloud accommodation provision did not make a significant change in the predictability of the

model above and beyond the predictability of reading achievement goal and general education participation. As instructional read-aloud accommodation provision did not significantly improve predictability above and beyond the second block, its effects were not interpreted.

### Discussion

The current study examined whether certain educational factors predicted the participation of students with intellectual disability in general statewide accountability tests. Data from the Special Education Elementary Longitudinal Study (SEELS) were used in a series of binary logistic regression analyses to determine whether two educational factors – educational placement and accommodation provision – were predictive of participation in general statewide accountability tests while controlling for students' broad reading achievement level. The results of the current study suggested educational placement was a significant predictor of general statewide accountability test participation for students with intellectual disability beyond broad reading achievement level. However, instructional read-aloud accommodation provision was not predictive of general statewide accountability test participation.

#### *Proportion of Student Participation in General Statewide Accountability Testing*

Overall, 34% of students with intellectual disability in the current sample participated in



general statewide accountability tests. This is relatively low given federal accountability mandates (U.S. Department of Education, 2009) that stipulate the participation of all students with disabilities in general statewide accountability testing, apart from those who have the most significant cognitive disabilities. Specifically, only 1% of all students, or 10% of all students with disabilities, is ultimately anticipated to need to participate in the alternate assessment toward alternate achievement standards. Although one might logically expect more students with intellectual disability than those with other disability types to participate in the alternate assessment given that these students generally have more significant educational needs than other disability groups, when one considers that the focus of the alternate assessment is truly only intended to be those with significant cognitive disabilities, the findings become particularly concerning. Students with significant cognitive disabilities, such as those with moderate, severe, and profound intellectual disability, comprise only 10% to 25% of all individuals with intellectual disability (APA, 2000; Daily, Ardinger, & Holmes, 2000). In the current study, a much higher percentage of students with intellectual disability (i.e., 66%) were taking either the alternate assessment or no assessment at all. This seems to point to a high potential for there to be students with less significant cognitive disabilities who are not participating appropriately in the general statewide accountability test who may consequently not experience the intended benefits of learning within an environment in which there are high expectations for their success.

#### *Educational Placement and General Statewide Accountability Testing*

Despite the low participation rates identified among students with intellectual disability, educational placement was a predictor of their participation in general statewide accountability tests. Inclusion in general education has previously been identified as a predictor of general statewide accountability test participation among students with emotional and behavioral disabilities (Carr-George et al., 2009), students with Autism Spectrum Disorders (Witmer & Ferreri, 2014), and high school

students with mild intellectual disability (Bouck, 2013). The findings of the present study similarly indicated that third through eighth grade students with intellectual disability placed in general education settings are more likely to be included in general statewide accountability tests, even when controlling for general reading achievement level.

Although the current study indicated relatively low participation rates of students with intellectual disability in general accountability testing, it pointed to exposure to general education environments as something that is associated with greater participation in the general accountability test, even when already accounting for broad reading achievement level. Causality cannot be determined from this study (i.e., whether including students in general education classroom environments causes inclusion in general statewide accountability testing, or vice versa, or whether the two are connected to a third variable cause); however, it does seem to offer the possibility that greater exposure to general education classrooms may result in greater expectations for performance among students with intellectual disability. Of course, placement in general education must be considered according to the specific needs of the child, taking into account the importance of appropriate supports, services, instruction, and other environmental factors that may influence students' performance and success. Even so, there is general empirical support for the inclusion of students with intellectual disability in general education (Freeman & Alkin, 2000), particularly when appropriate teacher training is provided to support inclusive practices (Kosko & Wilkins, 2009; Miller, Wienke, & Savage, 2000).

#### *Read-Aloud Accommodations and General Statewide Accountability Testing*

The present study examined whether read-aloud accommodations provided to students during instruction predicted their participation in general statewide accountability tests. For students with intellectual disability, provision of this accommodation was not a predictor of participation in testing above and beyond the predictive effects of participation in general education. Thus, provision of such an

accommodation during instruction is not anticipated to increase the likelihood of test participation for this group of students. However, this does not suggest that providing read-aloud accommodations during instruction is not beneficial for use by students with disabilities. Read-aloud accommodation is a frequently used accommodation, and Thurlow et al. (2012) noted it as useful for students who have limited reading skills and for those with difficulty maintaining attention to tasks. It simply was not found to improve the prediction of whether or not a student with intellectual disability would participate in the general accountability test in the current study.

The lack of an additional predictive relationship between read-aloud accommodation provision during instruction and participation in general statewide accountability testing could be due to a variety of reasons. First, it may be the case that the lack of association found in the current study was due to the fact that only 16% of the participating students actually received this accommodation; in other words, lack of substantial variation in provision of the accommodation hindered our ability to detect such a relationship. Second, it may be the case that those provided read-aloud accommodations were students with particularly significant academic needs. That is, those students may have had more significant intellectual disability than students not receiving read-aloud accommodations and may therefore have been more likely to take the alternate accountability test or be excluded from testing altogether. Student achievement was controlled for via their reading achievement goals; however, this is an imperfect measure as it is not a wholly accurate representation of academic achievement. This may therefore account for the lack of a predictive relationship based on accommodation status.

It is important to note that another issue that may have affected our findings is the wide variability in allowance and use of the read-aloud accommodation during testing. Although it is recommended practice that accommodations received in the classroom should also be provided during testing (Thurlow et al., 2012), a study by Cho and Kingston (2012) found that teachers may relegate stu-

dents with mild intellectual disability, an intellectual disability subgroup, to alternate accountability tests instead of general statewide accountability tests due to lack of test accommodation availability, particularly read-aloud accommodations. The variability in state-to-state allowances of read-aloud accommodations during achievement testing for accountability purposes may thus affect the rate at which students with intellectual disability are assigned to general statewide accountability tests.

### *Limitations and Implications*

Several limitations of the data and associated analyses should be noted. First, the findings are based on teacher report of educational practices, which may not reflect actual practices. For instance, respondents may have over- or under-estimated the extent to which services were provided. Second, the data were collected in 2003–04 and may not reflect current participation and accommodation rates. At the same time, there is no reason to believe that the predictive relationships explored within this study would change over time; therefore, this may still be considered highly relevant to consider in efforts to promote application of policy on the importance of including students with disabilities in accountability testing within practice. Third, in an attempt to control for overall achievement, we had to rely on using teacher-reported reading achievement goal. This is an imperfect approximation of general achievement, and respondents may have interpreted each goal option differently. Fourth, due to the secondary nature of the data, it is unknown how students were provided the read-aloud accommodation during instruction. For instance, read-aloud accommodations may differ in who (e.g., teacher) or what (e.g., electronic device) reads the material aloud, what material is read aloud, and how frequently material is read aloud. It is uncertain whether the accommodations were provided as specified by the respondents.

Despite these limitations, the current findings point to interesting and potentially fruitful directions for future research. First, we explored whether just one accommodation predicted test participation, but it may be

worthwhile to explore whether additional accommodations that are commonly provided are together predictive of test participation. Studies involving other possible predictive factors – for example, academic goals and teacher expectations (Witmer & Ferreri, 2014), school socioeconomic status (Carr-George et al., 2009), and perceived teacher competence – may further elucidate important variables that may be associated with and possibly promote the participation of students with intellectual disability in general statewide accountability tests.

Second, additional research on students who have been specifically identified as having mild intellectual disability is warranted. This population of students, Bouck (2007) states, is often subsumed into a larger group of other students with high incidence or developmental disabilities. This subgroup may be better suited for inclusion in general statewide accountability testing compared to peers with more substantial intellectual deficits or adaptive needs.

Third, future research should investigate the effects of teacher education about the importance of general statewide accountability test participation on the participation rates of students with intellectual disability. Research by Shriner and Destefano (2003) demonstrated the effects of IEP training on increasing the quantity and quality of accommodations provided to students with disabilities and their increased participation in general statewide accountability tests. Kosko and Wilkins (2009) also found that professional development resulted in increased perceptions of general educator competence in adapting instruction for students with disabilities in inclusive settings. Ultimately, better training for teachers on the importance of making appropriate educational setting and test participation decisions may facilitate greater inclusion of students with disabilities in general statewide accountability testing.

In order for accurate academic achievement information to be collected for students with intellectual disability and for them to experience the intended benefits of accountability testing, participation in general statewide accountability testing is important. The results of this study suggest increased time in general education settings may be one way to increase participation rates. However, it is im-

portant to recognize that participation in general education alone does not ensure participation in general statewide accountability testing for students with intellectual disability, nor does it ensure students' success. It is important for educators and other ancillary professionals to consider individual student needs when determining a student's educational placement and to provide and monitor the impact of instructional supports to ensure they are truly effective.

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## **Embedded Shared Reading to Increase Literacy in an Inclusive English/Language Arts Class: Preliminary Efficacy and Ecological Validity**

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*Abstract: Learning in general education contexts enhances access to general curriculum content for students with disabilities. However, few intervention studies focused on general education content have been conducted in general education settings. The current study provides preliminary evidence of the effectiveness of a literacy intervention using evidence-based practices (i.e., shared reading, embedded instruction, time delay) implemented in the context of a ninth-grade general education English/language arts class. A multiple baselines across conditions design was used to examine the effectiveness of the intervention, and field notes were collected to examine the factors that facilitated and inhibited the integration of the intervention into the general education class routines. Implications are discussed in relationship to future research focusing on interventions to improve access to the general curriculum in general education contexts, as well as for teachers providing such instruction.*

The general curriculum, by definition, is “the same curriculum as for non-disabled students” (IDEA, Individuals with Disabilities Education Act, 2004). Federal laws such as IDEA (2004) and No Child Left Behind (2002) mandate that all students, including students with disabilities, have access to evidence-based instructional strategies in the least restrictive educational settings. Literacy, defined as the natural use of language in everyday contexts (Gee, 2001), is particularly important to address within less restrictive settings such as general education classes, because peers provide natural opportunities to use language. Unfortunately, a majority of students with significant disabilities continue to be served in self-contained classrooms, and fail to realize the benefits of learning the general curriculum in age-appropriate, general education contexts (Kurth & Kozleski, 2014; Ryndak et al., 2014).

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Instruction in self-contained classes is characterized by limited access to general curriculum content, lack of structure and schedule, and a lack of well-conceived approaches to deal with behavior challenges (Causton-Theoharis, Theoharis, Orsati, & Cosier, 2011). In a study of literacy experiences of students with significant disabilities in self-contained classes, findings indicated that the instruction more closely resembled an ad-hoc set of activities rather than a cohesive curriculum with a scope and sequence (Ruppar, 2013). Research suggests that general education settings have a positive impact on students with disabilities’ use of literacy skills, independent living, social and emotional skills, community living, leisure activities, and employment in comparison to students who remain in self-contained classes (Ryndak, Ward, Alper, Montgomery, & Stroch, 2010). In general education classes, students with significant disabilities have greater opportunities to engage with goal-oriented, specific curriculum content, age appropriate materials, and general education content (Matzen, Ryndak, & Nakao, 2010). Access to general education content is associated

with increased instructional time and less problem behavior for students with disabilities when compared with other types of curricular content (Lee, Wehmeyer, Soukup, & Palmer, 2010). Wehmeyer, Lattin, Lapp-Rincker, and Agran (2003) found that students with intellectual disability were more likely to work on tasks related to a standard and have adaptations to access the general curriculum in inclusive settings, whereas students were working on tasks that were not linked to a standard and below grade level in self-contained settings.

Even though general education contexts are more likely to yield positive student academic and behavioral outcomes, instruction in general education classrooms for students with significant disabilities is not easy due to students' extensive needs. Curriculum modifications are necessary to help students benefit from general education content. Lee et al. (2010) found that curriculum modifications were a significant predictor of increased student engagement and decreased undesired behavior. With modifications to curriculum, students with significant disabilities can access meaningful literacy instruction in general education classes. However, limited research has been conducted on the effectiveness of specific modifications and instructional strategies in literacy instruction for students with significant disabilities.

Despite the evidence that students with significant disabilities benefit from learning in general education contexts with curricular modifications, intervention research focused on the access to the general curriculum for students with significant disabilities has rarely been implemented within those settings. Hudson and Browder (2014) found only 17 articles focused on access to general education content in general education contexts between 1975 and 2012; among those articles, the authors concluded that embedded instruction with constant time delay is an evidence-based practice for teaching students with significant disabilities in general education classes. This literature is limited in its scope, however, especially in relationship to literacy. Only seven of the identified studies targeted literacy skills, and four of the literacy studies focused only on sight word identification. The limited applied research on literacy

in general education contexts translates to limited information for teachers about how general education content can be taught to students with significant disabilities in general education contexts.

### *Embedded Instruction*

Embedded instruction is one strategy that can be used to provide targeted instruction for students with significant disabilities in general education classes (McDonnell, 1998), and has been identified as an evidence-based practice for providing access to general education content in general education contexts (Hudson & Browder, 2014). In embedded instruction, teachers use systematic instruction within the ongoing routines of the general education setting. Trials are distributed across activities that typically occur in natural performance settings. Studies have shown that embedded instruction is effective to teach both academic and developmental skills to students with significant disabilities in general education settings. For example, McDonnell, Johnson, Polychronis, and Riesen (2002) used embedded instruction to teach four students with developmental disabilities to read or define words provided on vocabulary lists of three high school general education content. In another study, Johnson, McDonnell, Holzwarth, and Hunter (2004) implemented embedded instruction in an inclusive elementary classroom for three students with developmental disabilities. Together, these findings illustrate that embedded instruction can be successful in promoting acquisition and maintenance of academic and developmental skills of students with significant disabilities in general education classes. While these findings are promising, one limitation of the embedded instruction research is that instruction was typically provided during breaks and transitions between classroom activities. Limited empirical evidence is available for strategies that can be used during class instructional time, which would allow students with significant disabilities to access general education content at the same time as their peers and promote greater membership and participation in general education classes.

### *Shared Reading*

Shared reading, a strategy to improve literacy, has a growing base of evidence supporting its use to improve the comprehension and engagement skills of students with significant disabilities. In shared reading, proficient readers such as teachers and peers read aloud and provide support for students with significant disabilities to engage with text (Hudson & Test, 2011). Text is adapted and augmented using a variety of strategies, such as embedded definitions of new or unfamiliar words, key words paired with picture symbols, summarized text, enlarged title of the book and the name of the author, laminated pages to make the books sturdy, repeated lines, tactile representations of nouns embedded throughout the story, and enhanced the sensory distinctiveness of the stimuli (e.g., soft cloth, textured surfaces, distinct smell like an orange) (Browder, Trela, & Jimenez, 2007; Mims, Browder, Baker, Lee, & Spooner, 2009; Spooner, Rivera, Browder, Baker, & Salas, 2009). The instructional procedures are guided by a task analysis for the student and teacher, and the use of systematic instructional procedures such as the system of least prompts (Browder et al., 2007; Mims et al., 2009; Spooner et al., 2009). Books have been adapted from the general education curriculum (Browder et al., 2007) or popular picture books (Mims et al., 2009; Spooner et al., 2009). Two studies of shared reading have been conducted in elementary general education classes, both using peer tutors to provide instruction. These studies demonstrate the effectiveness of the procedures within general education classes at the elementary level (Hudson & Browder, 2014; Hudson, Browder, & Jimenez, 2014). To date, shared reading has not been implemented in general education high school settings.

The purpose of this study was to examine the effectiveness and ecological validity of an embedded shared reading intervention in a high school general English/language arts (ELA) class for a student with multiple disabilities. Specifically, we investigated the effectiveness of shared reading instruction on the student's (a) literacy engagement, (b) vocabulary, and (c) listening comprehension skills. We also report features of the instructional

context of the class to begin to establish guidance for how a shared reading intervention might be integrated into general education class routines. The research questions that guided this study were:

- 1) What is the effect of a shared reading intervention embedded in an inclusive high school ELA class on the literacy engagement, vocabulary, and listening comprehension of a student with multiple disabilities?
- 2) What contextual factors support or inhibit the success of the shared reading intervention in an inclusive high school ELA class?

The current study builds on the established evidence base for the use of shared reading with elementary and middle school students (e.g., Browder et al., 2007; Browder, Lee, & Mims, 2011; Mims et al., 2009; Mims, Hudson, & Browder, 2012; Mims, Lee, Browder, Zakas, & Flynn, 2012; Spooner, Knight, Browder, & Smith, 2011), as well as the established evidence-based practices of embedded instruction and constant time delay in general education contexts. We extend the application of these strategies for use in an inclusive high school class.

### **Method**

#### *Participant*

The participant in this study was Caitlyn, a 16-year-old student enrolled in a general education ninth grade ELA class. Caitlyn qualified for special education under the categories of Other Health Impairment and Speech/Language Impairment; she also had bilateral hearing loss. Caitlyn wore hearing aids in both ears and used a personal FM assistive listening device, which she wore around her neck and gave to communication partners. Her expressive communication consisted of signs and gestures, many of which were idiosyncratic or modified due to fine motor challenges. She received academic modifications and support services (i.e., speech and language, physical therapy, occupational therapy) to maximize participation in school and meet her educational goals. While formal literacy assessment data were not available, Caitlyn was consid-



ered to be a beginning reader. She was able to recognize single words after multiple exposures. According to her teachers, Caitlyn was able to answer “what” questions with 80% accuracy and was working on expanding her academic vocabulary.

Prior to the study, Caitlyn participated in her ELA class with support from a special education teacher, who co-taught the class with a general education ELA teacher. She had been given a binder by her case manager (another special education teacher who was not an instructor in her ELA class) in which she practiced writing one Dolch sight word each week. At the end of the week, she was asked to write the word from memory given the prompt, “What was the word this week?” This material was not related to the ELA curriculum available to her classmates.

#### *Classroom and Curriculum Context*

The present study emerged from a collaborative relationship between the first author and the special education staff at Caitlyn’s high school. The special education teachers and administrators at the school initiated the relationship in order to improve literacy programming for the students with significant disabilities. Caitlyn was enrolled in the ELA class at her parents’ request; other students with similar disabilities at the high school were enrolled in a special education course called Foundations of Reading, which did not include students without disabilities and did not follow the general curriculum.

Twenty-nine students were enrolled in the ELA class; eight had Individualized Education Programs (IEPs). The class was co-taught by two teachers, a general education English teacher and a special education teacher. As is typical in high school ELA classes, the students in the class read literature in a variety of genres over the course of the school year. A typical class session included multiple opportunities and means for students to engage with text. Partner reading, large-group reading, audio books, videos, writing, sharing, and individual reading and work time were incorporated into the class structure, and students were provided with flexible means to express their knowledge (e.g., oral presentation, writing, use of technology). Lessons consisted of

journal writing, reading the text out loud or in small groups, class discussions about the text, completing accompanying study guides, and creating projects related to the major themes and concepts of the text. Students with IEPs used modified versions of the text, guided notes, movie clips, and question prompts to use during discussions.

The general and special education teachers rotated among students and presented to the whole group individually and cooperatively. The teachers loosely structured discussions in order to foster a sense of independence and community within the classroom, with a focus on validating students’ opinions. Outside of class time, the two teachers co-planned lessons, with the ELA teacher taking responsibility for the content and the special education teacher taking responsibility for the curricular adaptations and modifications. As the teachers’ relationship grew, each learned from the other and they began to contribute more equally to the content, instruction, and student support planning.

The scope and sequence of the ELA curriculum was focused on reading, writing, speaking, and listening skills and emphasized seven enduring understandings: critical thinking, community, empowerment, social justice, responsibility, appreciation of literature, and fostering a love of reading. Across the year, students read a variety of literature including a graphic novel, dramatic literature including Shakespeare, historical fiction, non-fiction, short stories, and poetry. Discussion skills were emphasized through small and large-group discussions which required students to take multiple perspectives, make logical inferences, and create intellectual connections between their own lives and communities to literature and to other content areas. Speaking skills were addressed through public speaking. Students addressed writing standards through an expository writing assignment, journaling, and partner writing.

All sessions were conducted during the ELA class. The interventionists were the special education teacher and a student teacher in her last semester of a Master’s program in special education. The special education teacher had an established relationship with Caitlyn and worked closely with her during the ELA class. The interventionists met with the research

TABLE 1

Steps in Task Analysis

	<i>Step</i>	<i>sD</i>
<b>Engagement</b>	1. Take out book	“Get out your book.”
	2. Point to title	“Point to the title.”
	3. Point to author’s name	“Point to the author.”
	4. Open book	“Let’s read.”
<b>Vocabulary</b>	5. Sign <i>trip</i>	This word is <i>trip</i> . Sign trip.
	6. Sign <i>brave</i>	This word is <i>brave</i> . Sign brave.
	7. Sign <i>hero</i>	This word is <i>hero</i> . Sign hero.
	8. Identify “hero” in print	“What word is this? You sign.”
<b>Comprehension</b>	9. Answer <i>who</i> question	Asks question when provided in text, and provides 3 choices. “Who _____?”
	10. Answer <i>what</i> question	Asks question when provided in text, and provides 3 choices. “What _____?”
	11. Answer <i>how</i> question	Asks question when provided in text, and provides 3 choices. “How _____?”
	12. Complete sequencing task	Provides three different pictures. “Which one first?” “Which one next?” “Which one last?”

team to determine the steps to be included in the shared reading task analysis. The intervention procedures were also discussed with the ELA teacher and the student’s case manager.

**Materials**

At the time of the intervention, the class was studying *The Odyssey*. Thus, the teachers and research team worked collaboratively to adapt *The Odyssey* so that it was accessible for Caitlyn. The team followed a process for adapting the text for complexity while maintaining the genre and author’s tone (see Apitz, Roessler, Ruppert, & Pickett, manuscript submitted for publication). The adapted book included a title page with a picture of the actual book, accompanied by an enlarged title and author’s name. The book was broken down into chapters based on Odysseus’ many journeys. Each journey was numbered and titled and included a list of characters associated with that journey. The pages at the beginning of the book showed pictures of the key characters and each of the three targeted vocabulary words (i.e., trip, brave, hero) along with a line drawing of the American Sign Language sign for each word. Each page of the text featured photographs captured from a movie version of the book along with the adapted version of

the text. There were approximately two to three sentences of text per page. The three targeted vocabulary words were integrated throughout the text and bolded. Comprehension questions appeared at the end of the book.

*Content Validity*

The ELA teacher reviewed the adapted version of *The Odyssey* to ensure that the key events and themes of the novel that would be emphasized in class were covered. The ELA teacher approved the text and provided no recommendations for improvement.

*Independent Variable*

A task analysis was created to target engagement, vocabulary, and comprehension of the modified version of *The Odyssey* (see Table 1). The task analysis consisted of 12 different steps, with four steps targeting engagement, vocabulary, and listening comprehension skills respectively. For each step of the task analysis, the teacher provided a cue, which served as the discriminative stimulus (e.g., “Point to the title”). If the student did not respond after a four to seven second response interval, the teacher delivered the controlling

prompt, which varied for each step. At times, the student was distracted or could not hear the teacher's cue due to her hearing loss; the interventionist was permitted to repeat the cue after gaining the student's attention by tapping her on the shoulder or providing a prompt to look at the book.

#### *Dependent Variable and Data Collection*

The dependent variable was Caitlyn's unprompted correct responses to the teacher's cues while reading the adapted version of *The Odyssey*. A correct response was defined as an independent response to the teacher's cue (i.e., discriminative stimulus) within the response interval; incorrect responses were recorded if Caitlyn made no response during the response interval and required the controlling prompt. Throughout the session, the interventionist recorded correct and incorrect responses for each targeted step of the task analysis. Thus, when Caitlyn met criterion for the vocabulary responses, the interventionist began providing the controlling prompt after the response interval for the engagement responses and continued to cue the vocabulary responses. Similarly, when comprehension was introduced the interventionist continued to implement the entire task analysis, including cues for the vocabulary and engagement responses.

#### *Experimental Design*

The current study is a systematic replication (Gast & Ledford, 2014) of a study by Spooner et al. (2009), which was an examination of culturally relevant shared reading conducted in a special education classroom. Following the procedures of Spooner et al. (2009), a multiple probe across conditions design was used based on a task analysis. The three conditions represented three different sets of literacy skills: Vocabulary, engagement, and comprehension. A systematic replication "demonstrates that the finding ... can be observed under conditions different from those prevailing in the original experiment" (Sidman, 1960, quoted in Gast & Ledford, 2014, p. 115). In the current study, we borrow Spooner et al.'s (2009) design and apply it in a high school general education context, referencing

the contextually appropriate general education content (i.e., *The Odyssey*).

#### *Ecological Validity*

To examine the ecological validity of the shared reading intervention in a ninth grade general education ELA class, the interventionists recorded field notes about the activities of the class each day. Specifically, the interventionists were asked to record any information pertinent to the success of the intervention or challenges related to implementing the intervention, a general overview of the class activities, and general notes regarding Caitlyn's participation.

#### *Procedure*

*Baseline.* In baseline, the student and the teacher read the modified text and the teacher provided a cue for each step in the task analysis, but no controlling prompt was given to teach the student the correct response. The interventionist did not model signs for the key vocabulary words.

*Training.* The first author trained the interventionists (i.e., special education teacher and student teacher) to implement the procedures, which were typical systematic instructional procedures that they used in their work as teachers. The first author coached the teachers to ensure correct use the procedures prior to the intervention. During the coaching, the first author modeled the instructional procedures and gave feedback to the interventionists as they practiced using the procedures in simulations.

The sessions were conducted during natural opportunities in the ELA class, usually when the students were directed to work independently. No instruction occurred outside of the ELA class. To begin the intervention, the interventionist delivered the first cue (i.e., "take out your book") and completed the task analysis quietly with the student at her desk. Each session lasted approximately 20 minutes total; sometimes, breaks were needed to accommodate Caitlyn's attention span or a change in class activity.

*Intervention.* The 12 skills in the task analysis addressed vocabulary, engagement, and comprehension. The task analysis was con-

**TABLE 2.**

**Social Validity Items and Means**

<i>Questionnaire</i>	<i>Item</i>	<i>Mean</i>
Prior to the intervention	I think that learning these three new vocabulary words is an important goal for this student.	4.14
	I think that answering listening comprehension questions is an important goal for this student.	4.57
	I think that increasing engagement is an important goal for this student.	4.71
	I think that the shared reading strategy will help this student learn new vocabulary words.	4.43
	I think that the shared reading strategy will help this student answer who, what, and how questions.	4.29
	I think that the shared reading strategy will help the student increase her engagement in reading.	4.43
	I think that adapting grade-level text is an appropriate way to include this student in the grade-level curriculum.	4.86
After the intervention	Now that the study is over, I think that learning these new vocabulary words (i.e., <i>hero, brave, trip</i> ) was an important goal for this student/my child.	4.43
	Now that the study is over, I think that answering <i>who, what, and how</i> comprehension questions was an important goal for this student/my child.	4.29
	I think that the shared reading strategy helped my student/child learn new vocabulary words and answer comprehension questions.	4.43
	I would support the use of shared reading for this student in the future. I would use support the use of shared reading for this student in the future.	4.43
	I have observed the student demonstrating improved listening comprehension skills in other environments after participating in the shared reading intervention.	3.86
	I have observed the student using the vocabulary words in other environments after participating in the shared reading.	3.57
	Overall, this intervention met my expectations.	4.14

structured in a logical order; engagement skills such as retrieving the book and pointing to the title and author preceded vocabulary and comprehension skills (see Table 1). However, vocabulary was chosen as the first intervention condition because Caitlyn’s teachers reasoned that her ability to use the key vocabulary from the book would aid her overall participation in the class activities. In the second intervention condition, engagement skills were addressed, followed by comprehension in the third intervention condition. Each condition was introduced when Caitlyn responded correctly to at least three out of the four steps across three consecutive sessions. For each step in the task analysis, the interventionist used constant time delay (i.e., delivered the cue; waited four to seven seconds for a re-

sponse; provided praise if response was correct or controlling prompt if no response was given).

*Inter-Observer Agreement and Procedural Fidelity*

An additional member of the research team was present for 38% of all sessions in each condition to conduct inter-observer agreement and procedural fidelity observations. Inter-observer agreement was calculated by dividing the total number of agreements plus disagreements by the total number of agreements and multiplying the quotient by 100. Inter-observer agreement was calculated at 99.2% across all phases of the study. In the baseline, first, and third intervention conditions, inter-observer agreement was calculated

at 100%. In the second intervention condition, inter-observer agreement was calculated at 97.2% (range 91.6% to 100%).

The same observer simultaneously conducted procedural fidelity checks. A correct was marked if the interventionist delivered the appropriate cue and adhered to the constant time delay procedures. An error was marked if the interventionist provided an incorrect cue or provided additional prompts. Procedural fidelity was calculated by dividing the total number of steps by the total number of correct steps and multiplying the quotient by 100. Procedural fidelity was calculated at 93.7% for all steps across all phases of the study. In the baseline phase, procedural fidelity was calculated at 87.5% (range 66.7% to 100%). In the first, second, and third intervention phases, procedural fidelity was calculated at 100%.

### *Social Validity*

A web-based questionnaire was sent to seven consumers of the intervention (i.e., special education case manager, general education teacher, parents, administrators, other special education teachers and paraprofessionals with whom the student worked). The questionnaire was sent twice during the study: before the intervention and at the conclusion of the study. Social validity questions related to the goals, procedures, and outcomes of the intervention and were rated on a 5-point Likert-like scale. See Table 2 for social validity questionnaire items and means.

## **Results**

### *Experimental Results*

Figure 1 presents the number of correct responses during baseline and intervention conditions across the three sets of behaviors. Across the five sessions of baseline, Caitlyn demonstrated zero vocabulary steps independently; a median of 1 engagement steps independently ( $M = .28$ ); and a median of .5 comprehension steps independently ( $M = .16$ ). For the vocabulary steps, Caitlyn remained at zero correct responses for the first five sessions before the level of correct responses increased, with a median of 3 vocabulary steps correct after the effect was ob-

served ( $M = 2.9$ ). The initial low level of correct responses can be attributed to her need for repeated exposure to the cue and need for multiple teaching sessions (i.e., with the controlling prompt) before demonstrating the target behaviors. For the engagement tasks, the trend was slower and more variable; these steps (e.g., point to the author) might not have been as motivating for her to complete ( $Mdn = 2$ ;  $M = 2.31$ ). The comprehension steps reflected a similar slow trend and high variability ( $Mdn = 3$ ;  $M = 2.83$ ).

### *Ecological Validity*

The field notes revealed that the timing of the intervention within the classroom routines was different each day. Throughout the study, the interventionists worked within the class schedule and activities to find opportunities to provide the intervention. At times, the intervention overlapped with another, more engaging class activity such as a video. For example, the interventionists noted that “[Caitlyn’s] attention needed to be redirected often” (Field note, 4/7/15) when such activities were occurring. As the study progressed, the interventionists shifted their approach; rather than requiring or redirecting Caitlyn to pay attention the book instead of the video, they used videos in class as opportunities for Caitlyn to take breaks from the shared reading activity. Field notes revealed that independent work time and quizzes or other testing were the most common times that the intervention occurred as the study progressed. Thus, the interventionists became more adept at integrating the intervention into class activities over the course of the study, so that (a) the student would not become distracted; and (b) the student would not miss important class content.

Throughout the unit, Caitlyn had opportunities to experience *The Odyssey* in formats other than the adapted text. In addition to the aforementioned film clips, Caitlyn’s peers sometimes read with her during independent reading time. Her peers took an interest in learning the signs for the key vocabulary words, so Caitlyn had multiple exposures to natural communication partners signing the key vocabulary words beyond the intervention and within the classroom environment. These activities seemed to benefit the peers as well as Caitlyn. *The Odyssey* is difficult

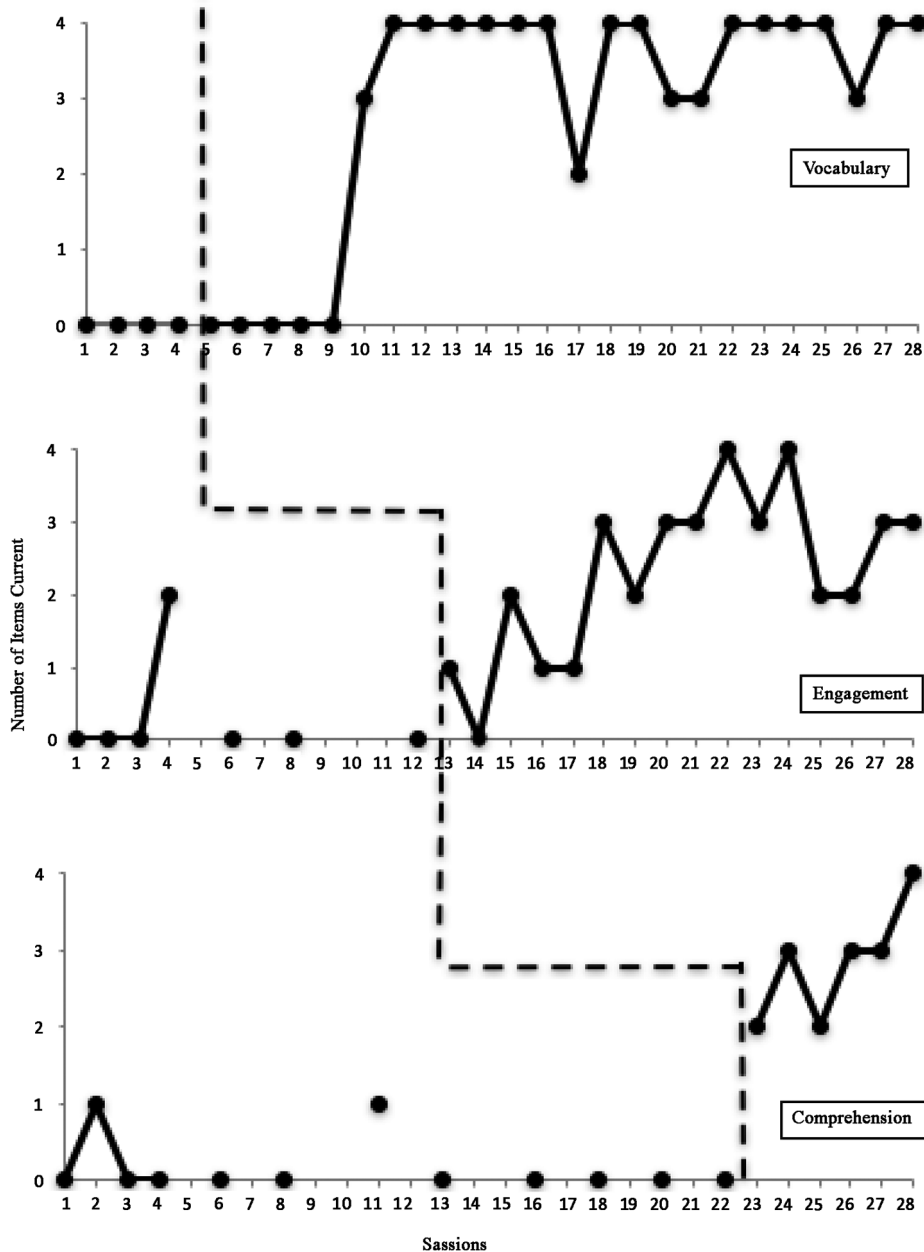


Figure 1. Number of correct responses across skill sets.

for many ninth-graders to read and understand; after reading with Caitlyn one day a student exclaimed, “Oh *that’s* what happened!” Caitlyn also read a graphic novel of *The Odyssey* during independent reading times, and heard audio versions of the text through classroom activities as well. Caitlyn therefore had exposure to the

content of *The Odyssey* in a variety of ways throughout the unit.

### Discussion

The current study provides preliminary evidence that shared reading, combined with

embedded instruction and constant time delay, can be effective for improving literacy skills among students with significant disabilities in general education classes. These three evidence-based strategies (i.e., shared reading, embedded instruction, and time delay) were combined to create a treatment package. The effects of this package were systematically examined with one student with multiple disabilities in a ninth-grade general education ELA class. Results of the study suggest that the shared reading intervention has potential for integration into high school general education ELA classes using embedded instruction and time delay.

Several key contextual factors might have contributed to Caitlyn's success with acquiring the targeted literacy skills. First, the teaching style of the two teachers in the ELA class was highly dynamic, incorporating the flexibility and multiple modalities that are central to a universal design for learning (UDL) approach. Caitlyn had opportunities to use the vocabulary with peers and experienced the content of the book in video, audio, and interactive spoken formats. Caitlyn had a special education teacher and student teacher to implement the intervention; in addition, many peers were interested in the procedures and enjoyed reading along with Caitlyn at non-intervention times. Integrating the intervention into the classroom routine proved difficult at times, and Caitlyn's slow progress led her to fall behind the rest of the class by the end of the study. Thus, the intervention has potential for increasing students' membership in the literate community of the classroom as well as enhancing literacy engagement, vocabulary, and listening comprehension skills, but challenges were faced in relation to the timing of the intervention within class activities.

The data trend and variability were inconsistent across the three intervention conditions. Comprehension, in particular, was marked by slow and variable progress. By the time Caitlyn reached the comprehension condition, her classmates had moved on to a different book. Caitlyn might have noticed that her activity was no longer reflective of the class' activities, and might have felt less motivated and more distracted during this phase of the study. Fatigue or boredom could also explain her slow progress during this phase.

Moreover, the story of *The Odyssey* is not linear and the events were difficult for most students in the class to follow. These factors might explain her slow progress toward the comprehension goal.

This study adds to the evidence base supporting the use of shared reading, embedded instruction, and time delay to advance vocabulary, engagement, and listening comprehension skills among students with significant disabilities (Hudson & Browder, 2014; Hudson & Test, 2011). As no previous studies have been conducted in high school general education settings, it was important to explore the ecological validity of the intervention in this context given that students are more likely to have access to general education content in general education settings, especially in relationship to literacy (Wehmeyer et al., 2003; Ruppard, Fisher, Olson, & Orlando, manuscript submitted for publication). Moreover, this study was the first to specifically explore the ecological validity of shared reading in a general education class. Ecological validity is defined as the extent to which an effect has been demonstrated to occur under conditions that are typical (Crano, Brewer, & Lac, 2015). Insofar as "typical" settings are age-appropriate general education classrooms with same-age peers, the results of this study suggest that the causal relation between the shared reading intervention and improved literacy outcomes can be observed in natural general education classroom contexts.

#### *Limitations and Implications for Research*

The limitations of this study suggest needs for future research in this area. The primary limitation of the present study was the limited number of participants. Nationally, few students with significant disabilities are included in general education classes, and the number of students included in high school classes is even smaller than in younger grades (Kurth & Mastergeorge, 2010; Kurth et al., 2014). The lack of potential participants who are already included in general education classes makes identifying sufficient participants difficult. Thus, few academic interventions for students with significant disabilities have been tested in general education settings, leading to a paucity validated practices for use in general ed-

ucation settings. This cycle perpetuates the low rates of inclusion in general education classes for students with significant disabilities because teachers have few research-based resources to draw on for interventions in inclusive settings.

An additional limitation of this and other shared reading studies is a lack of attention to generalization of literacy or language skills to other natural contexts. While many other shared reading studies have examined and observed generalization effects across materials, no study has examined generalization across environments. Grade-aligned academic skills are important to address because they ensure students with significant disabilities are held to high standards and are able to participate meaningfully in age-appropriate activities. However, literacy skills should also be chosen to address high-priority communication goals, as one of the primary benefits of teaching literacy is that it relates to the everyday use of language. A generalization component was not incorporated into the current study because we could only recruit one participant who was enrolled in a general education class, and time constraints limited us to one adapted text. To enhance generalization, skills should be selected using an ecological approach to ensure that sufficient opportunities for skill application are available in multiple, everyday, personally relevant environments (Hunt, McDonnell, & Crockett, 2012; Trela & Jimenez, 2013). Future research should examine ways to incorporate more natural uses of language into the shared reading intervention. Similarly, we did not collect maintenance data because the school year ended. Future studies should include a maintenance component.

To support the learning of students with significant disabilities in general education classes, additional studies should be conducted which focus on the efficacy of academic interventions for this population in general education settings. Teachers consistently report that they lack knowledge about evidence-based academic interventions that can be integrated into general education classrooms (Agran, Alper, & Wehmeyer, 2002; Ruppard, Dymond, & Gaffney, 2011). Future research should maintain a focus on validating interventions that support skill acquisi-

tion, increase participation, and enhance membership in school communities among students with significant disabilities (Billingsley, Gallucci, Peck, Schwartz, & Staub, 1996). Building on the findings of this study, research should be designed in ways that respond directly to the classroom context.

Finally, the evidence suggests that a more comprehensive planning process might be needed for shared reading to be successfully integrated into high school general education ELA classes. The teachers involved in the current study were highly motivated to implement the intervention; nevertheless, they faced logistical issues that other teachers and educational teams might be seen as barriers. A research-based planning process is needed that clearly identifies how the target student will participate in class activities, be supported by teachers and peers, and increase literacy skills, so that barriers to implementation are minimized. Further, the field notes collected were brief. Future research should report rich qualitative data, including field notes, interviews, and document review, and data should be analyzed using formal methods to further examine the facilitators and barriers to implementing shared reading in general education contexts.

## Conclusion

While federal legislation has required evidence-based practices for students with disabilities for nearly 15 years, and instruction in the least restrictive environment has been required for nearly 40 years, the process of combining these two legal mandates in practice has been difficult for many teachers. One contributing factor has been the lack of ecologically valid research to guide teachers in general education contexts. The current study provides preliminary evidence that shared reading, combined with embedded instruction and constant time delay, can be an effective strategy for supporting involvement and progress in the general curriculum for students with significant disabilities. However, much more needs to be done. Research has consistently supported that students with significant disabilities can learn academic skills. To continue to promote lifelong inclusion and meaningful educational experiences for



students with significant disabilities, intervention research focused on general education content must simultaneously focus on practical applications of evidence-based practices within general education contexts.

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## Utilizing Primary Tier Intervention to Enhance Reciprocal Turn-Taking of Children with Autism in Taiwan

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*Abstract:* This study investigated the effects of a primary tier video modeling intervention combining with a primary tier parent education model on parent-child interactions of children with autism during a picture-book activity in Taiwan. A multiple baseline design across participants was used. Four parents and their child with autism participated at their respective homes. Four additional typically developing parent-child dyads were also recruited as the normative comparison. After the intervention, the number of turn-taking instances increased and the number of instances of child-refusal behavior decreased without direct intervention. Three of the four dyads with a child with autism improved following the intervention and maintained their turn-taking skill within the established normative ranges. However, greater variability was found in the changes in parental behavior patterns. This low-resource, low-support intervention may provide an effective universal support tool for families. Suggestions for future research and the 3-tier video modeling intervention model are discussed.

Many studies have applied video modeling (VM), an evidence-based practice, to learners diagnosed with autism spectrum disorders (ASD). VM is a tool that uses video images to demonstrate to learners a desired skill for imitation and practice. A significant body of research evidence now supports the effectiveness of VM applications across a wide range of ages and target skills using a variety of video models, video lengths, and video component packages. The extensive body of both meta-

analyses (Bellini & Akullian, 2007; Mason et al., 2013; Mason, Davis, Boles, & Goodwyn, 2013; Mason, Ganz, Parker, Burke, & Camargo, 2012) and systematic literature reviews (Ayres & Langone, 2007; Delano, 2007; Hitchcock, Dowrick, & Prater, 2003; McCoy & Hermansen, 2007; Mechling & Moser, 2010; Rayner, Denholm, & Sigafos, 2009; Shukla-Mehta, Miller, & Callahan, 2010; Wang & Koyama, 2014) provide an integrated and readily accessible knowledge base that may be used to promote the VM strategy beyond the limits of current evidence-based practice. Specifically, a conceptual 3-tier VM intervention model framework offers one potential approach to further improve VM. It has been previously estimated that 80%, 15%, and 5% of learners may respond to interventions at the primary tier, secondary tier, and tertiary tier, respectively (Sugai & Horner, 2010). This “no-learner-left-behind” model ensures that no one is relegated to a treatment waiting list and that everyone is actively participating in and responding to interventions that are designed to enrich quality of life. Because different VM formats use different delivery types (e.g., self-administered vs. personnel-administered; individual vs. group instruction) and require different levels of resources and support (e.g., numbers of personnel required;

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the amount of skill, money, and time required; generic or individualized instruction), the 3-tiers may comprise a macro-to-micro perspective from prevention to treatment, from universal support to individual support, and from general learners to learners with special needs. Thus, Wang and Koyama (2014) drafted the 3-tier VM intervention model as follows: (A) primary tier: self-administered generic VM for all learners responding to interventions, which requires the least amount of resources and support; (B) secondary tier: group-based instruction for learners responding to interventions, which requires a moderate amount of resources and support; and (C) tertiary tier: individually administered individualized VM for learners responding to interventions, which requires the most amount of resources and support. Both individualized and generic VM are necessary to address adequately the spectrum of characteristics that typify learners with ASD and they differ in the following ways: level of familiarity with the video model, setting, and materials (high vs. low); made for one vs. made for all; developed for specific individuals vs. developed for general learners; intervention procedure resource and support requirements (high vs. low).

Wang and Koyama (2014) assessed the respective scopes of the tertiary tier and the primary tier of the 3-tier VM intervention model in their review of empirical studies that used VM as the primary intervention on learners with ASD. More than three-fourths of the studies that they reviewed supported the tertiary tier of the 3-tier VM intervention model and focused on the effectiveness of the individualized VM developed for learners with ASD. By contrast, primary tier video modeling studies were published less than 2%. Current evidence is limited regarding the effectiveness both of the primary tier of the 3-tier VM intervention model and of early childhood 3-tier parent education model (McIntyre & Phaneuf, 2008). This study investigates the effectiveness of a low-resource, low-support primary tier VM and primary tier parent education in enhancing the parent-child interaction skills of four families who have a child with ASD in Taiwan. The video intervention used in this study was the primary and the only instruction provided to parent and child

participants and was designed for self-administration with applicability to the needs of all learners. This study attempts to answer the following research questions: (A) Is the parent-administered primary tier VM an effective tool for: (a) increasing the number of turn-taking interactions; (b) increasing parent support skills such as waiting and extension; and, (c) decreasing child refusal behavior? (B) Does this study support the validity of the primary tier of the 3-tier VM intervention model? (C) What is the social validity of this VM intervention?

## Method

### *Participants and Settings*

Four typical developing parent-child dyads (the “TD dyads”) and four dyads of children with ASD and their parents (the “ASD dyads”) were recruited. All the TD and ASD dyads asked to be assessed at a consistent location in their homes.

*The TD dyads.* Four convenience TD dyads were recruited in northern Taiwan for developing the primary tier VM video, for additional demonstration of experimental control, and for normative comparison. The only inclusion criterion was: age of child between 2 and 4 years. The convenience TD dyad sample included two female and two male children together with two mother and two father models. The age of the parents ranged between 33 and 53 years old. The education level of the parents ranged from high school to graduate school.

*The ASD dyads.* Four children with ASD and one parent of each participated in this study in northern Taiwan. The ASD dyads included one female child, three male children, two mothers, and two fathers. The inclusion criteria for participant children included: (A) aged 2 to 4 years old; (B) diagnosis of ASD verified by the identification center at a hospital or through the identification committee in the educational system; (C) ability to imitate simple gross motor movements such as touching the head and clapping hands (this inclusion criterion follows Charlop-Christy, Le, & Freeman [2000] and Shipley-Benamou, Lutzker, & Taubman [2002]), and (D) ability to watch any video for > 5

minutes (this inclusion criterion follows Charlop-Christy et al. [2000]; Nikopoulos & Keenan [2003]). Children with multiple disabilities or with an unspecified developmental disability were excluded from this study. Inclusion criteria for participant parents included: (A) at least 18 years old; (B) a reported need in improving parent-child interaction; (C) willing to spend time with child watching the VM video (8 minutes) and practice picture-book reading (5 minutes) for a total of at least 13 minutes everyday; (D) born and raised in Taiwan; and (E) adequate social-communication skills. Only one parent per dyad was required. Participants were recruited through autism associations and word of mouth in the Taipei area.

All participating children with ASD attended either public preschool or a developmental center program and were currently receiving services related to their disability such as speech and language pathology and occupational therapy. None of the participants had previously participated in a video-modeling intervention or in a parent-child interaction-training program. Both participating mothers were primary stay-at-home caregivers. Both participating fathers were primary financial providers. All parents had either a high school or university education.

*ZY + Father dyad.* ZY is 4-year-2-month old. He has a younger brother, has some echolalia, and is able to use simple functional verbal phrases such as “Good morning, teacher”, “go shopping”, and “drink soda.” ZY is able to label more things in English than in Mandarin. He often uses non-verbal communication behaviors such as dragging and pushing away. ZY exhibits a preference for reading (especially in English) and for performing daily activities on his own.

*BY + Mother dyad.* BY is 3-year-2-month old. He has an older sister. His language level and social and communication patterns are similar to those of ZY. However, he is able to stay engaged in a single activity longer than ZY upon request, cries more frequent than ZY, and does not demonstrate a special aptitude/interest in English. BY enjoys interacting with his sister.

*LI + Father dyad.* LI is 2-year-6-month old. She is the only child. Prior to this study, her language level had been reassessed as similar

to that of her same-age peers. LI is generally emotionally stable and displayed some social initiations with the researcher. LI has routine reading experiences with her mother, the primary caregiver, but not with the participating father. LI’s father expressed his self-perceived incompetency in interacting with LI. LI’s mother is originally from Vietnam and has adequate Mandarin language skills.

*CH + Mother dyad.* CH is 4-year-1-month old. He is the only child. He does not have functional language, but make verbal attempts and imitates sounds. CH rarely interacted with others. His mother correctly and fluently used food as immediate reinforcer during CH’s participation in activities.

#### *Involved Resources and Support*

The research team provided the primary tier VM video, video player, monitor (or equivalent display medium such as a laptop), timer, and various picture books for use in this study.

*The primary tier VM video.* The primary tier VM video is developed primary for overall learners with ASD and all other users for self-implementation, so that it must be generally accessible and easy to use. The generic VM for the primary tier intervention was produced after the recruitment of the TD dyads and prior to the recruitment of the ASD dyads to ensure that this video would be applicable not only across the different learning dyads address in this study but also potentially for general learners with ASD. The generality is also ensured by using unspecified model(s) in various unacquainted home settings. However, the learner’s familiarity with model characteristics, settings, and materials were maximized to a certain extent in terms of common language, common ethnicity, similar arrangements of regional facilities, and common toys. No further instruction, prompts, or feedback were provided in line with the lowest resource/lowest support premise.

During the video-development process, the researcher also obtained VM video content validity by consulting experts on autism and media production. The video segments were first selected and then edited using POWER DIRECTOR 7.0 software. The selection principles that guided the development of this video were cultural relevancy, natural trajec-

tory, and parent-child interaction literature. Specifically, selected video segments included: (A) commonly seen parent-child interaction characteristics such as verbal behaviors, non-verbal behaviors, turn-taking, initiation, responding, activity engagement, positive mood, and eye contact; (B) other quality indicators of parent support skills cited in the parent-child interaction literature such as parent waiting and extension behaviors (e.g., Elder, Valcante, Yarandi, White, & Elder, 2005; Gillette & MacDonald, 1989; Kaiser, Hancock, & Nietfeld, 2000); and (C) other parent-child interaction commonalities observed across all the four modeling dyads such as parents' tendencies to "quiz" their child after naming a picture, to adjust the posture of their child to adhere to perceived social norms, and to ask that their child repeat his/her responses more loudly. The selected video segments were then edited based on relevant VM literature references (Wang & Koyama, 2014), including: (A) use of child models of similar age and ethnicity to demonstrate the target skill(s); (B) provision of social reinforcements to the child model, e.g., praise, either from the parent model or the narrator after demonstrating target skill(s); (C) the entire sequence was shown twice; (D) the 4 model dyads were used with alternation as multiple exemplars to promote generalization; (E) narration with subtitles; and (F) the use of a natural pace in order to convey an unscripted and natural situation.

#### *Design and Procedure*

The primary tier VM provides a clear definition of intervention in practice and of the type of delivery used. After obtaining a ready-to-use generic VM, the user (parent or teacher) self-implements the video for or with the learner (their child or student). The user and learner then practice the target skill together, which is the parent-child interaction skill addressed in this study. When appropriate, the learner may learn and practice on his/her own.

For the research matter, the researcher visited each family to explain the study purpose, to confirm participant eligibility, and to obtain informed consent. The participants were assured of anonymity and told that they could withdraw from the study at any time for any reason (Institutional Review Board approval

was not required at the time of study in Taiwan). The research assistant then started the study and visited the participating dyads two to three times per week for one to two weeks for TD dyads and for three to four months for ASD dyads. All data-collection assessment sessions were video-recorded and later analyzed with respect to the dependent measures (please refer to *Dependent variables and measures*).

*The TD dyads.* The data of the TD dyads was collected prior to the ASD dyads in the same manner as described in *Baseline phase*. Each TD dyad was measured for five sessions on five different days.

*The ASD dyads.* A multiple baseline design across four ASD dyads was used. This design had three phases: baseline, intervention, and follow-up. Observation probes and a shorter length of the baseline were used to minimize the frequency of home visits due to the limited availability of the research assistant and the families and to respect to family privacy based on cultural consideration in Taiwan. Repeated measurement across phases for each participating dyad served as an experimental control on its own as well as for others. Several generalization probes across person and across activity were used.

*Baseline phase.* The parents were asked to read a picture book(s) with the child as if no one else was present in the room for at least 5 minutes. The baseline phase consisted of at least three data points and continued until the data had not reached the highest point, after which the intervention phase began.

*Intervention phase.* The intervention phase of each participant was introduced in a staggered manner when the previous participant had two consecutive data points that were non-overlapping with and higher than the baseline. In the first session of the intervention, the researcher explained to each parent participant the following self-administered protocol procedure: Watch the same 8-minute video, practice book reading until the 5-minute-timer alarm goes off, and make a new entry in the parent intervention log every day. There were practice sessions and assessment sessions. The research assistant paid home visits for assessment purposes only, giving no other prompts, instructions, reinforcement, or feedback. The child and parent were re-

quired to stay in front of the video display for the full 8 minutes while the video was in play. The remaining book-reading procedures were the same as those for the baseline. The parent intervention logs were used as a measure of procedural reliability (please refer to *Reliability*). The intervention phase continued until at least 3 data points were non-overlapping with and higher than the baseline.

*Follow-up phase.* To assess whether the parent and child retained the ability to take turns while reading picture books, two follow-up probes were conducted approximately one week and one month, respectively, after the conclusion of the intervention. Follow-up probes were collected in the same manner as that used during baseline. Participants did not watch the video prior to the application of the probes.

*Generalization probes.* Several generalization probes were conducted throughout the study in order to assess whether the child had generalized the learned skill to the other non-participating parent or to a sibling and whether the child had generalized the learned skill to another parent-child interaction activity such as playing puzzles and music instrument. No generalization probes across person were conducted on the CH dyad due to the lack of additional family member availability and the technical loss of video data for the generalization probes across activity for the LI dyad.

### *Measurement*

*Dependent variables and measures.* Two types of dependent measures were used to measure, respectively, the parent-child interaction skill and social validity.

The data-collection system contained event recording in a 5-minute session. Four dependent variables of the parent-child interaction skill were examined across three categories: (A) the number of turn-taking instances (#T); (B) parent support skills, i.e., the number of instances spent waiting for  $\geq 3$  seconds (#W) and extension of the child's interaction (#E); and (C) the number of instances of a child's refusal behavior (#R). The turn-taking was the primary dependent variable, which determined the phase change of the ASD dyads. Table 1 shows the operational definitions and examples of the four variables. Additionally,

the researchers included an additional parental-support-skills "self-check" list that included items such as "waiting" and "extension" for use in evaluating the self-behavior awareness of parents. Parents checked whether they waited and extended or not in every assessment session.

In terms of social validity, the second dependent measure used in this study, the researchers addressed the seven categories of social validity suggested by Reichow, Volkmar, and Cicchetti (2008), which were designed to assess magnitude of clinical behavior change, consumer satisfaction with outcome results, and the cost-and-time-effectiveness of procedures and compare persons with and persons without disability. To evaluate consumer satisfaction, this study distributed anonymous questionnaires to the participating parents one week post-intervention (during the first follow-up probe session) and collected completed questionnaires one month post-intervention (during the second follow-up probe session). Anonymity was assured by collecting sealed questionnaires in identical envelopes from families and leaving them unopened for a period of time following collection. The parent questionnaire consisted of eight questions regarding intervention procedure and outcome that were self-scored on a Likert scale of 1-5 (strongly disagree, disagree, neutral, agree, and strongly agree) and five open-ended questions regarding the general experience of receiving parent training (e.g., sample question 1: I think the VM intervention procedure is easy; sample question 2: I think this VM intervention has improved my child's parent-child interaction skills; sample question 3: If you have previously had other parent training, please describe the differences between the previous training and the current training).

### *Reliability*

Two types of reliability were evaluated: inter-observer agreement and procedural reliability. The inter-observer agreement measurement was based on a sample of at least 25% of all sessions of each TD dyad and samples of at least 25% of all baseline assessment sessions and intervention assessment sessions for each ASD dyad. Two independent research assistants conducted these measurements, with

**TABLE 1**

**Definitions of Dependent Variables**

<i>Dependent variables</i>	<i>Definitions</i>
Turn-taking interaction (#T)	A pair of one initiation, either verbal or non-verbal interaction, and one response, either verbal or non-verbal interaction, comprised a turn-taking instance. For example, the parent pointed at a picture and said “car” (non-verbal and verbal) and then the child touched the same picture (non-verbal). This was a turn. Only positive turns and those relevant to the book reading were considered.
Child refusal (#R)	A “child refusal” was counted when any disruptive or inappropriate behaviors of the child in the context of book reading or in preparing for book reading (e.g., walking away from the book, whining, throwing a tantrum) were observed. For example, if the parent handed the child a book and the child threw the book, a refusal was coded. Appropriate refusal behaviors, such as saying, “All done with books,” were not counted as “R.” Refusal behaviors were not counted as interaction turns.
Parent waiting (#W)	One parent waiting behavior was counted when the duration of parent waiting time between the discriminative stimuli (SD)—i.e., the book being presented; new book page turned; or a parent initiation or response interaction conducted—and the response of the child exceeded at least 3 seconds. For example, (a) after the book was presented or a page was turned, the parent waited for 3 seconds before initiating an interaction if the child did not do so first; (b) after the parent initiated or responded to the child’s interaction, the parent waited for 3 seconds for the child to respond. Both the parent and the child had to be observed as engaged in the context to receive a count.
Parent extension (#E)	In response to the child’s verbal or non-verbal interactions, the parent included the child’s original verbalization or non-verbalization and added more words to model or to extend the child’s words. For example, the child pointed at the picture of the car, and the parent said, “That’s a car.” Or the child pronounced [che], and the parent pointed to the picture of the car and said, [che-zi] (“car” in Mandarin).

one of the two blinded to session status (i.e., baseline vs. intervention). Both assistants were trained to code the four dependent variables based on the operational definitions and achieved 90% inter-observer agreement on coding. The formula used was  $\frac{\text{agreed marks}}{\text{total marks (agreed and disagreed)}} \times 100\%$ . The average inter-observer agreement across dependent measures was 94% (range 82-100%) across ASD dyads and 94% (range 83-100%) across TD dyads.

The procedural reliability, aka treatment integrity or fidelity, of the parents in the ASD dyads was assessed using their parent intervention logs. The procedural reliability of the research assistant was assessed during random visits made by the researcher. The intervention logs tracked how often during the week each ASD dyad watched the model video and read together and ensured that mandated procedures were followed. All four ASD dyads

had reached a reliability range of 78-100% for watching the VM video and then practicing for 5 minutes every day as instructed. This range is considered high compared to those of other parent-training studies (Patterson, Smith, & Mirenda, 2011). Reasons related by parents for not being able to practice every day included external obligations, illness of the child, and the child watching the video but refusing to practice book reading. The research assistant followed all of the procedures required by the researcher.

**Results**

*Children with ASD and Their Parent-Child Interaction Skill*

*Main effect.* The visual analysis from Figure 1, the descriptive analysis from Table 2, anecdotal observation and other evaluation



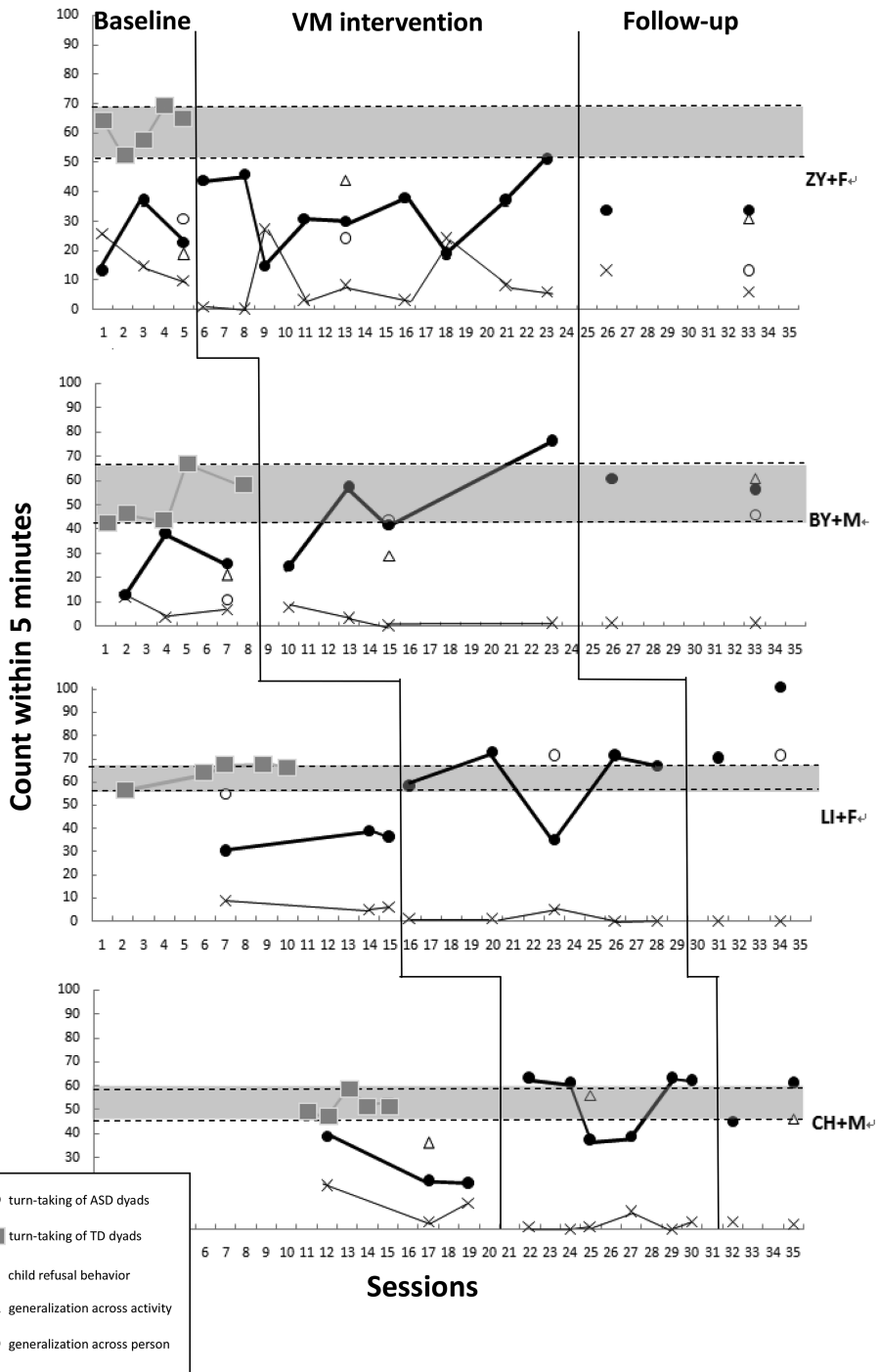


Figure 1. Primary tier parent-administered generic VM had a moderate effect and at least three ASD dyads reached normative range of parent-child turn-taking.

**TABLE 2**

**The Average and Range of all Dependent Measures of all Eight Dyads (ASD Dyad/TD Dyad)**

	#T	#T: ASD/TD %	#W	#E	#R
<i>ZY + F/TD1</i>					
Baseline	24(13–37)/61(52–69)	39	0/1(0–2)	1(0–2)/11(7–13)	17(10–26)/0
Intervention	35(15–51)	57	0	8(2–14)	9(0–27)
Follow-up	34(34, 34)	56	1(0, 1)	3(2, 3)	10(6, 13)
<i>BY + M/TD2</i>					
Baseline	26(13–38)/51(42–67)	51	0(0–1)/2(0–5)	3(1–4)/5(3–8)	8(4–12)/0(0–1)
Intervention	50(25–76)	98	0	3(0–6)	3(0–8)
Follow-up	59(56, 61)	116	1(0, 1)	5(4, 5)	1(1, 1)
<i>LI + F/TD3</i>					
Baseline	35(30–39)/64(56–68)	55	1(0–1)/0	6(3–10)/9(6–12)	7(5–9)/0(0–1)
Intervention	61(35–73)	95	1(0–2)	3(1–7)	1(0–5)
Follow-up	86(70, 101)	134	1(0,1)	9(6,12)	0(0, 0)
<i>CH + M/TD4</i>					
Baseline	26(19–39)/52(47–59)	50	0/1(0–3)	2(1–3)/14(9–20)	11(3–18)/0
Intervention	54(37–63)	104	1(0–2)	2(0–4)	2(0–7)
Follow-up	53(45, 61)	102	1(0, 1)	3(3, 3)	3(2, 3)

methods describe the results for the main effects of the VM parent-training intervention.

As shown in Figure 1, variability in turn-taking was commonly observed in both the TD and ASD dyads. While all ASD dyads performed a certain level of turn-taking instances, no data points reached the normative range in baseline. With the exception of the ZY dyad, the visual analysis indicates that all dyads showed either an immediate or a one-session delayed effect and level difference (average means changed  $\geq 2$ –6 standard deviations) for turn-taking after the onset of the intervention. A total of 67%–80% of the intervention phase data points for these three dyads did not overlap with the baseline data points and were within or higher than the normative range. There were some occurrences of child refusal behavior during the baseline. Child refusal behavior reduced after the intervention began, with some instances of non-occurrence.

Table 2 reports results within each ASD dyad, among AD dyads, and between ASD and TD dyads. Within each ASD dyad, the VM intervention yielded mean increases from the baseline in turn-taking of 46%, 92%, 74%, and 108% as well as mean decreases from the baseline in child refusal behavior of 47%, 63%, 86%, and 82% for the ZY, BY, LI, and CH dyads, respectively. For results among ASD

dyads, average instances of turn-taking during the 5-minute-picture-book-reading sessions rose from 24–35 at baseline to 35–61 during the intervention phase. Similarly, instances of child refusal behavior fell from 7–17 at baseline to 1–9 during the intervention phase. Comparing the range of average instances of turn-taking among TD dyads, which was 51–64 after VM implementation, the ASD dyads’ lowest range increased from 47% to 69% of the performance of TD dyads and the highest range increased from 54% to 95% of the performance of TD dyads. With the exception of the ZY dyad, the instances of turn-taking for the three remaining ASD dyads numbered half of their respective TD dyad, i.e., 50% of performance, prior to the VM intervention. Equivalent turn-taking performance between the three ASD dyads and TD dyads was found after the intervention. Among the four ASD participants, child ZY had the lowest level of performance for turn-taking, the highest number of refusal behavior instances, and the most attempts to interrupt the video-watching experience. The researcher observed that child ZY had a preference of English materials and was more skilled at using English words than Mandarin Chinese words. Moreover, the parents of child ZY were often unable to remove him from competing environmental stimuli. The child LI was observed during

baseline and during the third intervention session attempting to approach her non-participating mother, perhaps due to habit. It is worth noting that LI's mother, the primary caregiver and the non-participating parent, was reported and observed as having better interaction with LI than the participating father at baseline. However, evidence provided by this study shows that the participating father improved the number of turn-taking instances after the intervention and maintained a higher level through the follow-up phase.

Non-regression methods such as standard mean difference (SMD) between the baseline and intervention phases and percentage of non-overlapping data (PND) have been recommended by scholars (e.g., Olive & Smith, 2005) to evaluate the effect size of single-subject design studies. The SMD formula used in this study divided the mean difference between the baseline and the intervention by the standard deviation of the baseline. The SMDs for turn-taking and refusal behavior for each ASD dyad all exceeded the large-effect threshold ( $>0.8$ ). With the exception of the ZY dyad, the results for the remaining three ASD dyads all consisted of a high percentage of non-overlapping data points after the intervention (PND = 83–88%).

*Maintenance and generalization.* Overall, in the absence of continued VM implementation, all ASD dyads maintained or continued improving their turn-taking skill and child-refusal behaviors through the follow-up phase. With the exception of the ZY dyad, 83% of the maintenance probes used to assess turn-taking were within or higher than the established normative range.

Additionally, with the exception of the ZY dyad, the generalization probes confirmed the consistency of findings on increased turn-taking instances. Fifty percent of the generalization probes show meaningful improvement by entering and maintaining within established normative range. This generalization was further supported in parents' responses on the social validity questionnaire.

*Parent support skills.* Parent waiting and extension behavior showed limited, consistent, and observable changes (See Table 2). Parents of ASD dyads either demonstrated no or one instance of waiting during baseline and, at most, two instances of waiting during

the intervention. However, in comparison with an average of zero to two and a range of zero to five instances of waiting behavior across parents of TD dyads, parents of ASD dyads did not generally demonstrate less waiting behavior than their TD dyad counterparts. On the other hand, the parents of TD dyads consistently extended the child's interaction more than the parents of ASD dyads across the phases. Among the self-checklist of parental support skills, all parents of ASD dyads consistently noted relatively higher numbers of "waited" sessions and relatively lower numbers of "extended" sessions than they actually performed.

### *Social Validity*

Given that practitioners and parents rarely adopt evidence-based practices in the behavioral sciences, this study acknowledged social validation as a research question for the reason that it represents an essential consideration in evaluating whether a practice will be viable. According to Reichow et al. (2008) and the previous results section, this study is socially validated because the intervention was implemented by parents, who are the natural agents in the natural context of the parent-child interaction. The results show a clinically significant change in behavior in the three dyads in comparison with the TD dyad reference group. Parent-child interaction is a socially relevant skill because parents participated in this study due to their reported need to improve this skill. In addition, the parents in the ADS dyads indicated relatively high levels of satisfaction with the outcome results as well as with the effectiveness of the intervention in terms of both cost and time.

The average score total for the eight 5-point-Likert-scale questions was 4.5, with a range from 4 to 5. Parents' descriptions of post-intervention behavioral changes in their children included: self-initiated video watching and book reading; interaction had generalized to the other non-participating or non-primary caregiving family members; and book selections became broader and more diverse. The value of the self-administered protocol developed for this study is further enhanced because, although only two participating parents had previously received parent training,

all participating parents considered current intervention options inadequate for their needs. Additionally, these parents stated that they were “unaware that parent training exists,” that they considered parent training to be “too expensive,” or that these programs were “difficult to access.” The two families who had previously received parent training clearly stated that because the parent training implemented in this study was conducted at home, it was more time saving and effective than their previous parent training.

## Discussion

The results of this study provide supporting evidence for the effectiveness of the primary tier VM intervention model. The basic intervention effect demonstrated by three of four multiple baselines establishes a moderate functional relationship between the independent variable and the dependent variables. The parent-administered primary tier VM parent training effectively increased the number of turn-taking instances and decreased the number of refusal behavior instances in children. The number of instances of refusal behavior was highly and negatively correlated with the number of turn-taking instances, indicating that reductions in refusal behavior are associated with increased parent-child turn-taking and that these two behaviors are mutually incompatible. The common variability observed in both the TD and ASD dyads may due to the result of the random book selection or the dynamic nature of parent-child turn-taking skill. The significant variability in ZY dyad may have affected the demonstration of a basic intervention effect. The post-intervention number of turn-taking instances for three of the four ASD dyads was approximately equivalent to that of the TD dyads. This is undoubtedly inspirational for service providers and parents, as normative development has been an ultimate educational goal for inclusion and quality of life. The learned skills remained robust even after the conclusion of the VM intervention and the intervention was associated with generalization to one or two non-trained contexts (a person and/or an activity). Maintenance and generalization are critical quality indicators in autism treatments, and the sustainability of

this protocol was enhanced in this regard. Based on questionnaire results, child refusal behaviors improved across the board and behavior omission was found in a higher frequency after onset of the intervention. However, in comparison with their TD dyad peers, the ability of ASD children to sustain themselves in an activity remains impaired and in need of further improvement after the intervention. Instances of parent waiting were consistently low for parents in both TD and ASD dyads, with the additional result that parents of ASD dyads over estimated their awareness of waiting, indicating that this may be a behavior that is difficult to accurately self-aware which may lead to difficulty in behavior change. Although this study found variance in parent extension among TD dyads, parents of ASD dyads generally extended less than that of TD dyads to their children’s responses. The delayed language abilities of the four children with ASD and their higher instances of refusal behavior suggest that parents may be particularly challenged to recognize their ASD child’s communicative intention, especially those intentions communicated non-verbally. This study provides critical new evidence in support of the efficacy of the primary tier of the 3-tier VM intervention model suggested by Wang and Koyama (2014) and of the 3-tier model for early childhood parent education suggested by McIntyre and Phaneuf (2008). In addition to the novelty of using VM as the primary and only component in parent training, this study also introduced a dual video model, a unique concept in the current literature, which better suits the nature of parent-child interaction skills. Incorporating the normative comparison feature into a single subject design is essential in order to identify the gap between the ASD and the TD dyads in addition to looking at the behavior change within and among the ASD dyads. That is to say, what makes this research more meaningful is that the design addresses how much behavioral change is needed in addition to how much it changes. For example, the results of this study show that parent waiting is consistently low across all ASD and TD dyads. Therefore, besides the effort to enhance the waiting instances of ASD dyad parents, we also recognize that it may not require a large effect to have a significant meaningful clinical be-

havior change to perform as “normal.” Thus, this design helps researchers and practitioners to understand the validity, meaning, and effect size of educational treatments. We may not be satisfied with the effects of this study if we had maximized all resources and support. Additionally, we may not value the effects of this study without comparing ASD dyads with dyads with typical development. However, particularly among the practices in combatting the impact of ASD on families, we may appreciate if there is an easy and fairly accessible protocol with least amount of resources and support that results in improvement for 75% of all learners with ASD (three of the four dyads responding to the intervention in this study reflected a similar rate to those identified for other primary tiers of 3-tier models, which is approximately 80%) of their skill to the normative range. Since there is no single approach to treat the entire ASD population, group-based or individualized, higher-tier VM interventions that involve more resource and support must therefore be implemented for the 25% of all learners with ASD who do not benefit from the primary tier generic VM intervention. Most published VM studies are tertiary-tiered interventions. Therefore, protocols should be easy to access and use for non-responders to primary tier interventions.

In summary, the resources and support available from society for families are limited and not all families require interventions involving high level of resources and support. Therefore, the 3-tier VM intervention model provides a framework for parents and practitioners to determine the optimal fit between level of need and levels of necessary resources and support. Additionally, this model provides a guide for designing educational treatments on a continuum.

#### *Limitations and Future Studies*

Because the small sample size has been a consistent limitation in single subject studies, it is recommended replicating this protocol and additional primary tier interventions in future studies. However, future researchers should be cautious about the natural costs of conducting research in natural settings with natural agents and compromise the protocol accordingly. This form of research is relatively

infrequent due in part to the logistical challenges involved. We would like to offer our experience as a guide to help future research teams recognize and minimize these challenges. This study was disadvantaged by a shortage of research assistants, time-consuming video analysis, and the difficult coordination of family schedules. Only one part-time research assistant was available for the entire procedure, resulting in gaps between home assessment visits, video analysis, and decision making. In addition, after-school family schedules were often already busy with therapy sessions and parents’ work duties. This rendered home visits inflexible and made our research progress fall short of the dynamic nature expected of the single-subject design. However, our use of a repeated typical developing (TD) parent-child interaction measure is an innovation that facilitated experimental control. No other recognized factors were identified that threatened the internal validity of this study. Finally, most other data points still support the effectiveness of this intervention.

With respect to family ecological factors, we violated the established protocol in the following respects. First, we were not able to measure inter-observer agreement on the parent intervention logs, a necessary step to confirm procedural reliability and treatment integrity. Second, because some families lived together in a small studio apartment space or the participating parent was taking care of the other sibling child during assessment thus other family members or environmental distracting stimuli were often within line of sight or ear shot. Thus, dyads were not fully sequestered/alone during the assessment sessions. Third, a positive relationship between the research team members and the participants, while kept to a minimum, existed and may have impacted dyad interaction. In addition, the presence and frequency of visits by research team members with digital video recording equipment may have introduced confounding effects such as the placebo effect, monitoring effect, and camera interaction effect. Although a multiple baseline design controls for these effects, they may still have affected the social validity measure and thus may be considered as an intervention component separate from the primary tier VM. Therefore, it is recommended that a line of future research

may be conducted with an authentic self-administered procedure without home assessment visits and in the absence of research members, so as to more closely elicit actual relationship establishment and practice opportunities. In order to measure the outcomes of a self-administered intervention, the use of indirect assessments such as parent self-reports, focus group discussions, and anonymous questionnaires maybe more appropriate than direct observation assessment. However, this may influence the validity of outcomes.

It may be of interests for future researchers to investigate the ceiling performance level for dependent variables and how changes in level of parent behaviors contribute to child behavior change. Positive outcomes were observed, but the questions “How many turn-taking cycles (and instances of parent waiting and extension) should be considered sufficient?” and “To what extent did the behaviors of parents contribute to changes in turn-taking?” remain unanswered. The performance level of a typically developing (TD) trajectory may be an indicator of the ceiling performance level; however, since primary tier VM is designed for all learners, it may also worth investigating the intervention effects on TD dyads.

A further suggestion for future studies is to work on further development of the comprehensive 3-tier VM intervention model. Two important questions may be taken up in future research: (A) “For whom, with what characteristics, with what skills, in what manner, and in what context does the intervention produce the most beneficial outcomes?” Researchers have suggested that reporting the characteristics and reactions of responders (please refer to the selection criteria of *participant* section) and non-responders (please refer to the *ZY+F dyad* section) to interventions is equally imperative (Horner et al., 2005; Patterson et al., 2011). (B) “How many resources and how much support are involved in the intervention and what type of delivery method is used?” (please refer to *Involvement of Resources and Support* section) Answering these questions is vital to identifying which tier(s) is supported by a specific intervention and to assisting practitioners to accurately apply suitably tiered interventions to generate the greatest benefits for learners.

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## **Effectiveness of Teaching Café Waitering to Adults with Intellectual Disability through Audio-Visual Technologies**

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*Abstract: Learning vocational skills and employment are a priority, for adults with intellectual disability (AID) in terms of living independently. Use of technologies for the education of AID is one of the primary goals of World Health Organization. The aim of this research was to determine the effectiveness of teaching café waitering to adults with intellectual disability through use of tablet computers and Bluetooth headsets, modern pieces of audio-visual technologies. A multiple probe research design across participants was used for the present study. Participants were three adults with intellectual disability who were 19, 26, and 32 years old. The independent variable of the study was Café Waiter Education Program (CAWEP), and the dependent variable was the performance levels of AID in achieving the skills of café waitering. CAWEP is a vocational education program developed for the instruction of café waitering skills. All implementations took place in an educational setting similar to a real café. Findings indicated that instruction through use of tablet computers and Bluetooth headsets was effective in teaching café waitering skills to AID and that two of the participants were successful in generalizing and performing the skills they acquired in real workplaces.*

Recently, preparing individuals with intellectual disability for an independent and social life after years of schooling has received escalating attention within the field of special education. Teaching adaptive and functional skills that would expand an individual's independence in his/her present and future life is especially important in this process (Ayres, Lowrey, Douglas, & Sievers, 2011). Adaptive skills as defined by American Association on Intellectual and Developmental Disabilities (AAIDD) include social skills such as interpersonal relations in daily life, self-confidence, problem solving, and complying with rules and practical skills such as self-care, vocational skills, how to use money, safety, and transportation (Schalock et al., 2010). Listed among practical skills, vocational skills are the utmost

for the independent life that an individual will enjoy in the future.

People with jobs have economic freedom and autonomy (Jahoda, Kemp, Riddell, & Banks, 2008). Having a profession helps individuals develop self-confidence, experience the feeling of success, and increase the quality of their lives. However, it is extremely unrealistic to state that every individual reaching the proper age to work finds a job. Having a job is especially more complicated and difficult for individuals with intellectual disability (Roessler & Foshee, 1996; Trembath, Balandin, Stancliffe, & Togher, 2010). Relevant research concludes that more than 75% of individuals with intellectual disability face unemployment or tremendous difficulties in finding a job in the first three years after graduation (Cook, 2002; Luftig & Muthert, 2005; Scheid, 1999).

Shier, Graham, and Jones (2009) state that individuals with intellectual disability encounter several internal and external obstacles during searching for a job. According to them, the internal ones include individuals' low levels of motivation or self-confidence, insuffi-

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cient working experience, being illiterate, displaying problem behaviors, and difficulty understanding non-verbal workplace rules, whereas the external ones involve insufficient job opportunities, inefficiency of proper support, and discrimination and labeling at work. On the other hand, related body of research points out that the salient reason for not employing individuals with intellectual disability is the assumption that these people are incompetent (Baran & Cavkaytar, 2007; Trembath et al., 2010; Verdonschot, Witte, Reichrath, Buntinx, & Curfs, 2009). In addition, other reasons for the current unemployment include lack of employment policies for the disabled, attitudes adopted by the business and industrial world, lack of appropriate educational settings, inadequate support services, and weak coordination of the services (Wehman, 1996). This clearly underlines that efforts should be exerted to change the negative perspective against individuals with intellectual disability in employment laws, workplaces, and trade body (Scheid, 1999; Steed & Lutzker, 1999).

Improvements across opinions and attitudes against individuals with intellectual disability within the 21<sup>st</sup> century initiated countless innovations such as the development of new and practical instructional methods. International conventions, reports, and scientific studies targeting inclusion of individuals within society and defeating unemployment and poverty have also contributed significantly to these innovations. Literature hosts many findings indicating that individuals with intellectual disability could gain most vocational skills if they go through a systematic and individualized vocational training and that they could have job (Lancioni, Singh, O'Reilly, Sigafos, & Oliva, 2011; Roessler & Foshee, 1996; Steed & Lutzker, 1999; Taber, Alberto, & Fredrick, 1998). Yet, the number of individuals with intellectually disability who have a job or who work on a payroll is extremely low (Allen, Burke, Howard, Wallace, & Bowen, 2012). On the contrary, research results show that these individuals can adopt vocational skills and can be employed so long as they are given the opportunity to partake in vocational education programs after school (Davies, Stock, & Wehmeyer, 2002; Roessler & Foshee, 1996). Similarly, Newton, Olson, and Horner (1995) report that individuals with intellectual

disability experience several major obstacles in both domestic and social life especially in acquiring a profession and in being employed if they cannot benefit from support services they need. Cook (2002) underpins that transition from a long academic education process to a more independent life with a job requires intellectually disabled individuals be supplied with planned, systematic, and individualized education.

Life Centered Career Education (LCCE) can be said to be one of the most comprehensive practices serving individuals with intellectual disability to prepare for professional life (Brolin & Lyod, 2004; Roessler & Foshee, 1996). LCCE advocates that occupational training should start during early childhood and should continue until employment, and it should have follow-up processes lasting after an individual is employed. In other words, this kind of education spans along a considerable amount of time starting from primary education designed to prepare these individuals for an independent life and terminating when these adults are employed. Especially recently, there has been an increased focus on the need to develop instructional programs with functional/life skills curriculum, which is necessary to live, work, and integrate with the society. The main goal of this functional education program is to help individuals savor maximum independence (independent life, having a job, daily life skills, etc.) and turn into a member of the society. In this sense, such programs aim teaching skills needed for academic success, vocational training, daily life, transportation, finance, social interaction, and self-governing (Bouck, Satsangi, Bartlett, & Weng, 2012). All these programs underline that it will be a problem to generalize the skills learned in a classroom setting across real life situations, which accentuates the significance of community based practices and the need for studies to determine the efficacy of such programs (Cook, 2002). Lately, natural settings have specifically been important within special education, and methods (such as natural learning method) that endorse generalizing and retaining what is learned have been devised. In addition, special education experts have been utilizing new arrangements aiming to teach functional/life skills and vocational skills in real settings through use of commu-

nity-based instruction (Cavkaytar, 2012; Heward, 2013). Community-based practices offer learning within real settings that help students retain and generalize what they learn (Heward, 2013). All these indicate that efforts and support services targeting the inclusion of individuals with intellectual disability within society via help with economic freedom, legal rights, and social acceptance have been increasing and becoming more and more important (Davies, Stock, & Wehmeyer, 2002). Research results show that turning technology use into a part of daily life is an effective way to support these practices become successful (Bouck et al., 2012).

Augmented/Assisted technology include parts, tools, materials, and systems adapted and designed to increase, maximize, and sustain the capacity of individuals with special needs with respect to functional skills (IDEA, sec. 608, p. 8, 2004). Assisted technologies can be grouped under seven titles: positioning and seating, mobility, augmented and alternative communication, computer access, adaptive toys and games, adaptive environments, and instructional aids (Bryant & Bryant, 2003; Bryant, Smith, & Bryant, 2008). Use of technologies such as touch-screen computers, smart phones, and smart boards as instructional aids has become more and more prevalent in both general and special education (Sigafoos et al., 2013; Williams, 2013). For instance, tools that are portable, easy-to-use, functional, and having fewer parts have been favorite peripheral supports for community-based practices (Davies et al., 2002). Furthermore, the significance of assisted technologies has been underlined in 2013 annual report, announcing the goals of United States, by a statement focusing on the use of info-communication technologies to ease access to services for individuals with special needs and to eradicate the obstacles refraining them from functioning in the society (World Health Organization, 2012). Preparing education programs about assisted technologies, International Business Machines (IBM, 1991) made the following remark concerning the importance of technology for exceptional individuals: "Technology eases life for those with no disabilities; yet, it makes life livable for people with disabilities" (p. 2). Technology support has been used to teach independent life skills and vo-

ational skills to especially individuals with intellectual disability with successful outcomes (Bouck et al., 2012; Davies et al., 2002).

Whereas there are plenty of studies focusing to help adults with intellectual disability prepare for independent life, the literature is rather dry in terms of holistic research aiming to provide vocational education, employment, and job guarantee for these adults. Moreover, vocational education programs utilizing audio-visual technologies are also scarce within literature. Research subject is of special importance because it aims to combine the cooperation among local administrations, university, and public institutions with technology support, vocational education programs, and employability. The need to teach waitering skills, one of the most common jobs in the host country (Eskisehir, Turkey), to individuals with intellectual disability through use of audio-visual technology support and to employ these individuals has served as the foundation of this research. Accordingly, tablet computers and Bluetooth headsets have been utilized to teach waitering skills to individuals with intellectual disability because they are portable, practical, and effective. The aim of this research is to determine the effectiveness of teaching waitering skills to adults with intellectual disability via use of audio-visual technologies such as tablet computers and Bluetooth headsets.

The following are the research questions:

1. Is the instruction supported with tablet computers and Bluetooth headsets effective in teaching waitering skills?
2. Are the skills gained with the help of tablet computers and Bluetooth headsets sustained 10, 15, and 20 days after the termination of training?
3. Is the provided instruction effective in terms of generalizing waitering skills to different number of customers, orders, and settings?
4. Are the participants, customers, employers, and the participants' families content with Café Waiter Education Program?

## **Method**

### *Participants*

Participants were three adult females with mild intellectual disability who registered for

Café Waiter Education Program supported by Turkish Employment Agency and held in Gokkusagi Café (Rainbow Café) run by Tepebasi Municipality and who had no previous waiter training. During the selection, the candidates were required to have some prerequisite skills such as a) self-care skills; b) basic communication skills; c) motor skills; d) personal hygiene skills; e) non-existence of a problem behavior; and (f) literacy. Interviews with family members and observation by the researchers were two ways to identify the participants' performance levels concerning the prerequisite skills.

Participant 1: Aylin is a 32 year-old woman diagnosed with mild intellectual disability at a state hospital (IQ 68, WISC-R). No other disability accompanies her intellectual condition. She has both receptive and expressive language skills and experiences no difficulty communicating with peers, teachers, and other workers at the café. She is literate and has no problems verbalizing her opinions. She can follow verbal commands, and does not display any inappropriate behavior. She can commute to work and perform basic self-care skills independently. She takes a two-hour support education at a private special education center once a week.

Participant 2: Bilge is 19 year-old female diagnosed with mild intellectual disability at a state hospital (IQ 68, WISC-R). She doesn't have any other accompanying disabilities. She has both receptive and expressive language skills, and she has no difficulty communicating with peers, teachers, and other workers at the café. She is also good at reading-writing and expressing her opinions. Following verbal commands is no problem for her, and she doesn't exhibit any unsuitable behaviors. She can go to work independently and perform self-care skills without help from others. During the research, Bilge continued going to a vocational school.

Participant 3: Filiz is a 26 year-old female diagnosed with mild intellectual disability at a state hospital (IQ 68, WISC-R). She doesn't have any other conditions accompanying her intellectual disability. She has a good command of receptive and expressive language skills and no difficulty communicating with peers, teachers, and other workers at the café. She possesses literacy skills and expressing her

opinions well. Filiz can follow verbal commands and displays no inappropriate behavior. She can commute to work and perform self-care skills independently. She continued her education as an inclusion student through secondary school. She benefitted from education programs provided by special education and rehabilitation centers until age 15. She didn't take any additional support education during the research process.

### *Setting and Materials*

Practice phase of the research was completed at Gokkusagi Café run by Eskisehir Tepebasi Municipality (Cavkaytar, 2012). Pilot study, teaching, and follow-up sessions were conducted in a setting organized to resemble real café atmosphere upstairs of Gokkusagi Café. On the contrary, generalization sessions were held in real café setting with real materials and customers. All sessions were administered to each participant during the same time period (11:00-14:00).

Tools and materials used in the current study included menu, bill, tray, table napkin, spoon-fork pack, cruet, tea glass, tea spoon, sugar bowl, spray detergent, and cloth. As for audio-visual technologies, Nokia BH-503 stereo Bluetooth headset and Apple iPad I tablet computer loaded with necessary software were employed.

### *Design*

A multiple probe research design across participants was used for the current study. This research is based on Café Waiter Education Program (CAWEP) developed by Cavkaytar (2012). The third part in CAWEP, '*Teaching café waitering skills*', has been enriched with tablet computer and Bluetooth headset support, which led to an adaptation of the program through audio-visual technologies.

### *Independent Variable*

CAWEP supported with tablet computer and Bluetooth headset serves as the independent variable of this research. The adapted version of the program allows the researcher to send instructions and prompts to the participants' Bluetooth headset from the tablet computer,

and is assisted with an electronic book (e-book) prepared on iBooks Author program. The content of the e-book are e-book pages containing 147 skill steps based on the general instruction of “Serve the customer.” Each e-book page displays the related skill step as a moment. A voice button operating an audio file prompting each skill step orally, an applause button reinforcing the participant, and a warning button instructing the participant to terminate the skill step if she produces an incorrect response are embedded in each frame on the e-pages.

#### *Dependent Variable*

The performance levels of participants concerning the skill of “serving the customer”, one of the required behaviors and skills of café waitering profession, are the dependent variables of the present research. Doing what it takes with 95% precision right after the instruction—“Serve the customer”—is provided and until the customer leaves and the place is made ready for the next customer define the target behaviors of this study. A correct response is marked if the participant follows the skill steps in the appropriate order and as described on the e-pages, whereas incorrect response is recorded if the participant does not respond within 5 seconds, if she follows the skill steps in the wrong order, or if she does not perform the skill as described on the e-pages.

Café waitering is classified among a service sector that highly values customer satisfaction and that requires positive communication and interaction with people. Even the smallest details and flaws emerging during services are significantly effective over the contentment of customers. Therefore, preventing any failures during services is the primary principle. Quality service provision is possible only when a great majority of skills included in serving skill is thoroughly completed. Based on the fact that customers would have to accept low quality service if some of the skill steps are not fulfilled precisely, success criterion has been set as 95% for each participant.

#### *CAWEP*

CAWEP (Cavkaytar, 2012) is a vocational education program designed to teach the skills

**TABLE 1**

#### **Competencies of the CAWEP**

- 
- 
1. Being able to define waitering profession and its features,
    - a. S/he defines the waitering profession.
    - b. S/he states where waiters can work.
    - c. S/he lists the duties of a waiter.
    - d. S/he lists the duties of other personnel at the same workplace.
  2. Being able to describe the preparations a waiter needs to complete before work.
    - a. S/he puts on the work uniform.
    - b. S/he follows routines needed for personal cleaning and hygiene.
  - c. S/he names the tools s/he will use.
    - d. S/he points the places of the tools s/he will use.
  3. Being able to serve a customer.
    - a. S/he takes the orders.
    - b. S/he sets the table.
    - c. S/he serves.
    - d. S/he cleans the table.
    - e. S/he fetches the table and chairs.
  4. Being able to serve for at least three different customers, orders, and setting types.
    - a. S/he serves and individual, two people, and a group.
    - b. S/he serves only beverages, only food, and food and beverages.
    - c. S/he serves inside, in the garden, and upstairs.
- 

Adapted from Cavkaytar (2012).

necessary to work as a waiter at a café to individuals with intellectual disability. The aim of the program is to furnish adults with intellectual disability with skills needed to exhibit behaviors required for café waitering skills. In accordance with this general aim, competencies that the participants are expected to display are listed in Table 1.

Consisting of four parts, CAWEP was applied as follows in this research. The first part of the program is “*preliminary education*”; the second one is “*preparation skills for work*”; the third one is “*teaching café waitering skills*”; and the fourth part is “*retention and generalization in a real setting*.” In this research, each participant was included within planned education and teaching processes in order to gain related skills defined in each part of CAWEP when they were available. Thus, the first part of the education, “*preliminary education*”, was dedi-

cated to the introduction of the program, the definition, characteristics, duties, and possible work fields of café waiters. Accordingly, a two-hour presentation was prepared and the participants were informed. Presentations were based on direct teaching method.

Titled “*Preparation skills for work*”, the second part includes dressing up for work, being ready to work, and knowing and setting the tools and materials to be used during work. Training on the second part lasted for three hours and longer if the participants had difficulties reaching the competence level identified for this part.

The purpose of the third part, “*Teaching café waitering skills*”, is to teach the required skills to serve a customer at a café. Skills analysis developed by Cavkaytar (2012) was utilized for teaching waitering skills in this part; however, relevant adaptations had to be made on the original version due to use of new technologies in this research. As a result, 125 skill steps outlined in CAWEP increased up to 147. So, teaching serving skills was completed through 147 steps in the third part. The instruction was designed based on least-to-most prompting system provided via audio-visual technology support.

The last, fourth, part of the program entails carrying out “*retention and generalization practice in a real setting.*” Retention data of the study were collected 10, 15, and 20 days after the termination of the program where the training took place during follow-up sessions. Since one of the participants was not available, generalization sessions were completed with the other two participants. After the follow-up sessions, generalization sessions were held on the first floor of the café, the real café, and at the other branch of Rainbow Café with varying numbers of customers, different orders, and in different settings at the café for three consecutive days.

#### *Procedure*

The experimental phase of this study included 8 steps; (1) pilot study, (2) baseline sessions, (3) preparation for teaching, (4) prerequisite skills, (5) teaching café waitering skills, (6) multiple probe sessions, (7) follow-up, (8) and generalization.

*Pilot study.* Prior to the study, a pilot study was conducted in order to check whether the teaching plan was appropriate for practice or not. The pilot was administered to an adult who had mild intellectual disability, who bore the baseline criteria like the participants, and who had completed café waiter education program earlier. The participant, Mustafa, was a 33 year-old male with Down Syndrome, and he was diagnosed with mild intellectual disability at a state hospital (IQ 68, WISC-R). He does not have any other conditions accompanying his mental disability. He is good at both receptive and expressive language skills, and has no difficulty communicating with his teachers, peers and co-workers. Reading-writing and expressing opinions is not a problem for him. He can follow verbal instructions and displays no inappropriate behaviors.

The pilot was completed on the second floor of the café where the research was to be conducted. Subsequently, any flaws and failures on the technological tools and materials were eliminated, either new steps were added or some steps were excluded from the skills analysis, and data collection forms were modified and updated. Following the modifications, the pilot was repeated and the teaching plan was reported to be appropriate. In addition, preliminary trials were held with two adult females who also had intellectual disability and who had completed café waitering skills beforehand. These trials served to improve any flaws observed within the program, and the experiment started.

*Baseline sessions.* Prior to the implementation of training step, baseline sessions were simultaneously conducted with all the participants in order to determine how they already performed the skills within café waitering profession. Baseline data were collected on the second floor of the café, which functioned as ‘training floor’ and which was organized to resemble a real setting. Single opportunity method was employed to elicit the relevant data. Accordingly, first the setting was arranged, and then tools and materials were set. Secondly, the participant was wired with a Bluetooth headset, and she was prompted with “Are you ready? We’re starting” to draw her attention. Afterwards, she was given an audio instruction through the tablet computer as: “Serve the new customer.” Behaviors displayed

by the participant during the entire procedure were both videotaped and recorded by the researcher. Those skill steps the participant fulfilled correctly were recorded with a plus (+) onto the data sheet. If the participant did not respond at all within the first 5 seconds after the instruction, the procedure was discarded and all skill steps were marked with a minus (–) on the sheet. When the participant responded inappropriately for two consecutive skill steps, the procedure was discontinued, and all skill steps were recorded with a minus. If the participant responded correctly for one step and then responded incorrectly for others, then the correct ones were marked with a plus, and the incorrect ones were recorded with a minus. No stimulus or reinforcer was employed. When the participants produced stable data for three consecutive sessions, baseline phase was discarded.

*Preparation for teaching.* In this phase, the first author of this study delivered a two-hour presentation on the definition, characteristics, functions of café waitering profession and on places and settings where a waiter can work. The environment was organized for the presentation, all the participants sat around a table, and the expert informed everybody.

*Prerequisite skills.* This phase was dedicated to examples regarding waitering profession, its characteristics, places where waiters can work, and to the duties of waiters and other workers. Detailed explanation was provided about the uniforms, preparing for work, personal cleaning and hygiene, and possible tools and materials that waiters can use. Before teaching step started, participants' families were invited to the café, informed about the program, and their consent was granted in print. Lastly, families were asked to arrange their holiday plans in alliance with the program.

*Teaching café waitering skills.* Following the organization of the program on tablet computers, teaching phases was initiated. Based on the research model, the first participant was selected, and she was informed about the setting, tools and materials, and the procedure. Teaching environment, tools and materials were organized before the instruction began, and due attention was paid to keep everything the same throughout the entire

**TABLE 2.**

**Procedure**

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- 
1. The participant is given the instruction “Serve the new customer.”
  2. As the participant produces an appropriate response, she is reinforced by the “applause” sound sent from the tablet computer.
  3. If the participant displays an incorrect response, then a “beep” sound together with a verbal prompt describing the relevant skill step (“Beep-move towards the tray rack” etc.) is sent to her.
  4. The participant is reinforced by “applause” sound emitted from the tablet computer upon giving proper responses after the verbal prompt and after completing the skill steps within a group appropriately.
  5. If the participant does not respond correctly after the verbal prompt, she is fed with a “beep” sound and halted. Afterwards, the researcher approaches the participant, and provides the visual, printed, and audio prompt model on the tablet computer to the participant.
  6. The participant is reinforced by “applause” sent from the tablet computer upon displaying the correct response following the model prompt and completion of skill steps in a group successfully.
  7. The participant is physically directed to complete the relevant skill step by the researcher if she continues to produce incorrect response despite the model prompt.
  8. Upon reaching the criterion with the first participant during teaching sessions, simultaneous multiple probe sessions are held with all the participants, and training session is initiated for the second participant so long as data regarding each participant stabilizes; and the procedure is repeated for the second participant.
- 

procedure. In each session, the connection between the tablet computer and the Bluetooth headset was established after the environmental organization, and teaching started. The order of training is depicted in Table 2.

*Multiple probe sessions.* Probe sessions were conducted in order to determine the performance levels of all participants concerning the skills at the end of teaching sessions held with all three participants. During the probe sessions, the participants completing the teaching sessions were expected to display

performance levels similar to end-of-program goals while others ready to start the teaching session were expected to have performance levels parallel with those of baseline session. All probe sessions held within the research followed a similar pattern with that of baseline sessions.

*Follow-up and generalization phase.* Follow-up sessions were conducted 10, 15, and 20 days after the termination of training and in the same environment where baseline sessions had been completed. Following the end of teaching sessions, follow-up sessions were held on the first floor, the real café, and in a different setting, another branch of Gokkusagi Café, with two participants for three consecutive days. One of the participants was not able to partake in follow-up sessions because the course program ended and the teaching-learning program was not appropriate for her to work. Both follow-up and generalization sessions were organized exactly the same as multiple probe sessions. However, unlike the probe sessions, the participants were provided with non-specific prompts (What are we doing now? What is next step? etc.) when they headed for the wrong skill step during generalization sessions. When this was the case, correct responses by the participants were marked as plus (+) and incorrect responses despite the non-specific prompts were recorded as minus (-) on the data sheet. Data were collected in accordance with single opportunity method. Prior to the generalization sessions, participants were briefed about the setting, tools and materials, and the other workers downstairs. The tools and utensils used during the generalization phase were the same as those utilized during teaching sessions. Yet, one of the tools—a coffee table—employed during teaching phase had to be removed from the generalization session due to physical conditions (no space) of the café. So, a new data recording sheet with 140 skill steps was developed. Generalization phase started with the arrival of customer(s) at the café. At that exact moment, the researcher sent the instruction—“Serve the customer”—to the participant orally through the tablet computer, and data recording was initiated. Generalization sessions were not videotaped in order not to disturb the customer(s). Therefore, data records were kept by

the third researcher, a PhD student specializing on special education, independently via direct observation.

#### *Data Collection*

During the research, data concerning inter-observer reliability, practice reliability, and effectiveness were collected. A data recording sheet consisting of 147 skill steps for all sessions, but generalization phase, was used so as to obtain effectiveness data. As for generalization sessions, a new data sheet with 140 skill steps was developed after excluding 7 items that were inappropriate for generalization phase. Upon completion of the study, a social validity questionnaire was given to the participants, their families, employers, and the customers. For instance, one of the questions on the questionnaire designated for customers is as follows: “The waiter who served me has all the skills that a waiter should have. For example, hygiene, a smiling face, etc.” Possible answers to the questions were limited with ‘Yes’, ‘No’, and ‘Not sure’. Other questions directed to other individuals and possible answer options were formed similarly.

*Reliability analysis.* In this study, data regarding inter-observer reliability and practice reliability were collected by an educated observer, a PhD student in special education. Reliability data were collected for each participant during 30% of each phase. Video records of sessions selected randomly were watched by the independent observer, and participants’ responses pertinent to skill steps were coded on data recording sheets. Evaluation criteria for practice reliability were determined as: a) organizing the environment; b) checking instructional tools and materials; c) drawing participant’s attention to teaching; d) providing the instruction for related skill; e) waiting for participant’s response; and f) using prompts. On the other hand, the third researcher and the independent observer recorded the data through direct observation during generalization sessions. Subsequently, these forms were examined and compared with those coded by the third researcher, and inter-observer reliability was calculated by using the following formula “agreement/ (disagreement + agreement) x 100.”

**TABLE 3**

**Inter-Observer Reliability Mean Values for Multiple Probe, Teaching, and Follow-Up Sessions**

	<i>Baseline</i>	<i>Teaching</i>	<i>1<sup>st</sup> Multiple Probe Session</i>	<i>2<sup>nd</sup> Multiple Probe Session</i>	<i>3<sup>rd</sup> Multiple Probe Session</i>	<i>Follow-Up</i>	<i>Generalization</i>
<i>Aylin</i>	%100	%89,8	%98,6	%89,1	%99,3	%100	%95
<i>Bilge</i>	%100	%95	%97	%93	%91	%100	—
<i>Filiz</i>	%100	%96	%97,2	%97	%99,3	%100	%100

*Data analysis.* Data obtained after baseline, multiple probe, teaching, follow-up, and generalization sessions were analyzed diagrammatically. One of the diagrammatical analysis techniques, linear graphics were employed for data analysis. Social validity data of the present study were collected from customers, participants, their families, and employers. All sessions held within this research were videotaped, but generalization phase.

**Results**

*Reliability*

Examination of Table 3 indicates that inter-observer reliability is high for all participants. Similarly, Table 4 shows that practice reliability for all participants is within acceptable limits (80% and higher).

*Effectiveness*

Effectiveness findings were analyzed across five phases: baseline, probe, teaching, follow-up, and generalization. Figure 1 displays the performance levels during baseline, probe, teaching, and follow-up sessions for Aylin, Bilge, and Filiz, and during generalization session for Aylin and Filiz.

Findings regarding Aylin within Figure 1 show that Aylin produced '0' correct responses among 147 café waitering skill steps during the baseline. Aylin reached independence level in the 13<sup>th</sup> teaching session. Data gathered during follow-up sessions held 10, 15, and 20 days after training sessions ended point that Aylin was able to exhibit the skills she learned independently. Generalization data also indicate that Aylin successfully generalized the skills she learned across different settings, different number of customers, and different orders. During generalization sessions, Aylin performed the relevant skills appropriately after the instruction was given; however, she kept looking at the researcher expecting to be given prompts when she experienced little memory problems. In addition, Aylin's performance level notably decreased during the second generalization session since she was supposed to serve five customers. Moreover, she displayed signs of nervousness (trembling hands, asking for clarification about the orders a few times, hesitations, heading towards wrong direction, etc.) during the same session. Overall analysis of the sessions, however, shows that Aylin was able to perform café waitering skills independently.

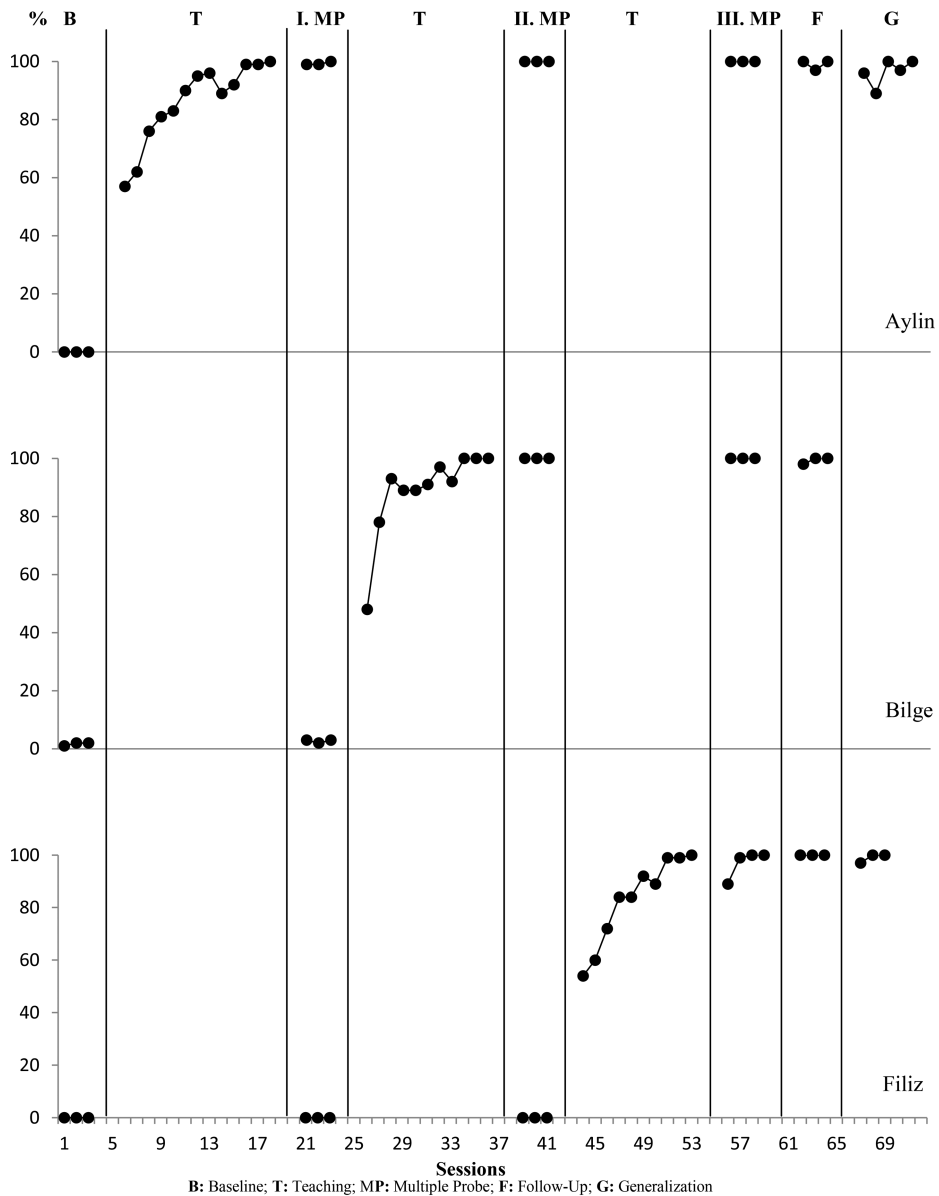
Examination of findings concerning Bilge within Figure 1 points that she was able to

**TABLE 4**

**Practice Reliability Mean Values for Baseline, Multiple Probe, Teaching, and Follow-Up Sessions**

	<i>Baseline</i>	<i>Teaching</i>	<i>1<sup>st</sup> Multiple Probe Session</i>	<i>2<sup>nd</sup> Multiple Probe Session</i>	<i>3<sup>rd</sup> Multiple Probe Session</i>	<i>Follow-Up</i>	<i>Generalization</i>
<i>Aylin</i>	%100	%100	%100	%100	%100	%100	%100
<i>Bilge</i>	%100	%100	%100	%100	%100	%100	%100
<i>Filiz</i>	%100	%100	%100	%100	%100	%100	%100





**Figure 1. Participants' Performance Levels during Baseline, Teaching, Multiple Probe, Follow-Up, and Generalization Sessions.**

respond correctly for '3' of café waitering skills during baseline. Compared to the other two participants, Bilge is a more social waiter candidate with communication and observation skills. Therefore, she performed better than the others during baseline and first multiple probe sessions. Bilge gained independence at the end of 11<sup>th</sup> training session.

Data obtained during the follow-up sessions conducted 10, 15, and 20 days after the termination of teaching depict that Bilge exhibited the skills she learned independently. Since the course program ended, and it was not possible to match the education program with working hours, Bilge could not join the generalization phase.

As for Filiz, the findings in Figure 1 indicate that she produced '0' correct responses for café waitering skills during baseline phase. Filiz did not respond in any way within 10 seconds after the customer arrived during baseline phase. She became independent at the end of 10<sup>th</sup> session. Filiz started all sessions enthusiastically and eagerly by saying "I m not going to hear the beep sound this time." She exhibited all the skills with 100% precision during follow-up sessions. Non-specific prompts were used for Filiz during real setting practice. She completed the generalization phase with non-specific prompts across different settings, different number of customers, and different orders within real café environment. In the meantime, she did not experience any difficulty fulfilling the skill steps except for occasional memory problems. General assessment of sessions showed that Filiz was able to perform waitering skills independently.

In conclusion, all participants were unsuccessful completing café waitering skill steps during baseline phase. However, participants improved their performance levels dramatically during teaching sessions supported with audio-visual technologies (tablet computer and Bluetooth headsets), and all gained independence at the end of training. Furthermore, it was recorded that all participants were able to sustain the skills they learned 10, 15, and 20 days after the termination of education program. Besides, two participants were able to generalize the newly learned skills across different settings, different number of customers, and different orders. Based on these findings, gradual increase of prompts provided through tablet computers and Bluetooth headsets can be said to be effective in terms of teaching café waitering skills.

Social validity data of the research were collected from the participants, their families, employers, and the customers via satisfaction questionnaire. This data set shows that all the participants were content with the education they received, their families were 100% happy with the education program their children went through, and 96% of 25 customers were satisfied with the service provided by the participants. In addition, three employers stated that waiter candidates fulfilled their responsibilities without flaws, that the candidates bore

all characteristics of a waiter, that they treated them equally as the other workers, and that the participants still needed to improve their skills though.

## Discussion

Vocational preparation and education services are supposed to be directed to employment for individuals with intellectual disability to lead an independent life. However, it may, sometimes, be difficult to employ these individuals even when they have relevant educational background (Trembath et al., 2010; Verdonschot et al., 2009). Thus, professions with a high rate of employment should be chosen for vocational education. A great majority of industrial employers avoid offering job opportunities for individuals with intellectual disability due to safety concerns (Baran & Cavkaytar, 2007; Heward, 2013). Besides, educational programs aiming employment within service sector are rather scarce, although the odds to be employed are quite higher compared to the industry. This research regards it as an advantage if the profession to be taught is selected from the service sector. The body of literature emphasizes that efforts to equip individuals with intellectually disability with jobs should start during early schooling period. Accordingly, it is underlined that functional skills facilitating these individuals' integration with society should be the focus of education during school years. Furthermore, this should turn into a life-long learning process starting from early years of life (Brolin & Lyod, 2004; Roessler & Foshee, 1996). In addition, administering vocational education programs in real settings is considered to be more effective than school practice in terms of retention and generalization (Beirne-Smith, Patton, & Kim, 2006; Heward, 2013; Mechling & Ortega-Hurndon, 2007). This study has shown that it is possible to teach vocational skills to individuals with intellectual disability in real life settings. Burge, Ouellette-Kuntz, and Lysaght (2007) report that providing vocational education programs in socially integrated places benefits more for both individuals with intellectual disability and for the society itself. Conducting this research in a real work environment increased participants' satisfaction. Furthermore, cus-

tomers coming to the café were also determined to be highly content with the services. Similarly, families were recorded to be happy since their children were given a vocational training in a real café setting. Findings of this research are parallel with those of other vocational training efforts completed in real work environments (Cavkaytar, 2012; Innstrand, Espnes, & Mykletun, 2004).

Adults with intellectual disability are generally successful at jobs demanding fewer skills and circling around certain routine (Beirne-Smith et al., 2006). Overall, assembly skills and basic handcrafts were taught to these individuals. However, Cook (2002) believes that such jobs are ineffective with respect to increasing employment opportunities for these people. Thus, it may be concluded that it is more effective to offer education programs to be applied in real settings with a stronger focus on functional skills for jobs with higher chances of employment such as café waitering. In this research, adults with intellectual disability have been determined to gain and generalize waitering skills after being trained in a real café setting. The interviews conducted with parents, employers, and customers at the end of the study point a high level of satisfaction, which can be interpreted as signs of adaptation to work-life for adults with intellectual disability. Indeed, the participants had no difficulty finding a waitering job at a café or restaurant where they live, and they are still employed.

This study was completed in a real café established by Eskisehir Tepebasi Municipality and run by a manager. Furthermore, this study has been converted into a project for Turkish Employment Agency (IS-KUR), and the participants were encouraged to attend a vocational training course. This helped the participants access social security subsidy by working as a real waiter on the payroll, which fueled the participants' and their parents' enthusiasm to partake in this research. Results of many community-based practices show that participants do not only gain a profession, but they also improve themselves by various aspects (Heward, 2013; Newton, Olson & Horner, 1995).

Recent advances in special education indicate that use of technology for the education of individuals with intellectual disability has

been on the rise lately (Dell, Newton, & Petroff, 2012). Relevant studies within the literature support that use of technological tools and materials during the education programs turns teaching into a more enjoyable process and eases instruction. Moreover, it gets more and more practical to integrate technology with education thanks to shrinking size of computers (Kagohara et al., 2010; Kagohara, 2011). An analysis carried out by US National Educational Technology Standards underlines that tablet computers have a high potential as an instructional tool (Couse & Chen, 2010). Portable computers produce more practical and easier practice because they can be integrated into any environment, they appeal to exceptional children, and children (Kagohara, 2011) can easily use them. It has become more prevalent to utilize technological tools and materials for teaching vocational skills and especially for teaching basic concepts and skills (Allen et al., 2012). In this sense, pieces of modern technology such as tablet computers and smart phones have been effectively employed for vocational education of individuals with different disabilities (Allen et al., 2012; Cihak, Kessler, & Alberto, 2008; Cook, 2002; Hammond, Whatley, Ayres, & Gast, 2010; Mechling, Gast, & Fields, 2008; Mechling & Ortega-Hurndon, 2007; Steed & Lutzker, 1999).

Findings of related research report that teaching individuals with intellectual disability in natural and real settings produce more rapid and permanent outcomes (Odom et al., 2005). Likewise, the participants in this research were determined to quickly learn and generalize the target skills of the program. Audio-visual technologies, especially tablet computers and Bluetooth headsets, were eagerly and positively welcome by the participants. Cavkaytar (2012) found out that subjects learned café waitering skills quickly and permanently when trained in real settings in his study. In this research, the first, second, and third participants gained the waitering skills in the 13<sup>th</sup>, 11<sup>th</sup>, and 10<sup>th</sup> sessions respectively. One-on-one teaching sessions for each participant were successfully completed in a 3-month period. This indicates that participants can learn how to perform vocational skills rapidly and at a level appropriate for

employment when they are trained via systematic instruction.

The significance of the current study lies in the fact that it was conducted at Gokkusagi Café, a real café founded by Eskişehir Tepebasi Municipality and Turkish Employment Agency (IS-KUR), and that the participants with intellectual disability were employed upon completion of the study. So, it would not be naive to conclude that both the participants and the society benefitted from this study. On the other hand, this research is not free from limitations: generalization sessions were not video-recorded; adaptations made on the skill steps due to physical conditions slowed the participants' serving pace; and the participants felt more nervous and anxious when serving real customers. Further research can be designed with different disability groups and by using different technological tools and materials in order to compare the outcomes.

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## Comparing Error Correction Procedures for Children Diagnosed with Autism

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*Abstract: The purpose of this study was to examine the effectiveness of two error correction (EC) procedures: modeling alone and the use of an error statement plus modeling. Utilizing an alternating treatments design nested into a multiple baseline design across participants, we sought to evaluate and compare the effects of these two EC procedures used to teach two sets of labels. Three children diagnosed with Autism Spectrum Disorder participated in this study. Results demonstrated that all participants acquired targeted labels in both EC conditions, and maintained high-levels of correct responding at follow-up. Only one participant acquired skills more quickly in the modeling alone condition. Future directions for additional research pertaining to effective and efficient EC procedures are discussed.*

Discrete trial teaching (DTT) is a widely implemented teaching procedure for children with an Autism Spectrum Disorder (ASD) (Smith, 2001). DTT involves three components: a discriminative stimulus ( $S^D$ ), the learner's response, and a specific consequence (i.e., reinforcement or punishment) that varies based on the learner's response. While efforts are made to ensure that the learner engages in correct responding, there are instances in which a child will make an error. When an error occurs, the instructor may deliver a stimulus intended to reduce the likelihood that the child will continue to engage in an incorrect response, or punish the incorrect response, sometimes called error correction (EC) (Leaf, Sheldon, & Sherman, 2010).

There are multiple ways that an instructor can implement EC procedures. This can include: response repetition/rehearsal (Carroll, Joachim, St. Peter, & Robison, 2015; McGhan & Lerman, 2013; Worsdell, et al., 2005), a brief time-out (Carroll et al., 2015; Turan, Moroz, & Croteau, 2012), delivering verbal feedback/error statement (e.g., “no,

that's not it”) (McGhan & Lerman, 2013), active student responding (Barbetta, Heron, & Heward, 1993; McGhan & Lerman, 2013), modeling (McGhan & Lerman, 2013), or a combination of techniques such as a brief time-out and additional task repetition (Turan, Moroz, & Croteau, 2012), an error statement in combination with a remedial trial (Leaf et al., 2010), or an error statement, modeling, and a remedial trial (Leaf, Leaf, Taubman, McEachin, & Delmolino, 2014).

Smith, Mruzek, Wheat, and Hughest (2006) sought to compare three different EC procedures. In this study, the authors compared the effects of a) modeling, b) delivering an error statement, and c) providing no feedback contingent on incorrect responses to teach six children with autism matching word-to-picture skills employing DTT. These six children ranged in age from 3 to 7 years old and based upon scores on the Mullen Scales of Early Learning and the Vineland Adaptive Behavior Scales participants ranged on functioning level within the study. All six participants had a history of exposure to modeling prompts within DTT, but only two had a previous history of exposure to error statement procedures. Utilizing an alternating treatments design, the researchers measured the number of trials to mastery to compare the rate of acquisition across EC procedures.

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The results of this comparative study demonstrated the rate of skill acquisition varied across participants depending on the EC procedure. These results suggested that some learners may acquire skills more rapidly depending on the EC procedure.

Leaf and colleagues (2014) compared a prompting procedure to an EC procedure to teach expressive labels to children (ages 4 to 6 years old) with autism. All participants could be described as high functioning individuals with autism. All had received behavioral treatment, and were attending school with supports. The prompting procedure and the EC procedure were implemented as part of discrete trial teaching. The EC procedure included an error statement, similar to Smith et al. (2006), however, the procedure also utilized modeling and remedial trials. The outcome of the study demonstrated that the prompting procedure was more efficient, but both the prompting procedure and the EC procedure were effective.

In another study, Turan, Moroz, and Croteau (2012) compared two types of EC procedures (i.e., Delay and Independent Probe). The first procedure involved a brief time-out, identified as a delay condition, in which a 5 s intertrial interval occurred following an incorrect response, then the re-presentation of the  $S^D$  and a prompt to engage in the target response using least to most prompting techniques. The second procedure also utilized a brief time-out, but with the addition of a distractor trial. This was referred to as an independent probe condition and consisted of a 3 s intertrial interval following an incorrect response, then the re-presentation of the  $S^D$  and a prompt to engage in the target response using least to most prompting. Following the learners response, the instructor then presented an instruction for the participant to engage in a previously mastered skill, referred to as a distractor trial. After the distractor trial, the instructor returned to presenting trials related to the target response. Three individuals diagnosed with autism participated in this study; their ages ranged from 6 to 8 years old. Two of the three participants received intensive behavioral intervention prior to the onset of the study. A within-session alternating treatments design was conducted in the first study in order to compare the effects of both EC

conditions to teach receptive language tasks. In the second study, an alternating treatments design was conducted to compare both EC conditions to teach tacts. The results indicated that the most efficient EC procedure, while it differed across participants, maintained across topographically different skill sets.

In 2013 McGhan and Lerman sought to identify the effects of a rapid EC assessment as a means of determining the least intrusive, yet most effective EC procedure for five children with ASD. The participants were initially exposed to four different EC conditions that made up the rapid EC assessment (i.e., error statement, modeling, active student responding, and rehearsal). The children that participated in this study ranged in age from 4 to 6 years old. All participants were receiving behavior analytic instruction at the time of the study. The participants' demonstrated at least a basic receptive repertoire. Communication varied across participants. Following exposure to all four EC conditions, the researchers targeted additional skills in three EC conditions based on the results; the researchers took the least intrusive, most efficient procedure and compared it to a procedure that was more intrusive and a procedure that was less intrusive. For four out of the five participants, the least intrusive, most efficient procedure identified in the rapid assessment remained as such when compared to a more intrusive and least intrusive procedure. This study also identified the least intrusive, most efficient procedure varied across learners.

These studies demonstrated the effectiveness of a variety of EC procedures for children with autism. The need still exists for researchers to determine the most efficient EC procedures because the efficiency may vary depending on the individual (McGhan & Lerman, 2013; Smith et al., 2006). To begin this process, it may be helpful to identify certain characteristics and prerequisite skills of learners to see how that is associated with the efficiency of a particular EC procedure. One group of learners that share similar prerequisite skills are children who are identified as high functioning as they tend to acquire skills quickly, score higher on IQ testing, and demonstrate social communicative behavior similar to their typically developing peers (with minor idiosyncratic differences). One may assume these

learners acquire skills when EC procedures are utilized; however, little empirical data captures this assumption. The purpose of this study is to provide empirical evidence to compare how children with ASD described as higher-functioning acquire expressive labels when exposed to two different EC procedures. The two procedures selected for this study were a modeling procedure (Smith et al., 2006) and an error statement plus modeling procedure, modified from Leaf et al. (2014). These procedures, while very similar, were selected because they are assumed to be the least intrusive EC techniques commonly utilized in clinical practices. This study will provide an analysis of skill acquisition, efficiency of both EC procedures, and maintenance of target skills given respective EC procedures.

## Method

### *Participants and Setting*

Three children independently diagnosed with ASD participated in this study. Riggins was a 6-year-old boy who had a full scale IQ score of 86 on the Wechsler Intelligence Scale for Children® - IV (WISC®-IV) and a Vineland Adaptive Behavior Composite (VABS) score of 70. Tara was a 7-year-old girl who had a full scale IQ score of 132 on the WISC®-IV and a VABS score of 84. Taylor was a 6-year-old boy who had a full scale IQ score of 119 132 on the WISC®-IV and a VABS score of 63. All participants attended a general education classroom (Riggins and Taylor with supports). All participants were receiving behavioral intervention in a clinical setting at the time of the study, and all had a history of exposure to DTT, differential reinforcement contingencies, a variety of EC techniques, and token economies. All participants engaged in multiple sentences to communicate and could carry on conversations. The study took place at the clinical site where the participants were receiving therapy. Each session was conducted in a small research room that contained a table and two chairs. Sessions were conducted two to three times a week (based on how often the participant was present at the clinical setting); no more than one session occurred per day. Each session lasted approximately 20 min.

### *Preference Assessment*

Prior to the onset of sessions, instructors conducted a paired-stimulus preference assessment (Fisher et al., 1992) to determine participants' preferred items or activities to be used during intervention. Ten items and activities were initially selected based on direct observation and clinical staff reports. During the assessment, randomly selected pairs of items were presented to the participant. The instructor asked the participant which item they would like to have (e.g., "Do you want the slinky or silly high-fives?"). After the participant selected the item/activity, the participant had approximately 30 s to interact with the item/activity. This was repeated until all pairs of items/activities were presented to the participant. The top four or five items were selected to be used during intervention.

### *Skills Taught*

Instructors taught participants to expressively label two sets of stimuli (see Table 1). The stimuli were not initially identified in a random manor, but based on the participants' age-appropriate interests determined by clinical staff and/or parent recommendations. Tara's target response was labeling the names of popular cartoon characters when exposed to a picture of the individual character. Riggins and Taylor's target response was labeling the names of a sports team when presented with a picture of the sports team's logo. While neither Riggins nor Taylor could read at the time of the study, the instructors attempted to select logos that did not display the team name within the logo, as well as select teams that were not playing at the time of the study. This was done to limit the likelihood of exposure to the logos outside of sessions so as to ensure the only way the participant acquired the names of the teams was a result of the study. After the initial identification of stimulus sets, the instructors randomly divided the stimuli into three conditions: two pictures were randomly assigned to the error correction plus modeling condition, two pictures were randomly assigned to the modeling alone condition and two pictures were randomly assigned to the control (no teaching) condition. Because of the initial identification



**TABLE 1**

**Skills Taught**

<i>Participant</i>	<i>Teaching Condition</i>	<i>Expressive Label Targets</i>	
		<i>Set 1</i>	<i>Set 2</i>
Riggins	Modeling Alone	Cowboys & Raiders	Patriots & Vikings
	Error Statement plus Modeling	Seahawks & Broncos	Chargers & Colts
	Control	49ers & Rams	Giants & Texans
Tara	Modeling Alone	Prince Naveen & Ray	King Fergus & Felix
	Error Statement plus Modeling	Mama Odie & Louis	King Candy & Elinor
	Control	Doctor Facilier & Charolette	Vanellope & Lord Dingwall
Taylor	Modeling Alone	Rockies & Marlins	Raptors & Mavericks
	Error Statement plus Modeling	Braves & Mets	Pacers & Timberwolfs
	Control	Nationals & Philies	Trail Blazers & Grizzlies

of age-appropriateness and popularity, we did not have to take into consideration separating the stimuli based on the difficulty of word length for any participant as the participants did not have difficulty in pronouncing words.

*Measures*

The primary measure of this study was the percentage of trials with correct responses during daily probes, which were conducted at the beginning of each session throughout baseline, intervention, and maintenance conditions. Daily probes were utilized to assess baseline and maintenance levels of responding, as well as mastery. Mastery criterion was determined per condition (error correction plus modeling, modeling alone, and control). Participants had to engage in 100% correct responding to both labels assigned to the condition across three consecutive daily probes to reach mastery criterion. A correct response was defined as the participant vocalizing the label that corresponded with the picture within 5s of the discriminative stimulus. An incorrect response was defined as the participant providing no vocalization of the picture label or stating a name that did not correspond with the picture. Participants were not exposed to labels from Set 2 until they reached mastery criterion for Set 1 labels.

The researchers also sought to examine the efficiency of each EC procedure. In doing so, the researchers measured the total number of teaching trials to criterion, as well as the total

length of time of teaching across teaching conditions, participants, and skill sets. The total number of teaching trials to criterion was determined by adding all teaching trials conducted prior to the participant reaching mastery criterion determined by responding in the daily probe trials. The total length of time of teaching was calculated by adding the length of time of each teaching session per condition.

*General Procedure*

*Baseline and Maintenance.* During the baseline and maintenance condition, after the researcher completed the 24 daily probe trials the participants were returned to their clinical session and no further sessions were conducted that day.

*Intervention.* During the intervention condition, after the 24 daily probe trials were implemented the participant was provided a brief break followed by the two teaching conditions described below. The order of the teaching conditions was randomly determined prior to the start of the session. If the participant met mastery criterion for targets in one teaching condition, the instructor moved on to the teaching condition in which the targets did not meet mastery criterion. If the participant met mastery criterion for all targets across both teaching conditions, the session was completed.

### *Daily Probe*

At the beginning of each session (across baseline, intervention, and maintenance phases), daily probe trials were conducted. During daily probe trials targets across the different conditions were intermixed. The researcher implemented a total of 24 randomly interspersed trials with four trials per target. Each trial began with the instructor presenting the picture and simultaneously presenting the discriminative stimulus (“Who is it?” or “What team?”), waiting 5 s for the participant to respond, and providing neutral feedback (“Thanks”) regardless of the correctness of the response.

### *Intervention and Teaching Conditions*

At the start of each condition the instructor placed a colored piece of paper on the table to designate the condition. Each teaching condition consisted of the presentation of the two labels previously assigned to the specific teaching condition. Each picture stimuli was interspersed five times for a total of 10 teaching trials. The instructor utilized a token economy system in which the participant received one token per correct response. The participant could cash in his or her tokens after all 10 trials for a previously identified preferred item or activity. The cash in was based on a differential reinforcement system. If the participant had less than six tokens he or she received no time with their preferred items; seven or eight tokens resulted in 1 min access with one item; nine or ten tokens resulted in 3 min access with one item. The participant was reminded of both token economy and differential reinforcement systems prior to the start of the 10 trials.

Each teaching trial began with the instructor presenting the picture while simultaneously asking the participant to label the picture and waiting 5 s for the participant to respond. Correct responses resulted in praise plus a token; incorrect responses resulted in implementation of the error correction procedure based upon the teaching condition.

*Modeling alone condition.* During this condition, an incorrect response resulted in the instructor modeling the correct response (e.g., “it’s the Cowboys”) in a neutral tone and

providing no corrective feedback immediately following the incorrect response from the learner. Following the instructor’s model, the instructor moved on to the next trial. The instructor did not require the participant to repeat or practice the correct response. As such, the inter-trial interval was approximately 5 s.

*Error correction statement plus modeling.* During this condition, an incorrect response resulted in the instructor providing general corrective feedback plus the model of the correct response (e.g., “No; it’s the Cowboys”) immediately following the incorrect response from the learner. Following the instructor’s general corrective feedback plus model, the instructor moved on to the next trial. The instructor did not require the participant to repeat or practice the correct the response. As such, the inter-trial interval was approximately 5 s.

### *Interobserver Agreement (IOA) and Treatment Fidelity*

The primary instructor recorded participant behavior during every session and an independent observer simultaneously recorded participant responding during 33% of daily probes across baseline, intervention, and maintenance phases, as well as both teaching conditions. IOA was calculated trial-by-trial by taking the number of agreements, divided by the total number of agreements plus disagreements, and multiplied by 100. Overall percentage agreement was 99% (range 84–100% across all phases and conditions).

The first author trained secondary observers to independently collect data on the instructor’s ability to adhere to the protocol per teaching condition. Treatment fidelity data were collected during at least 25% of all EC conditions across participants. Treatment fidelity was calculated by taking the number of occurrences and dividing it by the number of occurrences plus non-occurrences, and multiplying by 100. Treatment fidelity was 99.92% across all participants, skill sets, and conditions (range 99–100% per session).

### *Experimental Design*

In order to compare the effectiveness of the two EC procedures and examine the effective-

ness across participants, we used an adapted alternating treatments designed nested into a multiple baseline design across participants and replicated across sets.

## Results

Figure 1 depicts the results of the participants' percentage of correct responding on Set 1 during daily probes. All participants engaged in 0% correct responding across all labels during baseline. During intervention, all participants achieved mastery criterion (100% correct responding across three daily probes) within four to ten daily probes for labels that were exposed to EC conditions; however, the rate of acquisition across EC conditions varied across participants. Riggins mastered labels taught in the modeling alone condition after five daily probes and mastered labels taught in the error statement plus modeling condition after seven daily probes. Tara mastered labels taught in the modeling alone condition and error statement plus modeling condition after four daily probes. Taylor mastered labels taught in the modeling alone condition after six daily probes and mastered labels taught in the error statement plus modeling condition after ten daily probes. No participant reached mastery criterion for labels in the control condition. All participants maintained high-levels of responding across both EC conditions during maintenance; labels not exposed to EC conditions remained at 0% correct responding with the exception of Taylor who's responding increased, but did not exceed 50% correct responding.

Figure 2 depicts the results of the participants' percentage of correct responding on Set 2 during probes. All participants engaged in 0% correct responding during baseline probes. All participants achieved mastery criterion within six to ten daily probes. Again, the rate of acquisition varied across EC conditions across participants. Tara mastered labels taught in the modeling condition after ten daily probes and mastered labels taught in the error statement plus modeling condition after seven daily. Riggins mastered labels taught in the modeling condition after six daily probes and mastered labels taught in the error statement plus modeling condition after seven daily probes. Taylor mastered labels

taught in the modeling condition after ten daily probes and mastered labels taught in the error statement plus modeling condition after seven daily probes. No participant reached mastery criterion for labels in the control condition. All participants maintained high-levels of responding across both EC conditions after intervention. Labels not exposed to EC conditions remained at 0% correct responding.

Table 2 depicts the results of the number of teaching trials for each participant to reach mastery criterion across teaching conditions and sets of labels. Riggins reached mastery criterion after 50 and 70 teaching trials for Set 1 labels, and 60 and 70 teaching trials for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively. Tara reached mastery criterion after 40 teaching trials for Set 1 labels for both EC conditions. She reached mastery criterion after 70 and 100 teaching trials for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively. Taylor reached mastery criterion after 50 and 70 teaching trials for Set 1 labels, and 60 and 70 teaching trials for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively. An average of the participant's number of teaching trials to reach mastery demonstrated all participants reached mastery criterion after an average of 47 and 60 teaching trials for Set 1 labels, and an average of 73 and 70 teaching trials for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively.

Table 3 depicts the results of the total length of time per teaching condition across participants and sets of labels. For Riggins, the total length of teaching time was 6 min 13 s and 8 min 31 s for Set 1 labels and 6 min 7 s and 8 min 43 s for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively. For Tara, the total length of teaching time was unknown for the modeling alone condition for Set 1; however, the length of time for 3 of 4 sessions with teaching was 2 min 45 s. The total length of time was 3 min 51 sec for Set 1 labels exposed to the error statement plus modeling condition. For Set 2, the total length of time of teaching for Tara was 10 min 11 s and 7 min

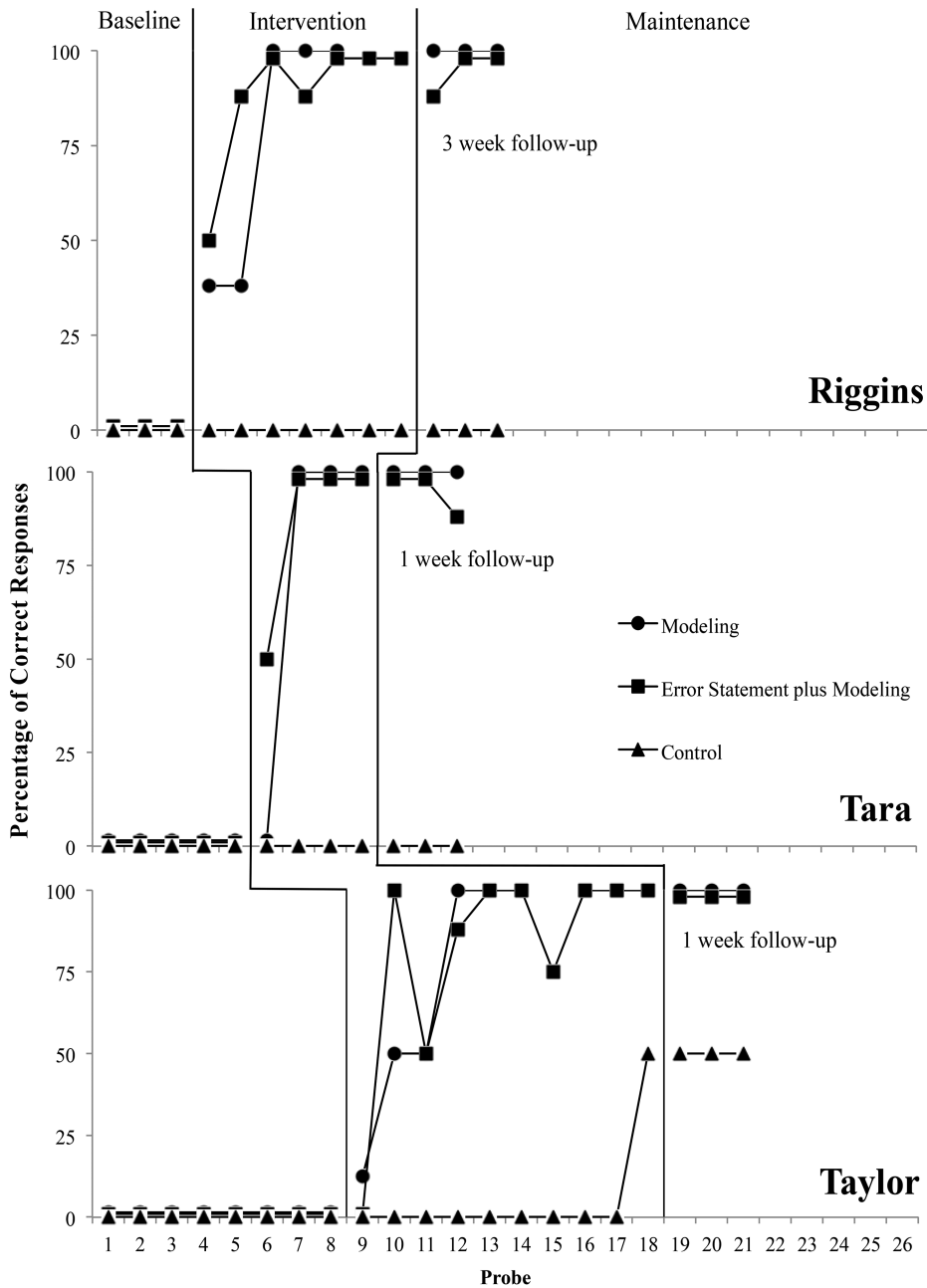


Figure 1. Percentage of correct responses for Set 1 expressive labels during probes across participants in which circles represent labels exposed to the modeling condition, squares represent labels exposed to the error statement plus modeling condition, and triangles represent labels in the control condition.

2 s for labels exposed to modeling alone and error statement plus modeling conditions, respectively. For Taylor, the total length of teaching time was 6 min 28 s and 10 min 1 s

for Set 1 and 11 min 39 s and 8 min 25 s for Set 2 labels exposed to the modeling alone and error statement plus modeling condition, respectively.

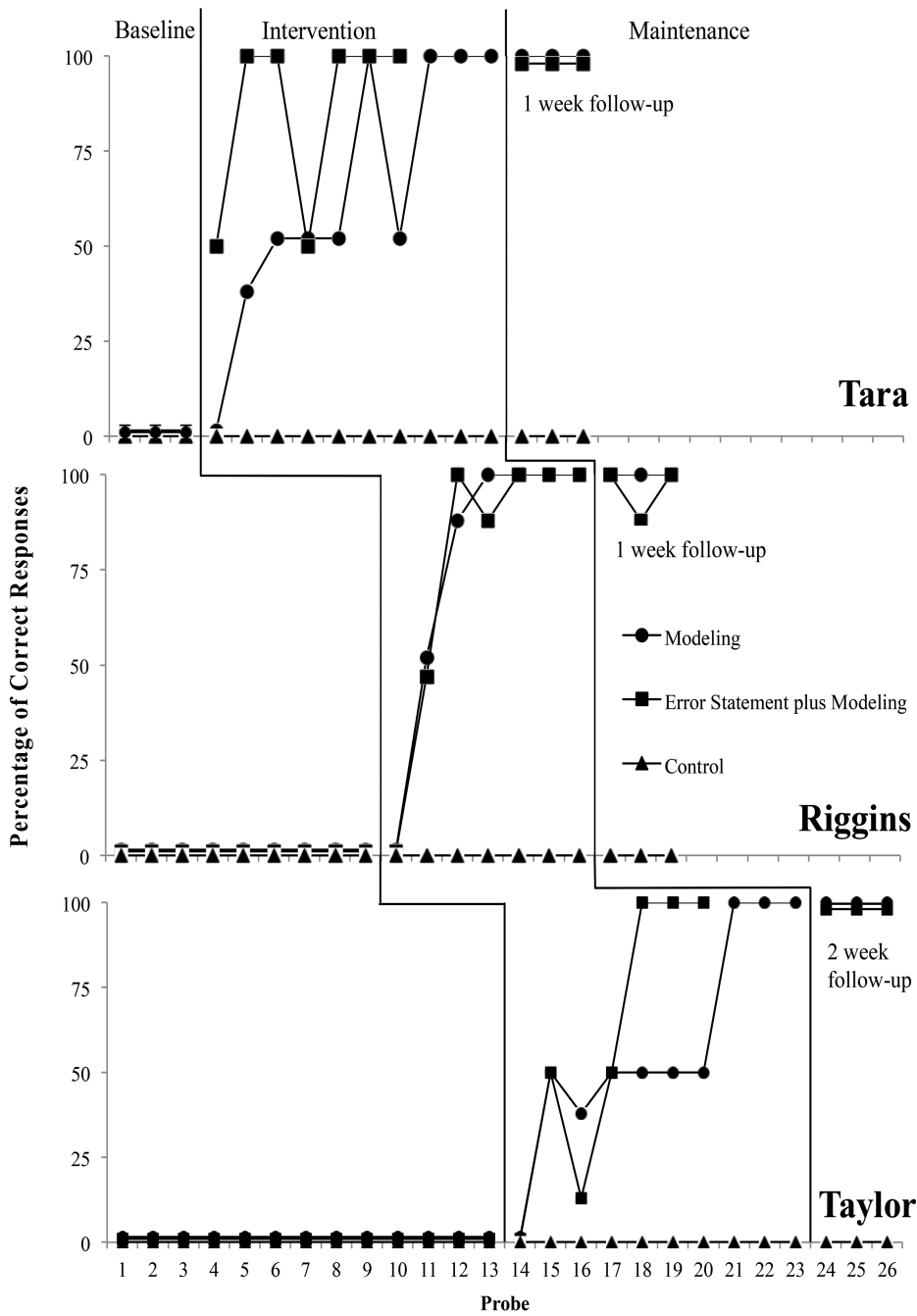


Figure 2. Percentage of correct responses for Set 2 expressive labels during probes across participants in which circles represent labels exposed to the modeling condition, squares represent labels exposed to the error statement plus modeling condition, and triangles represent labels in the control condition.

**TABLE 2**  
**Number of Teaching Trials to Reach Mastery**

<i>Participant</i>	<i>Teaching Condition</i>	<i>Number of Teaching Trials To Reach Mastery</i>	
		<i>Set 1</i>	<i>Set 2</i>
		Riggins	Modeling Alone
	Error Statement plus Modeling	70	70
Tara	Modeling Alone	40	100
	Error Statement plus Modeling	40	70
Taylor	Modeling Alone	50	60
	Error Statement plus Modeling	70	70
All Participants	Modeling Alone	47	73
	Error Statement plus Modeling	60	70

**Discussion**

Previous research has demonstrated the effectiveness of EC procedures when implemented in DTT with children with ASD, resulting in the acquisition of new skills (Carroll et al., 2015; Leaf et al., 2014; Smith et al., 2006;

Turan, Moroz, Croteau, 2012). This research has also demonstrated that the most effective and efficient EC procedure varies across participants with a range of skill deficits (Carroll et al., 2015; McGhan & Lerman, 2013; Smith et al., 2006). Little empirical data, however, support the effectiveness of EC procedures for children with autism that are described as high functioning. In order to provide empirical support for these types of learners, the purpose of this study was to identify the effectiveness and efficiency of two similar EC procedures that are presumably frequently utilized in clinical practice.

The results of this study demonstrate that children described as high functioning individuals with autism can acquire labels taught using two different EC procedures. The results also show all participants maintained high levels of correct responding one to three weeks after teaching was discontinued. This study adds to current literature providing empirical evidence that high-functioning children with autism not only acquire labels using two minimally intrusive EC procedures, but that these skills maintain over time as well.

The second part of the purpose of this study was to examine and compare the efficiency of the modeling alone and error statement plus modeling EC procedures. Only one participant (Riggins) acquired labels more rapidly with one EC procedure (modeling alone) across both sets of expressive labels. The number of teaching trials to reach mastery criterion, as well as the total length of time per teaching condition across participants and sets of labels were measured to assess the efficiency of the EC procedures. Only one participant (Riggins) acquired labels in less teaching trials and less time with one EC procedure (modeling alone) across both sets of expressive labels. The results of this study are not enough to claim one EC procedure was more or less efficient for the group of individuals. Perhaps the most efficient EC procedure would have been more easily identified if additional sets of skills were taught. One interesting finding was the error statement plus modeling procedure demonstrated a smaller range with respect to the number of teaching trials to reach mastery by 30 trials and the total length of time by approximately 2 min.

**TABLE 3**  
**Total Length of Time per Teaching Condition across Participants and Sets of Labels**

<i>Participant</i>	<i>Teaching Condition</i>	<i>Total Length of Time (Min:S)</i>	
		<i>Set 1</i>	<i>Set 2</i>
Riggins	Modeling Alone	6:13	6:07
	Error Statement plus Modeling	8:31	8:43
Tara	Modeling Alone	-(2:45*)	10:11
	Error Statement plus Modeling	3:51	7:02
Taylor	Modeling Alone	6:28	11:39
	Error Statement plus Modeling	10:01	8:25

\* Total length of time of 3 of 4 sessions with teaching.

While exploring the effectiveness and efficiency of two specific EC procedures, this study does not come without limitations. Because this study only measured skill acquisition for one response topography, future researchers should explore how responding maintains when children, particularly higher functioning children with autism, are taught different or more complex skills using different EC procedures in DTT or more natural learning environments.

The individuals that participated in this study were selected because they all demonstrated a broad range of expressive and receptive functioning, had a complex imitative repertoire, and were capable of engaging in complex, yet age-appropriate forms of social communication. In addition, all participants had extensive prior exposure to DTT, token economies, and differential reinforcement. Future studies should continue to explore how individuals who do not have an extensive expressive or receptive repertoire, and who do not readily engage in imitative behavior respond to these EC procedures similar to the ones outlined in this study.

Another limitation was that we did not control for several variables that could also explain the acquisition of the targeted labels. First, part of the procedure during teaching was the use of differential reinforcement within a token economy system. Previous research has indicated that the use of differential reinforcement alone can influence correct responding during skill acquisition (e.g., Rodgers & Iwata, 1991). Future researchers could replicate this study comparing EC conditions with and without differential reinforcement.

In addition, when utilizing the multiple baseline design one establishes functional control by demonstrating that skill acquisition occurs when, and only when, the intervention is implemented; however, one participant (Taylor) acquired one label outside of the intervention. Based on informal staff interviews and self-reports, Tyler's targets were of high interest. As he progressed through intervention, he was observed asking the instructors and staff the names of the labels not taught during intervention. When instructors and staff did not tell him the name of the label, he sought out the answer on his own. While this may have compromised the func-

tional control intended by the design of the study, it does reflect the reality of conducting research in clinical settings.

Another concern is the two EC conditions were very similar. While steps were taken to differentiate the two EC conditions to the participants using colored sheets of paper, the potential overlap between the two procedures could have attributed to the results. Continued efforts of research comparing similar EC procedures should ensure there is no overlap between conditions. Future researchers should take these necessary steps to avoid these confounding variables in an effort to most easily identify the EC procedure(s) as the only controlling variable.

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## **DADD Statement on the use of the term Intellectual Disability**

The Board of Directors for the Division on Autism and Developmental Disabilities endorses the use of the term “intellectual disability” to replace any previous term used to describe the population of students with significant limitations in intellectual functioning and adaptive behavior as manifested in the developmental period. This action is: (1) consistent with the Division’s movement away from the use of the term “mental retardation” over the past decade; (2) in alignment with the adoption of the term intellectual disability by the field’s primary diagnostic and classification systems; (3) adheres to changes in federal law with regard to nomenclature; and (4) reflects current conceptualizations of disability as manifesting as a state of functioning that exists within the fit between the person’s capacities and limitations and the context in which the person functions. The adoption of the term intellectual disability implies an understanding of disability consistent with an ecological and multidimensional perspective and requires that society responds with interventions that focus on individual strengths and that emphasize the role of supports to improve human functioning. Although some confusion has arisen in the field with regard to the use of the term intellectual disability (reflecting a single state of functioning) or intellectual disabilities (suggesting multiple types of states of functioning), DADD agrees with the use of the term intellectual disability, in the singular, to reflect a single state of functioning characterized by significant limitations in intellectual functioning and adaptive behavior, though with the understanding that intellectual disability can vary among students by severity of intellectual impairment and in the type, intensity, and duration of supports needed by a person to function in typical, integrated environments and contexts.

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PRISM  
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Volume 8

# Friendship 101: Helping Students Build Social Competence



Juliet E. Hart Barnett and Kelly J. Whalon, Editors



Council for  
Exceptional  
Children



DADD  
Division on Autism and  
Developmental Disabilities

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**Juliet E. Hart Barnett and Kelly J. Whalon, Editors**

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# Education and Training in Autism and Developmental Disabilities

## Editorial Policy

*Education and Training in Autism and Developmental Disabilities* focuses on the education and welfare of persons with autism and developmental disabilities. *ETADD* invites research and expository manuscripts and critical review of the literature. Major emphasis is on identification and assessment, educational programming, characteristics, training of instructional personnel, habilitation, prevention, community understanding and provisions, and legislation.

Each manuscript is evaluated anonymously by three reviewers. Criteria for acceptance include the following: relevance, reader interest, quality, applicability, contribution to the field, and economy and smoothness of expression. The review process requires two to four months.

Viewpoints expressed are those of the authors and do not necessarily conform to positions of the editors or of the officers of the Division.

### Submission of Manuscripts

1. Manuscript submission is a representation that the manuscript is the author's own work, has not been published, and is not currently under consideration for publication elsewhere.
2. Manuscripts must be prepared according to the recommendations in the **Publication Manual of the American Psychological Association** (Sixth Edition, 2009).
3. Each manuscript must have a cover sheet giving the names and affiliations of all authors and the address of the principal author.
4. Research studies, including experimental (group and single-subject methodologies), quasi-experimental, surveys, and qualitative designs should be no more than 20–30 typewritten, double-spaced pages, including references, tables, figures, and an abstract.
5. Graphs and figures should be originals or sharp, high quality photographic prints suitable, if necessary, for a 50% reduction in size.
6. Three copies of the manuscript along with a transmittal letter should be sent to the Editor: Stanley H. Zucker, Mary Lou Fulton Teachers College, Box 871811, Arizona State University, Tempe, AZ 85287-1811.
7. Upon receipt, each manuscript will be screened by the editor. Appropriate manuscripts will then be sent to consulting editors. Principal authors will receive notification of receipt of manuscript.
8. The Editor reserves the right to make minor editorial changes which do not materially affect the meaning of the text.
9. Manuscripts are the property of **ETADD** for a minimum period of six months. All articles accepted for publication are copyrighted in the name of the Division on Autism and Developmental Disabilities.
10. Please describe subjects (or any other references to persons with disabilities) with a people first orientation. Also, use the term "intellectual disability" (singular) to replace any previous term used to describe the population of students with significant limitations in intellectual functioning and adaptive behavior as manifested in the developmental period.

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