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

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June 2013


Portable and accessible video modeling: Teaching a series of novel skills within school and community settings. Teresa Taber-Doughty, Bridget Miller, Jordan Shurr, and Benjamin Wiles, Purdue University, Dept. of Educational Studies, 100 N. University Street, West Lafayette, IN 47907-2098.

Utilizing teaching interactions to facilitate social skills in the natural environment. Alyne Kuymjian, Mitchell Taubman, Eric Rudrud, Justin B. Leaf, Andrew Edwards, John McEachin, Ron Leaf, and Kim Schulze, 200 Marina Drive, Seal Beach, CA 90740.

Comparison of the effects of video modeling with narration vs. video modeling on the functional skill acquisition of adolescents with autism. Molly Smith, Kevin Ayres, Linda Mechling, and Katie Smith, Department of Special Education, The University of Georgia, 516 Aderhold Hall, Athens, GA 30602.

Effects of computer-based instruction on teaching emergency telephone numbers to students with intellectual disability. Serife Yucesoy Ozkan, Nuray Oncul, and Ozlem Kaya, Anadolu Universities, Egitim Fakultesi, Ozel Egitim Bolumu, 26470, Eskisehir, TURKEY.

Use of an iPhone 4 with video features to assist location of students with moderate intellectual disability when lost in community settings. Kaitlin Purrazzella and Linda C. Mechling, University of North Carolina Wilmington, Department of Early Childhood & Special Education, 601 South College Road, Wilmington, NC 28403-5940.

Teaching adults with moderate intellectual disability ATM use via the iPod. Renee Scott, Belva Collins, Victoria Knight, and Harold Kleinert, Department of Special Education, 229 Taylor Education Building, University of Kentucky, Lexington, KY 40506-0001.

Effects of Wh-question graphic organizers on reading comprehension skills of students with autism spectrum disorders. Keri S. Bethune and Charles L. Wood, Department of Special Education and Child Development, University of North Carolina Charlotte, 9201 University City Boulevard, Charlotte, NC 28223.

Evaluation of manual spelling, observational, and incidental learning using computer-based instruction with a tablet PC, large screen projection, and a forward chaining procedure. Kimberly Purrazzella and Linda C. Mechling, University of North Carolina Wilmington, Department of Early Childhood & Special Education, 601 South College Road, Wilmington, NC 28403-5940.

Evaluation of multiple-stimulus preference assessment with adults with developmental disabilities. Gareth Davies, Carly Chand, C.T. Yu, Toby L. Martin, and Garry L. Martin, University of Manitoba, St. Amant Research Centre, 440 River Road, Winnipeg, Manitoba R2M 3Z9 CANADA.

Effects of the CD-Rom version of the self-advocacy strategy on quality contributions in IEP meetings of high school students with intellectual disability. Jennifer Cease-Cook, David W. Test, and La’ Shondra Scroggins, National Secondary Transition Technical Assistance Center, UNC Charlotte, Department of Special Education and Child Development, 9201 University City Blvd., Charlotte, NC 28223.

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Abstract: Little is known about the effects of participation in inclusive settings on student self-determination. In this exploratory study, we examined the association between students' inclusive school and community activities and the self-determination skills of active involvement in IEP activities and use of selected self-determination strategies. Forty-seven students with severe intellectual disability from three high schools participated; one high school was undergoing state takeover for consistently failing to make AYP and served students living in a high-poverty community. Findings revealed significant differences across schools in student participation in general education and school- and community-based transition activities, which were associated with level of self-determination skill use. Students attending schools offering more inclusive activities reported significantly more use of six of nine self-determination skills. Active student IEP participation was reported to be low across all schools. We discuss implications of findings for future research and practice.

Accumulating evidence has suggested the role of self-determination in promoting positive academic, social, and adult outcomes for students with intellectual and developmental disabilities (e.g., Fowler, Konrad, Walker, Test, & Wood, 2007; Lachapelle et al., 2005; Martorell, Gutierrez-Recacha, Perda, & Ayuso-Mateos, 2008; Wehmeyer & Palmer, 2003). For example, Lachapelle and colleagues (2005) reported that self-determination status related positively to quality of life for adults with intellectual disability. Wehmeyer and Palmer (2003) found a positive relation between self-determination and post-school outcomes (e.g., employment and independent living) for students with intellectual and learning disabilities. Active involvement by students in their individualized education programs (IEPs) and transition planning is valued as a means to promote students' self-advocacy, self-determination, and positive post-school outcomes, and provides a measure of students' level of self-directed learning (Martin, Van Dycke, Christensen et al., 2006; Test et al., 2004; Wehmeyer, Palmer, Soukup, Garner, & Lawrence, 2007). The importance placed on students' involvement in their own educational decision making was established in the Individuals with Disabilities Education Act (IDEA) Amendments of 1997 mandating the inclusion of students in their IEP meetings when transition planning is being discussed and requiring educational decisions to be based on students' declared interests and preferences—a further example of self-determined behavior.

Research suggests that exercise of self-determination skills (e.g., choice making, problem solving, self-advocating) and active involvement in transition planning is positively related to skill instruction received and opportunity to practice skills in inclusive settings (e.g., Wehmeyer et al., 2007). Early studies in residential settings for adults with intellectual disability revealed that, in general, residents had little opportunity for making choices or decisions or advocating for themselves in their...
daily lives (e.g., Kishi, Teelucksingh, Zollers, Park-Lee, & Meyer, 1988; Wehmeyer & Meltzer, 1995). Subsequent studies examined restrictiveness of residential environment in relation to opportunities to practice self-determination. In general, more inclusive settings that provided supports and accommodations were associated with greater opportunities for choice, decision making, and promotion of self-determination for adults with intellectual disability (e.g., Robertson et al., 2001; Wehmeyer & Bolding, 2001; Wehmeyer & Garner, 2003). We found only one published study, however, in which self-determination skills were taught to adults in a residential setting. Specifically, Hughes (1992) taught four adults with severe intellectual disability living in a group home to solve problems related to daily living skills by learning to direct their own performance.

In contrast, a sizable number of investigations of the effects of instruction on self-determination and active involvement in educational planning has been conducted in school settings (cf. Carter, Owens, Trainer, Sun, & Swedeen 2009; Chambers et al., 2007; Shogren et al., 2007). Several researchers have demonstrated the effectiveness of published curricula in promoting positive measures of self-determination (e.g., Cross, Cooke, Wood, & Test, 1999; Hoffman & Field, 1995; Powers et al., 2001; Zhang, 2001b). For example, Cross et al. (1999) found that introducing the ChoiceMaker curriculum (Martin & Marshall, 1995) to students with intellectual disability to teach choice making and goal setting resulted in increased scores on The Arc’s Self-Determination Scale (Wehmeyer & Kelchner, 1995). Research has also examined the effects of instruction to increase students’ active involvement in transition planning and the IEP process, primarily with students with high-incidence disabilities (e.g., Allen, Smith, Test, Flowers, & Wood, 2001; Martin, Van Dycke, Christensen et al., 2006; Mason, McGhee-Kovac, Johnson, & Stillerman, 2002). For example, Martin, Van Dycke, Christensen et al. (2006) used the Self-Directed IEP curriculum (Martin, Marshall, Maxson, & Jerman, 1997) to teach secondary special education students (9% with intellectual disability) to increase their speaking, goal setting, and leadership roles in their IEP meetings. Studies show, however, that without instruction and support, few students are actively involved in the IEP process. Martin, Van Dycke, Greene et al. (2006) reported that, without training, secondary students at IEP meetings generally talk only 3% of the time. Secondary students in Agran and Hughes’s (2008) study likewise self-reported having received little instruction and assuming only a minimal role at their IEP meetings.

However, few investigations in schools have examined inclusiveness of setting in relation to self-determination skills (Shogren, Bovaird, Palmer, & Wehmeyer, 2010). Zhang (2001a) asked general and special education teachers to rate how often students with mild intellectual disability demonstrated 13 self-determination behaviors (e.g., making choices, setting goals, self-advocating) in their respective classrooms. Special versus general education teachers reported higher rates of self-determination behavior, suggesting that special education settings are more conducive to self-determination than are general education environments. However, Zhang suggested that teacher bias or expectations may have influenced results because special education teachers are more likely to be aware of the 1997 IDEA mandate to address students’ interests, preferences, and choices in educational programming. Unfortunately, Zhang did not report actual opportunities or activities that may have related to exercising self-determination in either setting. Further, student perspective on opportunity to exercise self-determination (e.g., making choices) across settings was not sought.

Carter et al. (2009) asked special education teachers of high school students with severe intellectual and developmental disabilities to use the AIR Self-Determination Scale (AIR; Wolman, Campeau, DuBois, Mithaug, & Stolarski, 1994) to rate opportunity to engage in and demonstration of self-determination behaviors at school. The AIR provides examples of opportunities for self-determination for each of six questionnaire items; however, examples relate only to teachers’ provision of opportunities that could influence self-determination. To illustrate, the example for the goal-setting item is “Troy’s teachers let him know that he is responsible for setting his own goals to get his needs and wants met.” Therefore, the AIR asks teachers to rate their own
actions in providing opportunities for students to practice self-determination, which could lead to inflated scoring. Indeed, teachers in Carter et al.’s (2009) study rated opportunities for self-determination as sometimes to almost always available at school, although they reported that students almost never to sometimes demonstrated self-determined behaviors. However, no evidence was provided by the authors to corroborate teacher report; therefore, it is not known to what extent opportunities actually existed in school settings. In addition, Carter et al. did not provide student input on opportunities to practice self-determination skills because of concerns with the validity of responses of students with severe intellectual disability.

This study is a preliminary investigation of the association of level of participation in inclusive activities in school and community and students’ reported self-determination skill use. As argued by Walker et al. (2011), “the degree to which one is socially included affects one’s opportunities to engage in self-determined actions; it also impacts the experiences in which one learns about individual preferences, interests, wants, needs, and desires” (p. 15). Walker and colleagues further argued that research (e.g., Wehmeyer et al., 2007) clearly shows, as compared to more restrictive settings and experiences, inclusion in community and school provides greater opportunities to make choices, express preferences, set goals, and become more self-determined. However, participation in inclusive settings and activities has not been investigated in relation to self-determination in school settings. Our hypothesis was that participation in more inclusive school and community activities would be associated with greater self-determination skill use.

In addition, we sought to extend the literature on self-determination and student involvement in educational programming by addressing limitations of previous studies of self-determination in school settings. First, because students from low-income communities rarely have been included in investigations of self-determination, we included a high school serving high-poverty youth in our study sample. Second, participants in previous studies investigating self-determination in both residential and school settings were largely White (e.g., Carter et al., 2009; Shogren et al., 2007; Wehmeyer & Meltzer, 1995), whereas the majority of our participants was from groups underrepresented in the disability literature (e.g., Blacks and Hispanics).

Third, rather than include participants with less intense disabilities (e.g., learning disabilities or mild intellectual disability), as in the majority of studies investigating self-determination and IEP involvement (cf. Test et al., 2004), students in our study had severe intellectual disability. Fourth, instead of querying teachers with respect to students’ active IEP involvement and self-determination (e.g., Zhang, 2001a), we interviewed students directly to obtain their perspective on IEP involvement and engagement in self-determination behaviors. Last, to address the concerns of Carter et al. (2009) and others with respect to validity of responses of people with severe intellectual disability and their tendency to acquiesce when queried, we introduced a novel methodological feature by asking participants to provide an example when a response was affirmative. If the example and response did not match in meaning, the response was invalidated. Retained responses provided rich illustrations of self-determination use as reported by students themselves.

Method

Settings

Students from three high schools located in a large urban school district of 78,000 students in southeastern U.S. participated in the study. We selected these three high schools because they represented geographically and demographically diverse areas of the school district. School A was purposely chosen because we wished to sample the self-reported self-determination skills of students attending an under-resourced, economically challenged high school serving students from a high-poverty community. In contrast, students attending Schools B and C were from more middle-income communities (see below). Further, unlike the other two schools, School A was being taken over by the state due to a 53% dropout rate and failing to make Annual Yearly Progress (AYP) on state exit exams. School A had also been identified as a segre-
gated, high-need “dropout factory” (Balfanz & Legters, 2004), whereas Schools B and C were in good standing with respect to graduation rates and exit exam scores.

School A enrolled 1070 students, of which 81% were Black, 16% White, and 3% Hispanic or Asian; 74% of students qualified for free or reduced lunch. The majority of households (56%) in the community were single-parent and 42% had an income of less than $25,000. In comparison, free or reduced lunch rates at Schools B and C were 41% and 53%, respectively. Majority student populations at these schools were 53% Black (40% White; School B) and 52% Black (24% White, 20% Hispanic; School C). Single-parent households in the communities served by these schools were 53% Black (40% White; School B) and 52% Black (24% White, 20% Hispanic; School C). Single-parent households in the communities served by these schools were 28% (School B) and 30% (School C), and household incomes of less than $25,000 were 27% (School B) and 17% (School C). Because preliminary Pearson Chi-square tests revealed significant differences across demographic characteristics of School A compared to each of Schools B and C when analyzed separately (i.e., students’ race/ethnicity < .001, graduation rate < .001, free/reduced lunch status < .001, single-parent households < .001, household income < .001), for all subsequent analyses, we compared School A against Schools B and C combined.

**Table 1**

<table>
<thead>
<tr>
<th>Participation in General Education and Transition Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>School</strong> No. of class periods <strong>A</strong> <strong>B-C</strong> <strong>p</strong></td>
</tr>
<tr>
<td>Total participants</td>
</tr>
<tr>
<td>In general education classes (daily)</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>1 class period</td>
</tr>
<tr>
<td>2 or more class periods</td>
</tr>
<tr>
<td>In school-based transition activities (daily)</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>1 class period</td>
</tr>
<tr>
<td>2 or more class periods</td>
</tr>
<tr>
<td>In community-based transition activities (weekly)</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>1 class or less per week</td>
</tr>
<tr>
<td>2 or more classes per week</td>
</tr>
</tbody>
</table>

*Note.* *p* < .01.

* Number and percentage of participants. School A is compared against Schools B-C combined.

**Participation in inclusive settings.** In addition, extensive direct observation by the authors in these high schools prior to the current study indicated that participation in inclusive school- and community-based activities by students with severe disabilities varied considerably for School A students versus students attending Schools B and C. To confirm our observations, we compared amount of time in and type of general education classes attended, and amount of time participating in transition-related activities (e.g., in-school jobs, vocational classes, community work experiences) as drawn from school records. We used Pearson Chi-square tests in SPSS (*p* < .01) to compare findings.

Table 1 displays participants’ enrollment in general education classes and involvement in school- and community-based transition activities. Significant differences were found using Pearson Chi-squared tests for number of class periods in (a) general education, (b) school-based transition activities, and (c) community-based transition activities for School A students versus School B-C students combined. Only four of the 19 participating students in School A attended one or more general education classes daily outside their self-contained classes. Similarly, only three students from School A were enrolled in one or more class
periods per day of school-based transition activities. Only eight (42%) of School A’s participants spent up to one class period per day in transition activities in the community. On the other hand, 15 of 28 students in Schools B-C attended two or more general education classes per day; five attended one class daily. Over half \( (\frac{n}{110} = 0.5) \) of School B-C participants engaged in two or more class periods of school-based transition activities daily, and over one third \( (\frac{n}{110} = 0.33) \) spent two or more class periods daily in community-based transition activities.

In addition, a two-tailed \( t \)-test \( (p < .05) \) for the combined categories of enrollment in general education and school- and community-based transition activities was significant, \( t(45) = 7.88, p < .001 \), with a mean of 0.89 (SD = 1.05) for School A versus a mean of 3.43 (SD = 1.10) for Schools BC where none = 0 and two or more classes per week = 2. The effect size was large (Cohen’s \( d = 2.35 \)).

Based on our preliminary analyses across School A compared to Schools B-C, we determined that proceeding with our investigation of students’ participation in the IEP process and self-determination skill use was justified, as follows.

Participants

Participants \( (N = 47) \) were enrolled in special education programs for students with intellectual disability that emphasized functional academics and employment skills. Participant selection criteria were: (a) students had an Individualized Education Program (IEP) and received special education services in classes for moderate and severe intellectual disability, (b) students had moderate to extensive support needs as documented by school records, (c) students could respond verbally to spoken questions in four-to-five word phrases and follow one- to two-part directions, and (d) written parental and student consent was obtained. Students meeting these criteria were 19 of 38 students (School A), 14 of 25 (School B), and 14 of 41 (School C) enrolled in these classes. Students excluded were those who did not communicate verbally (e.g., used gestures) and those with limited support needs (e.g., only monitoring or verbal prompts needed to complete daily living skills independently). Participants’ ages ranged from 14–21 years \( (M = 17) \) and 25 of 47 students were female. Participants at School A were 16 Blacks and three Whites; at School B, five Blacks and nine Whites; and at School C, eight Blacks, four Whites, and two Hispanics.

Instruments and Administration

Student Self-Determination Survey (SS-DS). We developed the Student Self-Determination Survey (SS-DS) based on an extensive review of literature in self-determination and student involvement in the IEP process. The SS-DS comprised 18 interview items (17 forced-choice questions with requests to give examples and one open-ended question) related to: (a) involvement in the IEP process \( (n = 8) \); e.g., Agran, Snow, & Swamer, 1999; Martin, Greene, & Borland, 2004; Test et al., 2004) and (b) use of self-determination strategies, such as problem-solving \( (n = 9) \); e.g. Agran & Hughes, 2008; Wehmeyer, Agran, & Hughes, 2000). A final open-ended question asked students to identify their post-school goals (e.g., Benz, Lindstrom, & Yovanoff, 2000). A draft instrument was field-tested for clarity of wording among five research staff and 17 racially and ethnically diverse high school students with severe intellectual disability; revisions in wording were incorporated into a final instrument. Cronbach’s alpha for the SS-DS was .82 (18 items, 54 respondents with severe disabilities).

The survey was conducted as individual interviews by graduate students in special education by following a written script (Agran & Hughes, 2008) to ensure consistency in administration. Interviewers read the questions to each participant individually in a quiet area of the classroom, providing clarification or rephrasing as needed to promote comprehension. Participants were asked to identify if and how often they engaged in IEP-related behavior (e.g., attending IEP meeting) or a self-determination skill, such as goal setting. If they responded affirmatively, they were asked to describe an occurrence as an illustration of when they had used the skill. To control for acquiescence as is characteristic of individuals with severe intellectual disability, if, after probing for understanding, participants’ examples did not match their response, affirma-
Data Analysis

Data analysis was comprised of the following four steps: First, students’ educational programming and participant responses were numerically coded and tabulated. Descriptive statistics were calculated for both data sets using Pearson Chi-square tests in SPSS. To control for random significance due to the number of descriptive comparisons (18), the \( p \)-value of the Chi-square analyses was set at .01. Second, because school and community demographic characteristics differed significantly for School A when compared to each of Schools B and C (see Setting), we compared School A findings against School B-C combined responses, as previously indicated. Third, upon visually examining histograms to assure normality of the data, we performed two \( t \)-tests to compare the mean summative responses of School A participants against the combined mean summative responses of School B-C participants. We compared students’ (a) reported level of involvement in their IEP process and (b) reported use of self-determination strategies. We set the \( p \)-value at .05 for both hypothesis-based comparisons and also calculated effect sizes. Fourth, we combined student-reported qualitative statements of their self-determination skill use and chose representative examples to illustrate findings.

Results

Findings are displayed in Tables 2 and 3, in which responses for School A are compared to combined responses for Schools B-C. Representative examples of students’ self-reported statements in response to questions on the SS-DS are included below.

**Participation in the IEP Process**

**Overall IEP participation.** Students’ self-reported participation in the IEP process in response to SS-DS questions is shown in Table 2. Low participation was reported across participants and schools for all phases of the IEP process queried, revealing no significant differences in responses for School A compared to combined School B-C responses. Less than half of participants across all schools (\( n = 21 \)) reported even knowing what an IEP was and only five students (School A = 0) reported leading their IEP meetings, although two-thirds (\( n = 31 \)) did report attending their meetings. When asked to tell what an IEP was, one student from School A said, “It’s a record for how you’re doing.” A School C participant responded that “an IEP is like a place, a meeting. They ask a couple of questions, like what you want to do, what you want to work at, and you have to tell them what, and where you want to work at once you leave out of this school.” Another School C participant stated, “It is when you get the chance to talk about what you need, your goals, and what you need to work on your need.”

When asked to tell about an IEP meeting he or she had attended, a School A student reported, “I sit in them. They talk about my reading skills, math skills, and what I will do after graduation.” Similarly, a student from School B said, “They talked about me. They talked about school.” Just over a third (\( n = 17 \)) of all participants reported knowing what their IEP goals were, while two-thirds (\( n = 31 \)) said they never read their IEPs. Those reporting to know their IEP goals gave examples, primarily related to academic performance. For example, one student attending School A said, “Working on my reading and getting better at math,” while a School B student stated, “Do good in subjects, pass, and get As in classes.”

Only 12 students reported ever evaluating their progress on their IEP goals, although seven students across Schools B-C reported evaluating their goals once a week (School A = 1) or daily (School A = 0). Only 40% (\( n = 19 \)) of participants reported ever discussing their IEP goals with parents or family, although nine students across Schools B-C reported doing so daily or weekly (School A = 2). Similarly, only 28% (\( n = 13 \)) of participants reported ever discussing IEP goals with teachers. Examples of IEP goal discussion primarily related to IEP meetings. For example, one School A student remarked that she discussed her IEP goals with her teachers “when we have an IEP meeting with my mom.”
Statistical analysis of IEP participation. A two-tailed t-test (p < .05) revealed no significant statistical difference between means of the cumulative responses to questions about participation in the IEP process between School A and Schools B-C combined, t(45) = 1.44, p = .158 with M = 3.05, SD = 2.34 (School A) versus M = 4.46, SD = 3.82 (Schools B-C), where no = 0 and yes = 1; never = 0 and daily = 3.

Self-Determination Skills

Table 3 shows findings for questions on the SS-DS related to self-determination skills. School A participants reported significantly less (p < .01) frequent use of six of nine self-determination skills: specifically, self-advocacy (How often do you speak up for yourself?), choice making (How often do you make choices by yourself?), self-reinforcing (How often do you tell or reward yourself that you did well when you finish a task?), self-monitoring (How often do you count the number of times you perform a task?), self-evaluating (How often do you compare how well you are doing now with how well you did in the past?), and problem solving (How often do you solve problems by yourself at school, work, or home?) than did students attending Schools B-C combined. At the same time, similarities across schools were evident in examples of use of self-determination skills provided by students, as follows.

Self-advocating occurrences (Question 10) reported by students across schools primarily related to defending themselves in social situations or from bullying. Examples included “When someone says you did something and you didn’t, you have to say ‘No,’” “I’m not even scared of—used to be a little girl but not now” (School B). Students’ examples of making choices by themselves (Question 11) generally related to daily life outside school, such as “I make choices to listen to my
CD" (School C). Self-reinforcing (Question 12) reportedly occurred in response to both school (e.g., “When I did well and made the honor roll, I told myself ‘Good job’” [School A]) and outside school events (e.g., “I say ‘Be cool’ when I did good playing soccer” [School C]). Students reported that they self-monitored (Question 13) primarily when exercising “I count when I’m on a track—I got to do five laps” (School A) or engaging in community-based job training “I count the number of tables I wash” (School C). Self-evaluating (Question 15) was reported to occur in relation to academic or work performance (e.g., “In the past I couldn’t read and write and now I can help people when they are sick or hurt” [School C]) and personal interactions (“I’m getting along with my family better now” [School B]). Problem-solving examples generally were in response to outside school events,
such as losing a house key (e.g., “My mom told me she’d leave the key under the trash can and it wasn’t there so I had to call my mom and she had to leave work” [School A]) or challenges at home (e.g., “When there are problems at home, it’s very hard to study during it. Had to ask Mom to help with sister” [School B]).

Although findings for the remaining three skills (i.e., goal setting, self-instructing, decision making) were not significantly different at the $p < .01$ level (self-instructing was at $p < .05$), School A participants reported never using these skills more frequently than did students in Schools B and C combined. For example, 11 School A participants reported never self-instructing, whereas 11 School B-C reported self-instructing all of the time (e.g., “Yeah, sometimes I do talk to myself, it’s a good idea and learning strategy” [School B]). Self-determination skills reported most frequently by School B-C students were self-advocating, choice making, self-reinforcing, and problem solving.

Statistical analysis of self-determination skills. A two-tailed $t$-test ($p < .05$) revealed a significant difference between means of the cumulative responses to self-determination skill items for School A and Schools B-C combined, $t(44) = 5.54, p < .001$. School A had a mean score of 5.89 ($SD = 4.50$) whereas Schools B-C combined had a mean of 15.22 ($SD = 6.29$), where never $= 0$ and all of the time $= 3$. The effect size was large (Cohen’s $d = 1.71$).

Post-school Goals

When asked the open-ended question on the SS-DS “What do you want to do when you graduate from high school?,” two-thirds of students across schools ($n = 30$) indicated wanting to seek employment. Responses included “Work in a grocery store putting things in a bag” (School A) and “I want to become a model and a fashion designer, because I like to design prom dresses” (School C). Nine students cited post-secondary education goals, primarily related to career training, such as “Go to technical school—do paint collision, custom painting” (School A) or “Go to college and graduate in culinary arts” (School B). Seven students indicated wanting to stay home and, in some cases, care for children, such as reported by a student from School B: “Stay home, keep my cousins.” Three students did not indicate any post-school goals.

Discussion

In this exploratory study, we examined the role of participation in inclusive settings and activities associated with active involvement in IEP activities and use of self-determination strategies among high school students with severe intellectual disability. We included a population rarely participating in self-determination investigations: students attending a high-poverty high school—many of whom were Black, Hispanic, or other ethnicities. Further, student interview data provided rich narrative findings to corroborate student self-reported use of self-determination skills.

Findings revealed significant differences in student participation in general education and transition activities across schools, which were associated, in turn, with level of self-determination skill use. Students with severe intellectual disability who were primarily educated throughout the day in their special education classrooms (School A) reported significantly less use of six of nine self-determination skills than did School B-C counterparts who experienced significantly more opportunity for inclusion in school and community. We also found significantly lower composite responses on self-determination skill use. Student-reported IEP participation was found to be low with no significant differences across schools. Most students across schools indicated wanting employment after high school versus post-secondary education. Our findings contribute to the literature in several important ways, as follows.

First, an empirical association has been established in the literature between indicators of self-determination and participation in the IEP process and positive post-school outcomes, such as employment (Martorell et al., 2008). It is critical, therefore, to know what components of transition programming promote the development of self-determination skills and active involvement in educational programming. This question is particularly compelling in light of the chronically poor post-school outcomes faced by students with severe intellectual disability (e.g., unemploy-
ment, economic dependence, segregation; Newman, Wagner, Cameto, & Knokey, 2009). Researchers have examined the role of instruction in promoting students’ self-determination and IEP involvement (e.g., Cross et al., 1999); in contrast, little is known about the influence of participation in inclusive settings and activities (e.g., Shogren et al., 2010).

We found that School A students participated in inclusive classes and school- and community-based transition instruction significantly less than did students attending Schools B-C. Numerous studies have demonstrated the positive effects of both inclusive school environments and community-based training on post-school outcomes, such as employment, postsecondary education, and independent living (e.g., Cimera, 2010; Test et al., 2009). It is likely that attending school exclusively in a separate special education classroom, such as did 79% of School A participants (Table 1), and having very limited or no community-based instruction (all School A participants), provided students little opportunity to independently make choices, solve problems, or speak up for themselves. As suggested by Wehmeyer and Metzler (1995), educational environments that are highly structured, restrictive, or protective typically do not provide opportunities for independent problem solving or decision making. When daily activities are totally predictable, students likely do not have the opportunity to develop the skills to respond independently to the ever-changing, unpredictable events and vicissitudes that comprise everyday life in inclusive school and community settings.

In contrast, inclusive environments may present frequent challenges that can prompt independent performance and self-determination skills. For example, the bus route that a student takes to a community-based job site may unexpectedly change, causing the student to have to problem-solve options to get to work. Or when walking in the hall to her inclusive class without a teacher, a student must learn to prompt and reinforce herself to get to class on time. School A students in our study—who were already handicapped by limited access to inclusive school and community instructional environments—reported significantly less use of self-determination skills than did their counterparts experiencing more inclusive educational environments, suggesting that segregated settings can hinder self-determination. Our findings suggest that the degree to which students are included in school and community may affect their opportunities to make choices, set personal goals, express preferences, and develop other self-determination skills, as argued by others (e.g., Walker et al., 2011; Wehmeyer et al., 2007).

Second, our study is important because it is one of the few to examine self-determination and IEP participation among ethnically and racially diverse students with severe intellectual disability (Schools A-C), as well as those attending a failing, high-poverty high school (School A). Studies of self-determination and IEP participation have overwhelmingly included White, middle-class participants (e.g., Carter et al., 2009). Further, rarely have high-poverty youth with severe intellectual disability (or any transition-age youth with severe disabilities, for that matter) been asked about their self-determination and IEP involvement, highlighting the need to include these students as study participants. Students attending high-poverty School A reported significantly less use of self-determination skills than School B-C students. They also spent significantly less time in general education classes and transition activities in school and community than did their School B-C counterparts.

We cannot assume a relation between high-poverty schools and lack of inclusion and transition activities from these findings; however, limited resources typically associated with high-poverty environments likely present challenges to providing inclusive activities in high-poverty schools. For example, lack of transportation, job sites, and recreational facilities typically associated with high-poverty neighborhoods (Barton & Coley, 2010) may severely limit community-based instruction for students attending these schools. Likewise, limited numbers of paraprofessionals and other school staff may prevent teachers from implementing job training sites on campus, such as in the cafeteria, school office, or sports facilities, because of lack of supervisory staff across dispersed training sites. If participation in inclusive activities in school and community relates to increased self-determination, as suggested by this study, the “deck may be stacked” against students with severe intellectual dis-
ability attending high-poverty schools. These students may be entering adult life a step behind their counterparts attending more affluent schools who may have had access to inclusion and community-based transition experiences. Not only may post-school success be compromised, but self-determination and student-directed learning may be as well.

As argued by Wehmeyer et al. (2011), poverty, segregation, and restrictiveness of setting may inhibit the development of individuals’ self-determination, especially when coexisting with disability. When limited inclusion is compounded with the lack of resources and opportunity for enriched and varied experiences traditionally associated with high-poverty environments, development of self-determination skills is likely to be hindered. Consequently, researchers have cited the need to examine the effects of racial and ethnic marginalization and economic status on self-determination (e.g., Carter et al., 2009; Wehmeyer et al., 2011). This call is particularly timely considering that by 2020, the majority of public school students is expected to be low-income and of color—as is already true in the South and several western states (National Center for Education Statistics, 2006; Suitts, 2010).

Third, low participation in IEP activities was reported by students across Schools A-C. Although the majority of participants reported attending their IEP meetings (School A 58%; Schools B-C 71%), few students across schools reported ever leading their IEP meetings or knowing or evaluating their IEP goals. Comments of students who did report attending their IEP meetings suggested limited involvement (e.g., “I sit in them. They talk . . .”). Our findings are particularly disconcerting because not only is IEP participation required by IDEA legislation; it has been advocated since the 1990s as a means to improve student outcomes (e.g., Martin & Marshall, 1995). However, as observed by Martin, Van Dycke, Greene et al. (2006), active participation in IEP meetings will not occur without instruction. In particular, students with severe intellectual disability and limited verbal skills are unlikely to state their goals, ask for feedback, and other recommended actions at their IEP meetings (e.g., Martin et al., 1997) without considerable instruction and support. Our findings suggest, however, that instruction and support for IEP participation may be rare across even affluent schools that provide greater opportunity for inclusion and community experiences.

In addition, we found few differences across schools with respect to students’ post-school goals or views toward personal decision making. Most students (30 of 47) cited employment as a post-school goal, primarily in entry-level jobs, such as bagging groceries. Only nine mentioned postsecondary education as a goal and only in the context of technical training (e.g., auto body work). Over 20% (n = 10) of students either wanted to stay home or expressed no post-school goal. Such limited expectations for adult life likely show that, despite some transition programming—especially at Schools B-C—little career exploration and planning may have occurred even among the more inclusive schools. Lack of career instruction may also explain students’ seeming ambivalence about having decisions made by parents or teachers at an age when most adolescents would be less than favorable toward personal decisions made by others. Decision-making skills are best taught within the framework of having actual opportunities to make relevant life choices (Walker et al., 2011), which likely were absent in participants’ curricula.

Limitations and Future Research

Our findings also highlight limitations of our study and directions for future research. First, we did not directly observe students’ participation in school- or community-based activities across schools. Therefore, we do not know if opportunity to make choices and so forth actually occurred more frequently in inclusive school and community settings. We do contend that stimulus variation increases when students routinely enter different environments comprised of ever-changing demands, persons, and features to which students must respond. Studies in residential environments have shown that simply moving to a less restrictive environment can increase opportunities to choose (e.g., Wehmeyer & Bolding, 2001) and that both opportunities to choose and social inclusiveness of the environment relate to level of self-determination (e.g., Wehmeyer & Garner, 2003). Restrictiveness
of setting may serve as a mediating variable consistent with contemporary social-ecological views of environmental factors that enhance or inhibit self-determination (e.g., Walker et al., 2011; Wehmeyer et al., 2011). Future researchers should develop means to observe both inclusiveness of settings and activities and occurrences of actual self-determination use (e.g., when given the opportunity to choose lunch items in the cafeteria, a student exercises choice either independently or with assistance).

Second, we did not investigate the psychometric properties of the SS-DS, the instrument we developed to identify student use of self-determination skills. Although we did establish a Cronbach’s alpha of .82 for the SS-DS among 54 respondents with severe intellectual disability, indicating a high level of internal consistency among items, the validity and reliability of the instrument were not demonstrated. Drawing items extensively from the literature, as we did when we developed the instrument, however, does provide some evidence of its content validity. Developing a psychometrically sound self-report instrument to assess students’ self-determination skill use would contribute substantially to the research base. We do hold, however, that the SS-DS was sufficient with respect to the exploratory nature of this study.

Third, we did not report or control for IQ of participants, although all students met our criteria for and were identified by their schools as having severe intellectual disability based on assessment data in their school records. It could be that variation in students’ responses related to unreported differences in cognitive skills. However, researchers report that IQ is not a strong predictor of level of self-determination; rather, IQ is a stronger predictor of restrictiveness of placement (e.g., Wehmeyer & Garner, 2003). We also compared schools by demographic characteristics (e.g., free and reduced lunch status) and inclusiveness of participants’ activities. However, we did not address or control for variables such as family support, teacher quality, or community resources that could have influenced self-determination behavior. It could be that schools differed on many additional characteristics that influenced self-determination skill use reported by students. Future studies would benefit from an expanded array of variables that are systematically measured and accounted for when comparing student-reported self-determination skill use across settings and schools.

Fourth, we had only 47 participants in our study representing three high schools within one urban school district. Although we purposely selected three schools within the district that were diverse geographically and economically, generalizability of findings is limited. Having more participants across school settings and additional student-reported examples of self-determination behavior, such as we requested from students to validate affirmative responses, however, would have strengthened the argument for generalizability of findings. Future research efforts should address study limitations by incorporating direct observation of opportunities for self-determination across school and community settings; developing a psychometrically sound assessment of student self-determination skill use; controlling for IQ and other participant, school, and community characteristics; and expanding participant pools and environmental settings.

Implications for Practice

Findings from this exploratory study suggest that students with severe intellectual disability with limited access to inclusive school and community experiences are likely to experience arrested development in self-determination skills compared to peers experiencing more inclusive educational opportunities. On its most basic level, this study highlights the need to increase inclusiveness of settings and experiences available to students with severe intellectual disability to foster students’ self-determination and post-school success. This recommendation may especially apply to students attending high-poverty schools where opportunities for inclusion in school and community characteristically are limited. Relating inclusiveness of school and community settings to students’ post-school outcomes is an area warranting further investigation, particularly in light of the limited postschool employment and postsecondary education experiences reported for students from low-income...
households as compared to those from more affluent homes (Newman et al., 2011).

In addition, findings illustrate the need to instruct and support students across all schools in acquiring IEP participation skills. As argued by Shogren et al. (2007), we need to have more, not fewer, opportunities and instruction for those who traditionally have had restricted opportunities to learn and practice self-determination and educational planning skills (i.e., students with severe intellectual disability and those who are low-income). These students can learn to make choices, self-advocate, and direct their own performance (e.g., Wehmeyer et al., 2007). We need to provide the opportunity, instruction, and support for them to do so.

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General Education Teachers’ Goals and Expectations for their Included Students with Mild and Severe Disabilities

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Abstract: The purpose of this study was to examine general education teachers’ goals and expectations for their included students with mild and severe disabilities. Participants were seven inclusive classroom teachers who were interviewed about their goals and expectations regarding one of their included students with a mild disability and one of their included students with a severe disability. Teachers described their primary goals for students with severe disabilities to be in the area of social development and reported that academic performance for these children was of little relevance. For children with mild disabilities, goals and expectations focused on classroom and behavior skills, academic performance, and improved self-confidence. Findings are considered in relation to a model of differential expectations (Cook, 2001; Cook & Semmel, 2000), which suggests that teachers’ attitudes towards students conform to their perceptions of the obviousness of the child’s disability.

The prevailing view among many parents, educators, and policymakers is that the general education classroom is the preferred placement for students with disabilities (Coster & Haltiwanger, 2004; Ferguson, 2008; Marks, Schrader, & Levine, 1999). In fact, it seems that the debate over inclusion has largely shifted from a discussion about whether students with disabilities should be served in general education settings to a focus on how best to implement inclusive practices effectively and provide appropriate access to the general education curriculum (Ford, Davern, & Schnorr, 2001; Soukup, Wehmeyer, Bashinski, & Bovaird, 2007). Initially, growth in inclusive placements occurred primarily for students with mild disabilities such as learning disabilities and behavioral disorders. However, in recent years schools have also experienced a dramatic increase in the percentage of time that children with severe and profound disabilities spend in general education classrooms (United States Department of Education [USDOE,] 2006). A significant consequence of this expansion is that general education teachers have been required to take on greater responsibility for educating students with mild, moderate, and severe disabilities alongside students without disabilities.

Advocates for inclusion argue that both students with disabilities and their nondisabled peers benefit from integrated environments (Agran & Alpers, 2000; Hollowood, Salisbury, Rainforth, & Palombo, 1994), yet they also acknowledge that what occurs for students with severe disabilities in general education settings is very different from what occurs for students with mild disabilities or typically developing students (Giangreco & Broer, 2005; Hollowood et al.). Traditionally, goals for students with severe disabilities have focused on functional, vocational, and social skills (Westling & Fox, 2008; Soukup, Wehmeyer, Bashinski, & Bovaird, 2007). However, legal mandates now require that all students, including those with severe disabilities, have access to the general education curriculum (IDEA, 2004). Thus, inclusive classroom teachers today are faced with the challenging tasks of determining (a) which aspects of the general education curriculum are appropriate for which students; (b) how and when to provide instruction in the general education curriculum to different students; and (c) how and when to address the functional, behavioral, and social goals of their included students.

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Teachers’ approaches to these tasks are clearly related to the goals and expectations that they hold for their students.

The importance of setting goals and holding high expectations for improving learning outcomes has been demonstrated in numerous studies (e.g., Babad, 1998; Brophy, 1986; Good & Weinstein, 1986; Graham, MacArthur, Schwartz, & Page-Voth, 1992; Miller & Kelley, 1994; Page-Voth & Graham, 1999; Rubie-Davies, Peterson, Irving, Widdowson, & Dixon, 2006; Shilts, Horowitz, & Townsend, 2004; Weinstein, 2002). The assumption underlying these findings is that there is a direct relationship between the goals and expectations held by teachers and their behaviors towards individual students. This is undoubtedly the rationale behind the use of measurable goals and objectives in Individual Education Programs (IEP), which are seen as a cornerstone of effective special education practice.

The process by which teachers’ goals and expectations affect the performance of students with disabilities is further clarified by research on teacher efficacy (e.g., Brownell & Pajares, 1999; Page-Voth & Graham, 1999; Ruble, Usher, & McGrew, 2011). This body of research draws largely on the tenets of Bandura’s (1986) social cognitive theory and the construct of self-efficacy. Simply stated, self-efficacy suggests that, “individuals pursue activities and situations in which they feel competent and avoid situations in which they doubt their capability to perform successfully” (Brownell & Pajares, 1999, p. 154). Research examining teacher efficacy with respect to inclusion has found that general educators who believe that they are successful in teaching children with disabilities are more willing to include those students in their classrooms and direct more teaching effort towards included students than teachers who feel less successful in this area (Ashton & Webb, 1986; Brownell & Pajares, 1999). A logical extension of this reasoning is that teachers will be more likely to set goals and hold expectations for their included students in areas where they feel confident in their own ability to help students achieve.

Despite considerable attention devoted to the need to differentiate goals for included students with disabilities (Baker & Zigmond, 1995; Carter & Hughes, 2006; Vaughn, Hughes, Moody, & Elbaum, 2001; Vaugh & Linan-Thompson, 2003), little is known about how teachers actually plan and set goals for students whose learning characteristics differ meaningfully. However, several investigations have considered teachers’ perceptions regarding the goals of inclusion for students with and without disabilities in general. For example, Carter and Hughes (2006) studied administrators, general educators, special educators, and paraprofessionals’ perceptions regarding the inclusion of students with severe disabilities in 11 high schools. Consistent with previous research (Agran & Alper, 2000; Fisher & Meyer, 2002; Kennedy, Shukla, & Fryxell, 1997), they found that teachers perceived social outcomes to be the most important benefit of inclusion for students with disabilities. Although studies such as these suggest that teachers place greater emphasis on the social benefits of inclusion as compared to other curricular areas, observational research indicates that the vast majority of instruction for students with disabilities in inclusive classrooms tends to be related to academic content (Cameron, Cook, & Tankersley, 2011; Helms- stetter, Curry, Brennan, & Sampson-Saul, 1998).

The model of differential expectations (see Cook, 2001; Cook & Semmel, 2000), which draws on aspects of attribution theory (Weiner, 1979) and social comparison processes (Festinger, 1954), holds that readily apparent external cues as to the presence of a disability impact teachers’ expectations and feelings towards students with disabilities. The model suggests that teachers hold typical expectations for students with mild disabilities (e.g., learning disabilities, behavioral disorders) because these “hidden” disabilities provide no clear indicator as to the presence of a disability. In essence, teachers treat students with mild disabilities much like their nondisabled peers because they look just like them. Conversely, teachers may be more likely to adjust their expectations for students with severe disabilities because their disabilities are “obvious” and provide a clear signal to teachers that their abilities are different from others. The model provides a possible explanation for findings that students with mild disabilities such as learning disabilities and behavioral disorders are more often rejected.
by teachers than students with more severe disabilities, despite the increased teaching demands that are likely to accompany students with severe disabilities in inclusive classrooms (Cook, 2001; Cook & Cameron, 2010).

In addition, the model of differential expectations suggests that in contrast to children with mild disabilities, inclusive teachers may be less likely to perceive the poor performance of students with severe disabilities to be a consequence of their own teaching effort (Cook, 2004). Thus, general education teachers may conclude that they have little to offer included students with severe disabilities and set goals for these students that are unreasonably low with respect to students’ actual potential. With respect to students with mild disabilities, teachers may set goals and expect improvement in academic areas that are consistent with those held for modal students, assuming that if the child just “tried harder” then he or she could perform as well as non-disabled students.

Several studies have found a connection between teachers’ attitudes and the instructional effort that teachers direct towards students with diverse learning and behavioral characteristics (Brophy & Good, 1986; Cook & Cameron, 2010; Good & Brophy, 1972; Jordan, Lindsay, & Stanovich, 1997; Ruble, Usher, & McGrew, 2011). Moreover, ample evidence indicates that the goals that teachers set for students have a clear and profound effect on student performance (Christenson, Ysseldyke, & Thurlow, 1989; Doherty & Hilberg, 2007; Fuchs, Fuchs, & Deno, 1985; Hattie & Timperley, 2007). The purpose of this study was to explore the goals and expectations general education teachers hold for their included students with mild and severe disabilities and to examine how these intentions differ by student group.

Method

Participants

We began the process of selecting participants by contacting special education administrators from local school districts in the region of northeast Ohio. Administrators were asked to identify schools that practiced inclusion and whose faculty would be willing to participate in the study. We then met with principals and teachers from nine schools, briefly observed their programs, and discussed the study with potential participants. After identifying general education teachers who taught classes in which students with both mild and severe disabilities were included, we asked one general education teacher from each of the schools to participate in the study. Two of these teachers were unable to participate. Each of the remaining teachers represented a different school, including five elementary and two middle schools, ranging in size from 333 to 980 students. All seven teachers interviewed in this study comprise a subsample of participants from an investigation reported by Cameron, Cook, and Tankersley (2011).

The sample comprised two 3rd grade teachers and one teacher from grades 1, 2, 5, 6, and 8. Participants had an average of 8.7 years of teaching experience and between 1 to 16 years of experience teaching in classrooms in which students with disabilities were included ($M = 6.6$ years). Four teachers reported having between 5 and 9 years of experience teaching in inclusive classrooms. One teacher had taught in an inclusive classroom for 16 years, and two teachers had less than 2 years of experience teaching in inclusive classrooms. All of the teachers were female and reported their race as Caucasian. Each teacher was responsible for a separate classroom in which average daily attendance ranged from 16 to 25 students. None of the classrooms were co-taught with other teachers. However, there were often other educational professionals, including assistants and special education teachers, present in these classrooms on an intermittent basis.

Students

Interviews focused on the goals and expectations teachers held for seven students with severe disabilities and seven students with mild disabilities. Demographic information for included students is provided in Table 1. Students identified as having severe disabilities (a) were nominated by teachers as having a severe disability, (b) had scores that fell in the severe range on the Basic Scale of Disability Severity (Cameron, 2004; described below), and (c) were categorized by their
schools as having a multiple disability (MD) or intellectual disability (ID). Each of the teachers was responsible for a separate inclusive classroom in which only one student with a severe disability was included (i.e., only one student in each classroom met the above criteria). Students grouped as having mild disabilities (a) were nominated by their teacher as having a mild disability, and (b) had scores that fell in the mild range on the BSDS. Children in the mild disability group were labeled as having a learning disability (LD), behavioral disorder (BD), or were in the high functioning range of autism spectrum disorder (ASD). Teachers reported that children with mild disabilities were included from 60% to 100% of the school day (M = 80.0, SD = 15.0), whereas students with severe disabilities spent from 20% to 70% of the day in general education classrooms (M = 42.1, SD = 23.4). All of the students with severe disabilities were supported by a paraprofessional when in general education settings.

**Procedure**

After obtaining informed consent from teachers, we asked them to nominate included students with identified disabilities (i.e., receiving special education services under the Individuals with Disabilities Education Act) for participation in the study. We then solicited informed consent for participation in the study from the parents of these students. Teachers were asked to nominate students as having a mild or severe disability based on their perceptions of the level of support that students required. Students with mild disabilities were described as students with identified disabilities whom teachers perceived as requiring little or only “intermittent” levels of support, whereas students with severe disabilities required “pervasive” or “extensive” support (Westling & Fox, 2008). In addition, the first author and a graduate student in special education observed students over the course of several lessons and rated students nominated by teachers using the BSDS (Cameron, 2004). The BSDS involves rating a student’s ability as compared to his/her same-age peers on a 4-point scale in three areas: (a) intellectual functioning, (b) behavior, and (c) motor, sensory and/or communication skills. Reliability of the scale (k = 0.81) was calculated by Cameron (2004) using Cohen’s kappa (Cohen 1961). Researchers randomly selected a student with a mild disability in each class to be the subject of interviews from among the

<table>
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<td>male</td>
<td>15–0</td>
<td>Learning disability</td>
<td>85</td>
</tr>
</tbody>
</table>

**Note.** % Percent of school day the student is included in general education settings.
three to four students identified as having mild disabilities based on the above criteria. Teachers also completed a short survey with a number of demographic questions prior to the interview.

The interviews were conducted by the first author in a private setting at each school several days after our initial observations. Interviews ranged from approximately 45 minutes to 1 hour and were audio-recorded. Interview questions were broadly grouped into three themes: (a) goals and expectations for students in general, (b) long-term versus short-term (e.g., day to day) goals and expectations, and (c) how goals and expectations differed for the different children. However, the interviews themselves were semi-structured so that we were able to move back and forth between themes or discuss adjacent topics, such as dilemmas and successes that teachers had experienced with particular children. We did not refer to "students with mild/severe disabilities" in the interviews, but rather to the individual students described above.

Analysis
The first author transcribed each of the interviews. Teachers’ responses were then separated into their smallest meaningful units and a process of constant comparison was employed to develop a series of themes (Lincoln & Guba, 1985). The second author then independently coded these items using themes derived from the first phase of analysis. We then compared responses and calculated an agreement coefficient (88%) using the point-by-point method (Kazdin, 1982). We discussed individual items where coding was in disagreement until we arrived at a consensus as to the meaning of each item and the major themes of the interviews. Some of the themes were broadened or adapted so that all items that we perceived as being meaningful for the study were included.

Presentation and Interpretation of Findings
Five themes emerged from our analysis of the interview transcripts. These involved goals and expectations relating to (a) social development, (b) classroom and behavior skills, (c) academic improvement, (d) student self-confidence, and (e) the perceived insignificance of academics (Table 2). Although teachers’ responses to questions about students with mild and severe disabilities were often quite similar, two of these themes pertained almost exclusively to one group of students. First, teachers’ emphasis on improving student self-confidence emerged when discussing children with mild disabilities. Second, the perception that academic progress was largely irrelevant pertained solely to students with severe disabilities. With respect to other between group differences, a strong trend was found among teachers’ responses concerning two themes: (a) teachers reported that social development was the primary goal for students with severe disabilities, whereas (b) expectations for students with mild disabilities centered on behavioral and classroom management issues.

As teachers’ goals largely overlapped with the expectations they held for students, we chose to combine these two concepts in the analysis. However, in general it seems that beliefs concerning teachers’ goals for students corresponded to long-term hopes or aspirations; whereas expectations related more directly to daily aspects of classroom life (e.g., “I expect all my students to pay attention”). Yet, this distinction was far from consistent.

Social Development
The social development theme comprised statements indicating that the goal for included children was to gain social skills, make friends, or generally interact with other students. Also included in this category were items referring to the broad social benefits for both general and special education students, such as “greater diversity.” All seven teachers made multiple statements about the value of children with disabilities socializing and developing relationships with nondisabled peers. The only other theme that was emphasized to a similarly high degree was that of classroom and behavior skills. Although teachers at times referred to the social benefits of inclusion in general; when talking about individual children, this issue was almost exclusively used to describe teachers’ goals and expectations for students with severe disabilities. Only one
teacher made this point when referring to her student with a mild disability. The social aspect of inclusion was also more frequently represented in teachers’ discussion of long-term goals than with regard to short-term objectives. The few statements referring to short-term expectations related to socially appropriate behavior for the entire class, such as the expectation, “that they get along and accept everybody.” In contrast, long-term goals and expectations tended to be applied toward students with severe disabilities and focused on concepts such as making friends, fitting in, or feeling comfortable with one another. For example, one teacher noted, “Probably the most important thing is getting them comfortable with relating to their peers.” Another teacher expressed her hopes that a student with a severe disability would “become a real member of the class.”

Teachers were also adamant about the goal of getting typically developing students to become more accepting of children with disabilities. For example, one teacher stated, “My biggest goal for all the children with special needs is that the kids see them as kids just like them, but with differences.” The issue of acceptance was particularly prominent for stu-

### TABLE 2

**Teachers’ Goals and Expectations for their Included Students**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description of Category</th>
<th>Examples</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Development</td>
<td>Statements concerning the goal or expectation that students with disabilities gain social skills, make friends, or generally interact with nondisabled students.</td>
<td>“My long-term goal is really just to get them comfortable with interacting with peers and being part of a group.”</td>
<td>Primarily emphasized for students with severe disabilities and as a long-term goal.</td>
</tr>
<tr>
<td>Classroom and Behavior Skills</td>
<td>Statements related to the expectation or goal of performance in areas such as following routines, paying attention, staying on task, turning in homework, organizing materials, and/or motivation to work.</td>
<td>“An expectation would be that they come to attention when I direct them . . . so that they are sitting down ready to listen.”</td>
<td>Primarily emphasized for students with mild disabilities in association with short-term goals and expectations.</td>
</tr>
<tr>
<td>Academic Improvement</td>
<td>Statements that the teacher would like to see improvement with regard to some aspect of academic performance.</td>
<td>“I would hope that his reading would improve.”</td>
<td>Primarily emphasized for students with mild disabilities. Referred to as both a long-term and short-term goal.</td>
</tr>
<tr>
<td>Student Self-confidence</td>
<td>Statements that the teacher would like to see the students' perception of themselves and/or their abilities improve.</td>
<td>“I think a goal that I have for them is for them to see themselves as able to be successful.”</td>
<td>Solely in reference to students with mild disabilities and primarily as a long-term goal.</td>
</tr>
<tr>
<td>Insignificance of Academics</td>
<td>Statements referring to the teacher’s belief that the academic performance of the student is not likely to improve, is of lesser importance than other areas, is not the general educator’s responsibility, and statements describing a lack of knowledge regarding student abilities.</td>
<td>“She had an academic plateau. She’s not going to go past what she has right now.” “I’m probably not real sure what his abilities are going to be at the moment.”</td>
<td>The only area for which teachers stated what they did not see as a goal for students. These statements referred solely to students with severe disabilities.</td>
</tr>
</tbody>
</table>
ents with severe disabilities. A teacher reflected over her long-term goals for a student with a severe disability and issues such as, “how he’s going to fit in with the kids. Are they going to accept him? Are they going to be kind and respect him as a person and treat him as a class member?”

In accordance with concerns over students’ acceptance of one another, a number of teachers described scenes that depicted successful interactions between children with and without disabilities. For instance, one teacher described peers’ interactions with a student with severe disabilities during recess, “Out on the playground, like, one nice day last week—he’s never out on the playground—he was out there and the kids just had a ball with him. So, the socialization part is what it’s for.” A second teacher described a scene in which one general education student made a specific request to work with a child with significant intellectual and physical impairments, “I was kind of like putting the kids with their partners and D came up to me and said, ‘I’ll be A’s partner.’ She picked him. She wanted to do it. So, I thought that was awesome. So I was like, yeah, alright! I was just going to leave him with the aide.”

The finding that teachers set goals for included students in the area of social development is consistent with previous literature indicating that interaction with peers is considered one of the major benefits of inclusion (Agran & Alper, 2000; Carter & Hughes, 2006; Janney, Snell, Beers, & Raynes, 1995). For example, Agran and Alper (2000) found that teachers emphasized social interactions, friendships, and self-determination as more important skills for successful inclusion than academic performance. Presumably, the emphasis participants placed on setting goals related to social development is due to the important role that social skills play in forming friendships and emotional well-being.

On the other hand, it is also possible that teachers perceive social development as the area that they feel most qualified to address. In accordance with the model of differential expectations (Cook & Semmel, 2000), setting goals for students with severe disabilities primarily in the area of social development would be perceived as appropriate given teachers’ differential expectations for children with “obvious” disabilities. In contrast, teachers may be less concerned with setting goals in the area of social development for students with mild disabilities as the difficulties they experience are largely “hidden”, leading to the expectation that their social skills and related needs are essentially the same as nondisabled students.

Classroom and Behavior Skills

Teachers often expressed the goal that their students improve in the area of classroom and behavior skills. Included in this theme were teachers’ expectations that students observe classroom rules and procedures, follow directions, and develop time-management skills. Examples of statements included in this theme were references to staying on task, completing classwork and homework, and asking appropriate questions at appropriate times. The frequency of statements falling within this area was second only to that of social development.

The issue of students’ attention to task was the most frequently expressed of teachers’ concerns in this area, referring primarily to students with mild disabilities. Six of the seven teachers cited this issue as a major goal for included students. Examples of teacher comments included expectations that students “pay attention” or “keep their attention focused on me.” These expectations also varied with respect to student ability. For example, one teacher noted, “that he’s engaged as much as he can be,” when referring to her student with a severe disability.

Teachers were also adamant that students be prepared when class begins and organized in their work. For example, an eighth grade teacher noted, “that’s a big thing, teaching them those skills like getting ready and being ready when we start.” In a fifth grade classroom a teacher and her colleagues had focused their efforts on ensuring that students kept their homework folders up-to-date and organized. When describing her goal for a child with a mild disability, she stated, “Our goal is that this year, he would just have it ready because he knows that we’ll be coming by to check it.”

Although behavior was an important goal for teachers, only a handful of comments re-
ferred explicitly to reducing or controlling misbehavior such as aggression or defiance towards teachers. Regarding her sixth grade student with a behavioral disorder, one teacher commented, “I have more conversations with him because of his behavior. I’m constantly redirecting him. Whereas other kids I might not say anything to them during the entire class period about behavior.” Despite these concerns, teachers seemed generally more concerned with what they perceived as apathy or lethargy on the part of students. One teacher concluded that her student with a mild disability was simply “lazy.” She surmised, “with him, my long-term goal would probably be to light a fire under his behind and get him moving.”

Findings that teachers emphasized classroom and behavior skills for students with mild disabilities are consistent with previous research. In fact, since the beginning of inclusion reforms, teachers have expressed the importance of task and order-related behaviors for successful integration of students with disabilities into general education classrooms (Cartledge, Frew, & Zaharias, 1985). In a more recent study, 441 special educators rated the importance of different standards of practice for inclusion (Grskovic & Trzcinka, 2011). Findings indicated that classroom management skills were seen as more important than almost all other areas; only instructional strategies received higher ratings (Grskovic & Trzcinka). Thus, it is not surprising that teachers in this study also placed a great deal of emphasis on the issue of classroom skills and behavior. Teachers’ differentiation of goals for students with mild and severe disabilities in this area also appears to be connected to the theme of academic improvement presented in the following section.

Academic Improvement

A third theme emerging from the data reflected teachers’ desire that students realize improvement in overall academic performance or within specific academic subjects (e.g., reading, mathematics). Four of the seven participants made at least one reference to this issue. In addition, goals and expectations in this area almost exclusively pertained to students with mild disabilities. Whereas a third grade teacher had in mind a fairly concrete long-term objective that her student with a mild disability would eventually “read on grade level,” another teacher stated that her goal for a student with a learning disability was, more broadly, “that his reading would improve.”

In contrast to long-term objectives, short-term objectives were more closely aligned with academic issues pertaining to daily instruction. For example, a sixth grade teacher expressed the desire that included students “leave the classroom with an understanding of the key concept that we’ve gone over.” Another teacher stated her hopes that “academically” an included student with a severe disability would become “more involved with the regular classroom.” Thus, even within the area of academics, the social aspect of inclusion played an important role for this teacher.

We interpret the finding that teachers set clear objectives and hold high expectations in the area of academics as a positive sign for the potential for academic growth among included students with mild disabilities. However, teachers’ lack of attention to academic goals and access to the general education curriculum for included students with severe disabilities may be cause for concern. Carter and Hughes (2006) found that teachers rated instruction in academic and non-academic areas as significantly higher for general education students than students with severe disabilities. These areas included: (a) following rules and procedures, (b) learning responsibility and good work habits, (c) developing skills for adult life, (d) actively participating in class, (e) acquiring academic or vocational skills, (f) learning course content, (g) developing critical thinking, and (h) completing homework assignments. In fact, the only goal that was significantly higher for students with severe disabilities was special educators’ ratings in the area of “interacting socially with classmates” (Carter & Hughes). Correspondingly, our finding that teachers are more likely to hold academic goals and expectations for students with mild disabilities as compared to children with severe disabilities suggests that goals and expectations are lower for the latter group of students in areas not related to social development. One plausible explanation for this difference is that the teachers have lower
feelings of self-efficacy (Bandura, 1986) concerning their ability to engender positive outcomes for included students with severe disabilities. Accordingly, students will logically set higher goals for the performance of students whom they perceive as being able to help to achieve academic goals.

*Student Self-confidence*

A small number of teacher responses dealt with the issue of student self-confidence. Statements coded under this theme described teachers’ goals and expectations that students’ perceptions of themselves and their abilities would improve. The vast majority of these statements were derived from responses to questions about teachers’ long-term goals for their included students and all of the statements coded under this theme concerned students with mild disabilities or included students in general. Whereas a first grade teacher reflected on her goal that her student’s “attitude about himself would improve,” another teacher was concerned that students in her class recognize their potential for success. From her perspective, this goal was not likely to be accomplished in a segregated setting:

> A lot of times I think special ed kids are used to coming in and saying, “oh, I can’t do that” . . . or “they don’t make me do that.” I just kind of go “well, you’re going to do it.” So, I try to make them believe that they can do things.

Previous research applying the theory of differential expectations to teachers’ attitudes in inclusive classrooms found that, in comparison to students with severe disabilities, students with mild disabilities were significantly over-represented among teachers’ concern nominations (Cook, 2004). Early research establishing the validity of these categories identified “concern students” as those with whom teachers became intensely and personally involved because they felt that their efforts would make the difference between the child’s success and failure (Good & Brophy, 1972; Silberman, 1971). It is revealing that participants felt strongly about the emotional well-being of their included students with mild disabilities and suggests that they were aware of the important role that self-worth and self-esteem play in motivation and achievement (Covington, 2002; Thompson, 1994).

*Insignificance of Academics*

In contrast to the goals of improved academic performance, a theme emerged from our analysis suggesting that academic improvement was seen as “insignificant” for students with severe disabilities. Often it was the belief that academic goals were of less importance than goals related to social skills that led to this conclusion. For example, a third grade teacher stated, “it works to come up here for the socialization part, but I don’t think I’m doing anything for his education.” A middle school teacher expressed a similar sentiment, “The reason for her being here is more for the socialization than for the academics . . . if they catch something academic along the way than that’s a plus.”

Statements of this kind were also associated with the perception that a child’s academic performance was unlikely to improve. “She had an academic plateau,” noted one teacher, “she’s not going past what she has right now.” Also grouped in this category were items indicating that included students were not considered the general educator’s responsibility and academic objectives were, therefore, not a primary concern. One participant came to the following conclusion, “I’m not concerned with his comprehension levels. I’m not his classroom teacher.” With reference to her student who had an individual assistant, another teacher stated, “She doesn’t take up more time because the aide works with her.”

Given the assumption among many participants that students with severe disabilities were not the responsibility of general education, it is not surprising that teachers also professed a lack of knowledge with respect to these students. In describing an included student with multiple disabilities, one teacher stated plainly, “I’m not sure what his abilities are.” This same teacher argued that attending to the academic instruction of this child would distract her from teaching her “core students,” stating, “There are things that I’ve changed because he’s in the classroom but, as in teaching, or, you know, being concerned...
with his academics or actually what he’s doing. I can’t take my focus off of what I’m doing.”

Schuster, Hemmeter, and Ault (2001) studied the frequency of teaching opportunities delivered on the IEP objectives of 12 students with low-incidence disabilities in inclusive classrooms. In 383 minutes of observation, four students did not receive any teaching related to their IEP objectives, and only 45% of objectives were addressed among those students who did receive instruction related to their IEPs. Although we did not investigate the IEP objectives of students in this study, it is highly unlikely that these students’ IEPs did not include a number of goals related to areas other than social development. In other words, it appears that these teachers placed a disproportionate emphasis on social goals for included students with severe disabilities at the potential expense of other areas.

In accordance with the theory of differential expectations (Cook, 2001), teachers may set inappropriately low goals for their included students with severe disabilities because they perceive the likelihood that students will experience gains from their teaching efforts as minimal. Moreover, as the theoretical construct of self-efficacy (Bandura, 1986) suggests, if teachers see themselves as lacking the knowledge and ability to teach these students, they are not likely to invest energy in an area that they do not feel confident. Consequently, the combination of teachers’ lack of awareness of educational objectives and low expectations for included students with severe disabilities may have serious consequences for the quality of education that these children receive, at least with respect to areas other than social development.

Limitations and Suggestions for Future Research

It is important to recognize a number of limitations with regard to this investigation. First, it is not certain that teachers’ statements of their goals and expectations for students reflect their actual practice with these students. Teachers certainly interact with students on a daily basis in accordance with specific learning tasks in many different areas. Thus, teachers are likely to hold a range of activity-specific goals for students that are perhaps more relevant to the “here and now” of teaching than the broad categories we have presented here. Observational research of teachers while they interact with students is necessary to clarify this picture. In addition, given the importance placed on IEPs in establishing the educational objectives of included students, more research is needed to investigate the degree to which general education teachers’ goals and expectations align with students’ IEPs. An additional limitation of the study is that we did not analyze individual student factors such as personality, disability type, gender, ethnicity, or age and grade level, which may have revealed subtleties about the way teachers think about and form goals and expectations for included students. By grouping children broadly into mild and severe disability groups and across grade levels we have potentially overlooked information about how teachers adjust their goals and expectations for students on an individual basis. We suggest that future research consider both contextual variables as well as individual characteristics of students and teachers in relation to the goals that teachers set for their included students.

Conclusion

Findings from this study indicate two strong trends with respect to the different goals that general education teachers hold for their included students with mild and severe disabilities: (a) participants reported that social development was the primary goal for students with severe disabilities, whereas (b) expectations for included students with mild disabilities centered on classroom and behavior skills. In addition, the goal of improving student self-confidence emerged when discussing children with mild disabilities. In contrast, teachers in this study viewed goals related to academic performance to be of little importance for students with severe disabilities.

We applied a model differential expectations to assist in explaining how teachers’ goals and expectations for individual students with mild and severe disabilities differ. Our findings suggest that teachers’ goals and expectations for their included students with disabilities conform to their perceptions of the obviousness of the child’s disability, leading teachers to conclude that they have little to offer included students with severe disabilities.
beyond the opportunity to socialize with other children. Whereas it is clear that students with different abilities should have different educational goals, the finding that teachers’ goals and expectations for students with severe disabilities were narrowly focused on social development may reduce the learning opportunities for these students in other important areas. We recommend that school administrators, special educators, and general educators take the time to reflect on the different goals and expectations they hold for included students and consider how these beliefs may affect student achievement and development. In addition, in order for teachers to set realistic, challenging, and appropriate goals for their included students with disabilities, it seems necessary that sentiments indicating that general education teachers do not consider themselves primarily responsible for educating students with severe disabilities must be addressed.

References


Individuals with Disabilities in Education Improve-
access to the general education curriculum. *Exceptional Children, 74,* 101–120.

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Abstract: Concern and research involving the overrepresentation of African American students in the category of mild intellectual disability (MID) has existed for over four decades. Yet, little research focuses exclusively on the disproportionate representation of African American students at the secondary level. This study analyzed the National Longitudinal Transition Study-2 (NLTS2) data using composition index and relative risk ratio approaches to explore the proportion of African American students in the disability category of MID at the secondary level. Additionally, logistic regression analyses were used to examine whether ethnicity predicted the likelihood of a student being identified as MID. African American students were overrepresented in the disability category of MID and logistic regression results indicated ethnicity predicted the likelihood of students having MID.

Decades of research document the disproportionality of African American students in the high-incidence category of mild intellectual disability (MID) (Artiles, 2003; Chinn & Hughes, 1987; Donovan & Cross, 2002; Hosp & Reschly, 2002; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006a; Waitoller, Artilles, & Cheney, 2010). In fact, concern regarding the overrepresentation of African American students in the category of MID dates back to Dunn’s (1968) classic article in which he discussed unequal representation patterns of students of low status backgrounds (i.e., African American, American Indians, Mexicans and Puerto Rican Americans) in classes for students considered ‘educable mentally retarded’ (Waitoller et al., 2010). Despite researchers’ extensive investigation on the issue of overrepresentation, the disproportionate number of African American students receiving special education services persists. The duration and consistency of findings in literature demonstrates the magnitude of this issue (Hosp & Reschly, 2004).

Overrepresentation

Overrepresentation occurs when the percentage of minority students in a disability category exceeds the percentage of these students in the total school-aged population (Zhang & Katsiyannis, 2002). The subjectivity of the determination of high-incidence disabilities makes these categories more susceptible to overrepresentation as opposed to low-incidence or severe disabilities (e.g., severe intellectual disability, deaf) (De Valenzuela, Copeland, Qi, & Park, 2006; Elhoweris, Mutua, Alsheikh, & Holloway, 2005; Harry & Anderson, 1994; Millan & Reschly, 1998). Hence, the overrepresentation of African American students is more likely to occur in high-incidence disabilities, such as mild intellectual disability.

Overrepresentation can be the result of inappropriate referral, identification, or culturally biased tests. Previous researchers demonstrated these processes tend to be discriminatory and, too often, individuals completing the process lack cultural awareness (Harry & Anderson, 1994; Harry & Klingner, 2006; Oswald, Coutinho, Best, & Singh, 1999; Skiba et al., 2006b). Teachers do a vast majority of referrals and biased perceptions of students—intentional or unintentional—or a lack of cultural competence lead to more referrals of African American students than Caucasian students (Skiba et
Within the identification process, tests used for assessments are typically standardized on Caucasian Americans and reflect that particular cultural knowledge base. Hence, tests can be biased against students unfamiliar with the Caucasian American cultural knowledge base, such as African Americans (Artiles & Trent, 1994; Harry & Anderson, 1994; Harry & Klingner, 2006). Last, once the referral process is initiated, the likelihood of African American students being placed in special education increases significantly with 85% of all referrals of African American students resulting in special education placement, as compared to 70–74% of students as a whole (Gottlieb, Atler, Gottlieb, & Wishner, 1994; Millan & Reschly, 1998; Ysseldyke, Vanderwood, & Shriner, 1997).

The lack of cultural awareness on the part of individuals referring and identifying minority students for special education services is of particular concern as the literature suggests ethnicity predicts disability (Artiles & Trent, 1994; Chinn & Hughes, 1987; Skiba et al., 2006a; Zhang & Katsiyannis, 2002). In other words, African American students are more likely to be identified for special education services in the MID disability category (Gottlieb et al., 1994; Harry & Klingner, 2006). Oswald et al. (1999) examined the influence of economic and demographic factors on African American students’ identification in the MID disability category. African American students were overrepresented in the MID category and were 2.5 times more likely to be identified as MID compared to non-African American students.

Impact of Overrepresentation

The disproportionate representation of African American students receiving special education services for MID and the impact of disproportionality on African American students are two long-standing concerns in the field (Chinn & Hughes, 1987; Dunn, 1968; Harry & Anderson, 1994). For one, receipt of special education services is often permanent through students’ school years and typically related to a more restrictive placement (e.g., outside of general education classroom) (Polloway, Lubin, Smith, & Patton, 2010). In fact, African American students identified with MID spend more time outside the general education classroom compared to Caucasian students with MID (McDermott, Goldman, & Varenne, 2006; Reid & Knight, 2006). Restrictive placements may provide a less challenging and stimulating academic experience and leave African American students unprepared to progress educationally (Harry & Anderson, 1994; Hosp & Reschly, 2004).

Second, and equally problematic, are the negative postschool outcomes of students with MID. Compared to peers without disabilities, students with MID are more likely to drop out of school, less likely to access postsecondary education or obtain employment, and more likely to be incarcerated (Nietupski, McQuillen, Berg, Daugherty, & Hamre-Nietupski, 2001; Wagner, Newman, Cameto, Levine, & Garza, 2006). Students with disabilities who do not graduate from high school with a standard diploma are more apt to experience lifelong consequences such as incarceration and the inability to become economically self-sufficient (Gaumer-Erickson, Kleinhammer-Tramill, & Thurlow, 2007). School completion is a legitimate concern for students with MID, as students with MID are more likely to receive nontraditional exit certificates rather than a standard diploma (Gaumer-Erickson et al., 2007; Polloway et al., 2010).

Examining Overrepresentation at the Secondary Level

Despite concerns about the disproportionate representation of African American students in high-incidence disability categories, few studies examine overrepresentation at the secondary level (exceptions include Edgar, 1987; Wagner & Davis, 2006). Secondary students are often overlooked in the disproportionality literature as most studies focus attention on students at the elementary level (Hosp & Reschly, 2004; Oswald et al., 1999). Thus, research is needed at the secondary level (e.g., seventh through twelfth grade) to determine whether African American students continue to experience the disproportionate representation occurring at the younger grades (e.g., Hosp & Reschly, 2004; Oswald et al., 1999). Therefore, this study examined disproportionality (i.e., risk of being identified and frequency of identification) within the category of MID at the secondary level to determine
whether ethnicity influenced the proportion of students identified with MID.

This study differs from previous studies in that it examines disproportionality at only the secondary level as opposed to the elementary and secondary level or just the elementary level (e.g., Hosp & Reschly, 2004; Skiba et al., 2006a; Zhang & Katsiyannis, 2002). To achieve the purposes of the study, National Longitudinal Transition Study-2 (NLTS2) data were analyzed. The authors sought to answer the following four research questions for students with MID: (a) given a population of students with disabilities, what are African American students’ risks of being identified with MID compared to the risk for non-African American students?, (b) given a population of students with disabilities, what are African American students’ risks of being identified with MID as compared to the risk for Caucasian students?, (c) to what extent are African American students over/under-represented in the MID disability category in comparison to their representation in the school-aged population?, and (d) does ethnicity predict whether students are more likely to have a primary disability of MID?

Method

Researchers focused on Wave 1 data from NLTS2 conducted by SRI International (SRI International, n.d.). In NLTS2, information was collected over a 10-year period from parents, youth, and schools (i.e., teachers and principals) to provide a national picture of the experiences and achievements of secondary students with disabilities as they transitioned into early adulthood (SRI International, n.d.). Information was collected over five (5) waves, beginning in 2001 and ending in 2009, and included six data collection mechanisms (parent/youth interview, student assessment, school characteristic survey, school program survey, transcripts, and general education teacher survey) (SRI International, n.d.). NLTS2 data were weighted to represent students nationally by creating population estimates (SRI International, 2000). Using a two-stage sampling process, a random sample of school districts was selected from the population of school districts and was stratified to represent different regions, sizes and levels of school district wealth (Wagner & Davis, 2006). Of the 501 total school districts sampled, the second stage consisted of randomly selecting students in each district from each disability category to create population estimates using students sampled in each of the federal special education disability categories in use during 2001 (Javitz & Wagner, 1990; SRI International, 2000; Wagner & Davis, 2006).

Participants

Our analysis focused on a subset of students in NLTS2 data. To be included in analyses students met the following conditions: (a) received special education services at the secondary level (e.g., grades 7 through 12) during the 2001–2002 academic year (i.e., Wave 1), and (b) identified as having a primary disability of mild intellectual disability (MID) by school personnel. The authors only focused on one high incidence category—MID—as historically African American students are believed to be overrepresented in this category nationally (Harry & Klingner, 2006).

A weighted sample of 58,766 students met these criteria (see Table 1 for participants’ gender, grade level, and income information). Of the weighted sample of students included in this investigation, African American students represented 47.0% of the MID category while Caucasian students represented 52.1%. Additionally, non-African American students, which included Caucasian as well as Hispanic, Asian/Pacific Island, American Indian/Alaska Native, Other/Multiple accounted for 53.0% of the MID category. The category of non-African American students included Caucasian students due to limitations with NLTS2 data in which categories with unweighted numbers lower than two cannot be reported.

Measures

Of the six data collection mechanisms used in NLTS2 (parent/youth interview, student assessment, school characteristic survey, school program survey, transcripts, and general education teacher survey), this analysis used data from the parent/youth interview and school program survey (SRI International, n.d.). The
TABLE 1
Characteristics of Students in Mild Intellectual Disability Category as a Percent

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>(n = 58,766)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>African American Male</td>
<td>32.8 (5.4)</td>
</tr>
<tr>
<td>African American Female</td>
<td>14.2 (4.0)</td>
</tr>
<tr>
<td>Non-African Male</td>
<td>24.8 (0.6)</td>
</tr>
<tr>
<td>Non-African Female</td>
<td>28.2 (2.8)</td>
</tr>
<tr>
<td>Caucasian American Male</td>
<td>24.8 (0.6)</td>
</tr>
<tr>
<td>Caucasian American Female</td>
<td>27.3 (1.9)</td>
</tr>
<tr>
<td>Income Range, African American</td>
<td></td>
</tr>
<tr>
<td>Less than $25,000</td>
<td>36.4 (6.1)</td>
</tr>
<tr>
<td>$25,001–50,000</td>
<td>5.7 (5.4)</td>
</tr>
<tr>
<td>$50,001–75,000</td>
<td>–</td>
</tr>
<tr>
<td>Greater than $75,000</td>
<td>–</td>
</tr>
<tr>
<td>Income Range, Non-African American</td>
<td></td>
</tr>
<tr>
<td>Less than $25,000</td>
<td>21.4 (3.6)</td>
</tr>
<tr>
<td>$25,001–50,000</td>
<td>20.6 (1.9)</td>
</tr>
<tr>
<td>$50,001–75,000</td>
<td>2.7 (0.5)</td>
</tr>
<tr>
<td>Greater than $75,000</td>
<td>2.6 (0.7)</td>
</tr>
<tr>
<td>Grade Level</td>
<td></td>
</tr>
<tr>
<td>Eighth</td>
<td>30.5 (8.5)</td>
</tr>
<tr>
<td>Ninth</td>
<td>18.5 (5.4)</td>
</tr>
<tr>
<td>Tenth</td>
<td>21.5 (4.6)</td>
</tr>
<tr>
<td>Eleventh</td>
<td>23.0 (5.7)</td>
</tr>
<tr>
<td>Twelfth</td>
<td>5.0 (2.7)</td>
</tr>
</tbody>
</table>

Note: Non-African American included Caucasian, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Other/Multiple. All unweighted values below two were not reported. Not all respondents provided an answer to questions regarding household income and grade level. Income range percentages for African Americans in the MID category represents 89.6% of the total African American population. Income range percentages for non-African Americans in the MID category represents 89.3% of the total non-African American population. Income range percentages for Caucasians in the MID category represents 89.1% of the total Caucasian population. Grade level percentages for students in the MID category represents 98.3% of the total student population. Standard error values are in parentheses.

Within the larger NLTS2 project, the authors identified relevant variables from the school program survey and the parent/youth survey in Wave 1. These variables included students’ primary disability (npr1D2b), grade level (npr1A1), ethnicity (np1A3), gender (np1A1) and household income (income_range). We eliminated all non-relevant variables and cases in both databases to leave only students who had a primary disability of MID. We then merged the school program survey and parent/youth interview by cases.

In the construction of the final database for analysis, some original NLTS2 variables were used; however, some categorical variables were recoded. The variable regarding student ethnicity (np1A3) originally included six separate categories (e.g., Caucasian, African American, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, and Other/Multiple) and we condensed it into three: African American, Caucasian, and non-African American (i.e., Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, Other/Multiple, and Caucasian). Another manipulated variable addressed students’ household income and consisted of 16 separate categories. This variable was condensed into four categories (e.g., less than $25,000; $25,001 to 50,000; $50,001 to 75,000; and greater than $75,000) by separating the categories into four quartiles.
Using the complex samples option in SPSS to represent weighted national population estimates, descriptive analyses were run to obtain frequency data regarding participants’ ethnicity, household income, gender, and grade level. Weights were provided in the original NLTS2 databases and allowed for the estimates to represent population characteristics (see Javitz & Wagner, 2003; Wagner, Kutash, Duchnowski, & Epstein, 2005 for additional information relative to weighting the data). Risk index, relative risk ratio, and composition index approaches were used to examine the representativeness of participants in targeted categories. Finally, logistic regression analyses were conducted to identify whether ethnicity impacted the likelihood of participants having a primary disability of MID.

Risk index and relative risk ratio. Risk index (RI) and relative risk ratio (RR) approaches were used to answer research questions one and two regarding African American students’ risk of being identified compared to non-African American and Caucasian students (Skiba et al., 2008). “Risk” indicates the likelihood of a student from a target group being identified with a disability, or in this case the particular disability category of MID (Skiba et al., 2008; Westat, 2005). According to Westat, RI is computed by dividing the number of students from an ethnic group (e.g., African American) in a category (i.e., MID) by the total number of students from an ethnic group (e.g., African American), and then multiplying by 100. In order to obtain the best measure of disproportionality, a relative risk ratio (RR) must be computed which is done by dividing the RI for the target group (African American) by the RI for the comparison group (Caucasian or non-African American) (Westat, 2005). For example, the RI for the African American group divided by the RI for the Caucasian group will provide a RR for the African American group. A RR of 1.0 indicates no difference between target and comparison groups, while a RR greater than 1.0 indicates risk for the target group is greater than risk of the comparison group (i.e., target group is overrepresented). A RR less than 1.0 indicates risk for the target group is less than the risk for the comparison group (Skiba et al., 2008).

Logistic regression analyses. To answer research question four regarding whether ethnicity predicted the likelihood of students having MID, logistic regression analyses were conducted using SPSS. Researchers chose to only examine ethnicity because they felt it was the strongest and most significant predictor variable to examine when attempting to understand whether overrepresentation occurred for African American students at the secondary level as previous researchers suggested African American students are at high risk of receiving a disability label (Harry & Klingner, 2006). Logistic regression was most appropriate because it required the use of a binary outcome variable (i.e., MID vs. not MID) and predictor variables that could be continuous or categorical in nature (Huck, 2008). Two separate logistic regression analyses were conducted (i.e., African Americans...
compared to Caucasians and African Americans compared to non-African Americans) due to limitations with NLTS2 database, as the ethnicity variable did not allow participants to be simultaneously coded into two categories (i.e., both Caucasian and non-African American). The outcome variable differed (MID vs. not MID), but the predictor variable (ethnicity) was the same for each logistic regression analysis. The effect of ethnicity on the odds of students having a primary disability of MID was estimated.

Results

Risk Index (RI) and Relative Risk Ratio (RR)

Risk indices were calculated for African American (RI = 10.4%), Caucasian (RI = 3.3%), and non-African American (RI = 2.7%) students. The RR for the African American group and Caucasian comparison group was 3.15; in other words, African American students were 3.15 times more likely to have a primary disability of MID compared to Caucasian students. Similarly, the RR for the African American group and non-African American group was 3.85; suggesting African American students were 3.85 times more likely to have a primary disability of MID compared to non-African American students.

Composition Index (CI)

Using NLTS2 data, African American students represented 47.0% of students with a primary disability of MID. The number of African American students enrolled in all schools in grades seven through twelve was 7.42% (U.S. Department of Education, Institute of Education Sciences, n.d.), indicating African American students were overrepresented in the category of MID.

Logistic Regression Analysis

The results of logistic regression analyses revealed ethnicity significantly predicted whether students had a primary disability of MID. The odds ratio indicated African American students were 4.36 times more likely of having a primary disability of MID compared to non-African Americans and 9.10 times more likely compared to Caucasian students (see Table 2 for a summary of logistic regression results).

Discussion

This study examined the NLTS2 to determine the representativeness of secondary-aged African American students identified as having MID as their primary disability as well as analyzed data to examine whether ethnicity predicted secondary students' likelihood of having a primary disability of MID. Findings determined African American students were overrepresented in MID. Additionally, ethnicity predicted students having a primary disability of MID.

Throughout all analyses a connection was found between secondary African American students and the category of MID. The logistic regression analyses indicate African American students are more likely to have a primary disability of MID compared to non-African American students and Caucasian students. Using the CI, African American students were grossly overrepresented at the secondary level compared to their representation in the school-aged population (47.0% vs. 7.42%). Results of RR support the overrepresentation

### TABLE 2
Summary of Logistic Regression Analyses

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>exp(B)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American vs. Caucasian*</td>
<td>2.209*</td>
<td>0.585</td>
<td>9.107</td>
<td>0.003</td>
</tr>
<tr>
<td>African American vs. Non-African American*</td>
<td>1.1474*</td>
<td>0.354</td>
<td>4.366</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: \( \exp(B) \) = exponentiated \( B \), \( a = \) the estimated parameter was set to zero because this is the reference category. \( p < 0.05 \)
finding (i.e., 10.4% for African Americans vs. 3.3% for Caucasians and 2.7% for non-African Americans). Findings from this study suggest disproportionality in the MID category continues to be a problem for African American students despite decades of research and attention (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010; Donovan & Cross, 2002; Dunn, 1968).

Disproportionality in the MID category is problematic if these students are not receiving what they need in terms of educational programming (Nietupski et al., 2001). Special education can be considered a protective or a risk factor (Donovan & Cross, 2002). African American students placed in the MID disability category may actually be receiving educational support necessary to help them succeed in high school; however, researchers document this is frequently not the case. The efficacy of special education services has been contested for many years due to the problematic outcomes of the special education system (e.g., achievement level, dropout rate, poor postschool outcomes) (Artiles & Bal, 2008; Harry & Anderson, 1994; Polloway et al., 2010).

Concern also exists that African Americans with MID receive low-quality instruction and experience more segregated education settings than Caucasians with MID (Polloway et al., 2010). Students placed in segregated settings may be denied access to the general education curriculum and receiving services that do not meet their learning needs, which can further exacerbate poor postschool outcomes, such as decreased opportunities for employment, as well as in-school success (Hosp & Reschly, 2002; McDermott et al., 2006; Nietupski et al., 2001; Polloway et al., 2010; Reid & Knight, 2006; Skiba et al., 2006a; Waitoller et al., 2010). The negative postschool outcomes associated with African American students with MID (e.g., school completion, postschool economic and occupational attainment, access to college)—both those correctly and wrongly identified, indicate a need for an increased commitment to successful school completion for these students (Artiles & Bal, 2008; Polloway et al., 2010). Particular attention should be given to methods to improve African American students with MID postschool success, such as access to meaningful employment and post-secondary education. One such strategy is the use of a functional curriculum as it has the potential to improve students with MID in school success as well as postschool outcomes (Bouck, 2004; Bouck & Flanagan, 2010).

Conclusions and Implications

Findings from this study highlight the issue of overrepresentation at the secondary level among African American students—particularly when considering students with MID, a problem still existing over 40 years after Dunn (1968) raised the issue (Artiles et al., 2010; Waitoller et al., 2010). One potential solution to the issue of disproportionality is training school professionals to be culturally competent (Cartledge & Kourea, 2008). Schools have become increasingly diverse, but the same cannot be said for teachers (e.g., Caucasian women of Anglo-European origin) (Case & Hemmings, 2005). Many school professionals lack knowledge about the cultural experience of African American students (Cartledge & Kourea, 2008). Training school professionals to be culturally competent would permit them to be better equipped to work with a broad range of students from different cultures with varying disabilities. Additionally, training school professionals to be culturally competent could result in fewer inappropriate referrals of African American students to special education and, consequently, reduce their overrepresentation (Artiles, Harry, Reschly, & Chinn, 2002; Valles, 1998).

Another potential solution is re-evaluating the assessment and identification process. The assessment and identification process has been the focus of many researchers as this process may possibly contribute to the disproportionate number of African American students in special education (Skiba et al., 2006b). Often, in the identification process, tests used for assessments are typically standardized on Caucasian Americans and reflect that particular cultural knowledge base (Artiles & Trent, 1994; Harry & Anderson, 1994; Harry & Klingner, 2006). One way to circumvent this issue is to implement assessments that focus more closely on instruction and classroom practice, such as performance-based measures or curriculum-based measures.
By implementing assessments that are more academically meaningful, the potential bias experienced by those unfamiliar with standardized assessments will be reduced and may result in the determination of fewer students eligible for special education services (Donovan & Cross, 2002).

Limitations and Future Directions

A few limitations are identified in this study. One limitation is the number of logistic regressions. Due to limitations with NLTS2 data, we were unable to conduct one single logistic regression comparing all ethnic groups. Thus, there is some redundancy in the two logistic regressions because they are comparing similar populations (i.e., Caucasian and non-African American—which included Caucasians). Future research should examine the identification of other racial/ethnic groups (i.e., non-African American) as there is the potential for these groups to be over/under-represented as well. This would also remove the issue of redundancy in the logistic regressions and strengthen the findings of the study.

Another limitation is the use of ethnicity as the only predictor variable. Although research suggests ethnicity predicts disability (e.g., Artiles & Trent, 1994; Chinn & Hughes, 1987; Skiba et al., 2006a; Zhang & Katsiyannis, 2002), previous research also suggests correlations between income and ethnicity and their effect of predicting disability (Artiles, 2003; Artiles & Trent, 1994; Gottlieb et al., 1994). Future research should examine a range of factors that may impact disability identification (e.g., academic achievement, parental educational status, socio-economic status, suspension rates, postschool outcomes) as further analysis of these variables may strengthen the results of the study.

Additional research is needed regarding disproportionality at the secondary level considering students with MID as well as other high incidence disabilities categories, such as emotional/behavior disorders. There is a lack of research addressing disproportionality issues at the secondary level; most studies focus attention on students at the elementary level (Hosp & Reschly, 2004; Oswald et al., 1999). Future research should longitudinally examine the school experiences of students identified with MID beginning at the elementary level and follow these students into the secondary level. A longitudinal study would provide evidence of the disproportionality issues that exist at the secondary level. Moreover, this type of study would provide some insight into how disproportionality initiates at the elementary level and culminates at the secondary level.

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Teaching Reading Comprehension and Language Skills to Students with Autism Spectrum Disorders and Developmental Disabilities Using Direct Instruction

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Auburn University

Abstract: There is limited research demonstrating Direct Instruction (DI) as an effective reading comprehension intervention for students with autism spectrum disorders (ASD) and developmental disabilities (DD). Previous research has shown that DI, when portions of the program were implemented, resulted in increased skills (Flores & Ganz, 2007; Flores & Ganz, 2009). The purpose of this pilot study was to implement DI comprehension programs without modification, using whole lessons. Eighteen elementary students with ASD or DD participated in the study and data were collected using curriculum-based assessments. One-way analyses of variance indicated that there were significant differences in students’ skills over time. Results and their implications will be discussed.

Individuals with developmental disabilities (DD), including students with autism spectrum disorders (ASD) are diverse in their characteristics and often display deficits in their ability to use and understand language. Students with ASD and DD need educational programming designed to meet their individual needs. However, recent legislative requirements of No Child Left Behind (2002) and the Individuals with Disabilities Improvement Education Act (2004) mandate that students with disabilities (including students with ASD and DD) participate in the general education curriculum and receive high quality instruction such that they make adequate progress toward grade level standards, especially in the areas of reading and mathematics. Reviews of the literature with regard to academic instruction for individuals with ASD and DD have shown that interventions are limited (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozine, 2006; Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, 2008). However, research has shown that systematic reading is a realistic goal for students with ASD and DD regardless of their cognitive functioning (Whalon, Otaiba, & Delano, 2009).

Access to the general education curriculum includes reading and reading comprehension; however there is less extensive literature that includes students with DD and ASD (Chiang & Lin, 2007). According to O’Conner and Klein (2004), reading instruction for students with ASD and DD has been underemphasized. Research has provided ample information regarding effective instructional methods for teaching reading in the general education setting (Shippen, Houchins, & Steventon, 2010). Of the various reading programs cited in the literature, research has shown Direct Instruction (DI) (Carnine, Silbert, Kameenui, & Tarver, 2004; Engelman & Carnine, 1991) to be an effective intervention for students at-risk for academic failure (Carlson & Francis, 2002; Foorman, Francis, Fletcher, & Schatschneider, 1998; Frederick, Keel, & Neel, 2002; Grossen, 2004; Shippen, Houchins, Steventon, & Sartor, 2005), students with learning disabilities (Torgesen et al., 2001), as well as students with cognitive deficits (Bradford, Shippen, Alberto, Houchins, & Flores, 2006; Flores, Shippen, Alberto, & Crowe, 2004).

Newly emerging reading research involving
DI instructional approaches with individuals with ASD and DD has shown that this may be a promising instructional method for teaching language and reading comprehension. Flores and Ganz (2007) investigated the effects of a DI program, *Corrective Reading Comprehension A Thinking Basics* (Engelmann, Haddox, Hanner, & Osborn, 2002), on the reading comprehension skills of four individuals with DD and ASD. The researchers provided instruction using three strands of the program, statement inferences, using facts, and analogies. Results indicated that a functional relation existed between DI and reading comprehension skills, as all students met criteria for mastery across each of the three skill areas.

Flores and Ganz (2009) extended the line of research, investigating the effects of *Corrective Reading Comprehension A Thinking Basics* (Engelmann et al., 2002) on the reading comprehension skills of three individuals with ASD and DD. Within this study, the researchers taught three different instructional strands of the program, picture analogies, deductions, and inductions. Using a multiple probe across behaviors design, the authors demonstrated a functional relation between the DI program and reading comprehension as all participants met the criterion in each of the three areas.

In another study, Ganz and Flores (2009) investigated the effects of *Language for Learning* (Engelmann, & Osborn, 1999) on the oral language skills for three participants with ASD. The researchers taught students how to identify the materials of which objects are made, utilizing a single subject changing criterion design. Results indicated a functional relation existed between the program and language acquisition; the students met criterion with replications over three changes in criterion.

In a study by Zayac (2009), the author found that the DI program, *Reading Mastery Plus* (Engelmann, 2002), was effective in teaching children with DD (including children with ASD) letter-sound correspondences, blending, segmenting, and word reading. Unlike other DI research for this population, the program was implemented without modification. A functional relation could not be determined due to the use of an A–B design. However, the author concluded that individuals with DD can acquire beginning reading skills using DI.

Research in the area of DI reading comprehension instruction for students with ASD and DD is limited. Of the existing research, single subject designs have been employed to show a functional relation between DI and improved comprehension and language skills. In addition, portions of DI programs (Flores & Ganz, 2007; Ganz & Flores, 2009; Flores & Ganz, 2009) have been shown to be effective. The line of research regarding DI reading comprehension and language interventions for students with ASD and DD is missing investigation of a comprehensive implementation of a DI program, meaning whole lesson presentation over time. Therefore, the purpose of this pilot study was to investigate the efficacy of DI comprehension and language programs for students with ASD and DD by implementing the programs as they were designed within classroom settings.

**Method**

**Participants**

Eighteen male students in grades one through seven participated in the study. The students were chosen to participate based on their performance on the program placement tests. The researchers administered the placement for the *Corrective Reading Comprehension A Thinking Basics* program (CR) (Engelmann et al., 2002) to all students. Eleven students placed within that program, beginning with the first lesson. However, seven students’ placement scores indicated that a beginning language program such as the *Language for Learning* program (LL) (Engelmann, & Osborn, 1999) would be appropriate. The LL placement test was administered to these students and their scores indicated that it was an appropriate program. Therefore, two subgroups were formed.

The group of students who received instruction using CR was comprised of students ages eight to thirteen in grades two through seven. All of the students were eligible for special education services, seven under the category of ASD and four under the category of multiple disabilities (intellectual disability and other health impairment or intellectual dis-
ability and orthopedic impairment). The students’ intellectual functioning was assessed using the *Leiter International Performance Scale Revised* (Roid & Miller, 2002) and their intellectual abilities (IQ) ranged from significantly below the average range to within the average range. The students’ language performance was measured using the *Test of Language Development: Intermediate, 4th Edition* (Hammill & Newcomer, 2008a) or *Test of Language Development: Primary 4th Edition* (Hammill & Newcomer, 2008b). The students’ overall language standard scores ranged from significantly below the average range to within the average range.

The group of students who received instruction using LL included seven students, ages seven and nine in grades one through four. All of the students were eligible for special education services, three under the category of developmental delay and four under the category of ASD. The students’ intellectual functioning was assessed using the *Leiter International Performance Scale Revised* (Roid & Miller, 2002) and their intellectual abilities (IQ) ranged from significantly below average to within the average range. Based on their age, the students’ language performance was measured using the *Test of Language Development: Intermediate, 4th Edition* (Hammill & Newcomer, 2008a) or *Test of Language Development: Primary 4th Edition* (Hammill & Newcomer, 2008b). The students’ overall language standard scores were significantly below the average range. See Table 1 for a summary of participant characteristics.

**Setting**

The study took place in a university-sponsored summer program, created for the provision of extended school year services for students with disabilities. Extended school year services were indicated in the individualized educational programs (IEPs) of all students in attendance. Staff in the classrooms consisted of two graduate students (who held teaching certificates in special education) and one undergraduate student, each majoring in special education. Classroom structure and instructional programs were tailored to students’ needs as stated in their IEPs and statements of extended school year needs. These included strategies such as small group direct instruction in academic areas (reading, written expression, and mathematics), incidental teaching, social skills instruction, and the use of visual supports. The current study took place during reading instruction within each classroom. DI comprehension instruction lasted for approximately thirty minutes each day. Instruction was provided by certified teachers enrolled in a Master’s program in special education who received professional development in the implementation of DI within two of their required university courses. In addition, one day of professional development was devoted to program delivery prior to the start of the program. Prior to program implementation, each instructor demonstrated proficiency in program implementation using a fidelity checklist (Marchand-Martella, Lignugaris-Kraft, Pettigrew, & Leishman, 1995).

**Instructional Procedures**

Classroom instructors administered the CR placement test prior to beginning instruction. Based on placement test performance, students were grouped homogeneously for instruction. Students, who did not place into the CR program, were given the LL placement test. Based on students’ performance, instruction began with the lesson prescribed by the program. Seven students received instruction through LL, beginning at lesson forty-one. The instructional content included the following: (a) differentiation of *whole* and *part*; (b) opposites, such as *full*/*empty* and *big*/*small*; (c) use of the prepositions *on*, *over*, and *in front*; (d) use of pronouns when describing actions or pictures; and (e) general information such as stating the days of the week. Eleven students received instruction through CR, beginning at lesson one. Instructional content included the following: (a) appropriate use of the terms *all*, *some*, and *none*; (b) classification of objects; (c) deductive reasoning using the terms *all*, *every*, *don’t*, *no*, and *some*; (d) statement inferences; (e) using facts to provide evidence; and (f) general information such as stating the months of the year and the seasons in a year.

Instructional groups varied in size from two to four students, based on classroom enrollment and placement test performance. Instruction occurred during regularly scheduled reading instructional time, for approximately
thirty minutes per day, five days per week. The instructors followed the programs’ prescribed scripts for the particular behavior or skill. This included modeling the particular skill for the students, leading, as the students demonstrated the skill or behavior, and asking the students to perform the behavior independently without the instructor. The students responded to questions chorally as a group. The instructor followed program procedures for ensuring that the students responded together. Errors in responses were corrected immediately through the following: (a) modeling the correct response; (b) leading the students in the correct response; (c) and asking the students to respond independently. The program included instances when the students were asked questions individually and these procedures were followed as well.

**Assessment Procedures**

The students’ placement test performance served as the first performance assessment.

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**TABLE 1**

**Participant Demographics**

<table>
<thead>
<tr>
<th>Language for Learning Group</th>
<th>Age</th>
<th>Disability Category</th>
<th>Cognitive Ability (IQ)</th>
<th>Language Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>7</td>
<td>autism spectrum disorder</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>developmental delay</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Cognitive Ability (IQ)a</td>
<td>above 85</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>71–85</td>
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<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>55–70</td>
<td>3</td>
<td>below 55</td>
<td>1</td>
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<tr>
<td>Language Performanceb</td>
<td>55–70</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>below 55</td>
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<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Corrective Reading Thinking Basics Group</th>
<th>Age</th>
<th>Disability Category</th>
<th>Cognitive Ability</th>
<th>Language Performance</th>
</tr>
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<tr>
<td></td>
<td>8–9 years</td>
<td>7</td>
<td>55–70</td>
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<td>10–11 years</td>
<td>5</td>
<td>55–70</td>
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<td></td>
<td>12–13 years</td>
<td>3</td>
<td>55–70</td>
<td>4</td>
</tr>
<tr>
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<td>8–9 years</td>
<td>autism spectrum disorder</td>
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<td>4</td>
</tr>
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<td>10–11 years</td>
<td>multiple disabilities</td>
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<td>1</td>
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<tr>
<td></td>
<td>12–13 years</td>
<td>3</td>
<td>55–70</td>
<td>6</td>
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<tr>
<td>Cognitive Abilitya</td>
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<td>3</td>
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<td></td>
<td>55–70</td>
<td>3</td>
<td>55–70</td>
<td>2</td>
</tr>
<tr>
<td>Language Performanceb</td>
<td>above 100</td>
<td>1</td>
<td>55–70</td>
<td>2</td>
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<td>4</td>
</tr>
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</table>

a Standard score using *Leiter International Performance Scale Revised*

b Spoken Language (total) standard score using *Test of Language Development: Primary 4th Ed.* or *Test of Language Development: Intermediate, 4th Ed.*
Each student’s placement test was analyzed based on the number of items correct, representing the concepts and skills included in the twenty instructional lessons that would follow. For example, the LL placement test included items which asked the student to name the days of the week and this skill was included within the instructional lessons forty-one through sixty, the lessons one might expect a typical student to encounter over twenty days of instruction. The second performance measure was administered after two weeks of instruction. It consisted of curriculum-based assessments which were the mastery tests included within the LL program after every tenth lesson. The third performance measure was administered after four weeks of instruction and it was the following appropriate mastery test from the program. The students in the LL group took the mastery tests located after lessons fifty and sixty. Assessments were administered to students one-on-one, before daily instruction, in order to more accurately assess the students’ learning. Student performance was reported as the percent of items correct.

The same procedures were followed for students who received instruction from the CR program. The first performance measure was the placement test. Each student’s placement test was analyzed based on the number of items correct, representing the concepts and skills included in the first twenty instructional lessons. Each student’s performance was reported in terms of percent of instructional items correct. The CR program includes mastery tests after lesson twenty. Therefore, for the second performance measure, it was not appropriate to administer the first mastery test after two weeks of instruction since students could have only completed lessons one through ten or fewer, if repetition was necessary. A curriculum-based assessment was created by the first author using the same format as the program mastery test; however, items assessed the skills taught in lessons one through ten. The second performance measure consisted of the mastery test included in the CR program without modification (located in the program after lesson twenty). Performance measures were administered one-on-one, at the beginning of a lesson, prior to instruction. Student performance was reported as the percent of items correct.

Treatment Integrity/Inter-observer Agreement

Instruction was carried out according to a checklist of teacher behaviors (Marchand-Martella et al., 1995). These behaviors corresponded to the procedures and behaviors prescribed in the Direct Instruction program. Once per week, one of the researchers observed instruction. The fidelity of treatment was 92% across instructional groups. Treatment fidelity for instructional groups ranged from 62% to 100%. Approximately 30% of the curriculum-based assessments were checked for inter-observer agreement. This was calculated as the total number of agreements divided by the total number of disagreements and agreements, multiplied by 100. Inter-observer agreement for instructional probes was 100%.

Results

Because the sample sizes were small, the researchers checked assumptions for normality, linearity, and variability prior to analysis. For each sub-group, a one-way within subjects analysis of variance ANOVA statistical procedure was conducted with the factor being time and the dependent variable being the percent correct on each curriculum-based assessment. The progress measures for students receiving instruction using CR were analyzed separately from students who received instruction using LL because the content within the curriculum-based measures were different. The means and standards deviations for curriculum-based assessments are presented in Table 2. For the CR group, the results for the ANOVA indicated a significant time effect, Wilk’s $\Lambda = 0.075$, $F(2, 9) = 55.37$, $p < .01$, multivariate $\eta^2 = .93$. Follow-up polynomial contrasts indicated a significant linear effect with means increasing over time, $F(1, 10) = 149.28$, $p < .01$, partial $\eta^2 = .94$. For the LL group, the results for the ANOVA indicated a significant time effect, Wilk’s $\Lambda = .014$, $F(2, 5) = 173.1$, $p < .01$, multivariate $\eta^2 = .99$. Follow up polynomial contrasts indicated a significant linear effect with means increasing over time, $F(1, 6) = 569.38$, $p < .01$, partial $\eta^2 =$
These results suggest that the instructional programs made a statistically significant difference in students’ growth in skill over time.

Discussion

The purpose of this study was to extend the line of research regarding DI language and comprehension instruction for students with ASD and DD by implementing a pilot study in which students with ASD and DD received more comprehensive instruction than in previous research. The researchers implemented programs as they were designed, addressing multiple skills by teaching whole lessons. Eighteen students with ASD and DD participated in either Language for Learning (Engelmann, & Osborn, 1999) or Corrective Reading Comprehension A Thinking Basics (Engelmann et al., 2002) for four weeks during an extended school year program. Their performance was measured over time using curriculum-based assessments included in the programs or developed based on the programs.

Results indicate that DI programs had a strong effect on students’ learning ($\eta^2 = .94$ and $\eta^2 = .99$). This extends prior research in which single case research designs indicated that there was a functional relation between DI and increased language skills by investigating specific instructional strands within DI programs (Flores & Ganz, 2007; Flores & Ganz, 2009; Ganz & Flores, 2009). In contrast to these previous studies, the current study provided a more realistic implementation of DI programs. The programs were implemented by classroom teachers without modification of the programs’ content organization.

Previous research demonstrated that students with ASD and DD could successfully participate in DI, including its unique instructional formats such as frequent questioning, choral and individual responding, and the presentation of multiple skills within one lesson (Flores & Ganz, 2007; Flores & Ganz, 2009; Ganz & Flores, 2009). Within the current study, students with ASD and DD were able to participate in all portions of the lessons and successfully move from one lesson to the next, replicating previous research. The current findings extended previous research from the use of portions of programs to presentation of the programs as prescribed, without modification. This study extended this investigation by exposing students to lessons in which they learned multiple skills (more than presented in previous research) and demonstrated that students could participate appropriately and transition between different formats within each lesson.

Implications

The results of this study have implications for instructional design and content for students with ASD and DD. This study further demonstrates that students with ASD and DD can benefit from group instruction. One-on-one instruction in the form of discrete trial teaching represents the largest body of intervention research for this population (National Research Council, 2001). However, students in the current study successfully participated in DI which required sustained attention, fre-

### TABLE 2

<table>
<thead>
<tr>
<th>Means and Standard Deviations for Curriculum-based Measures</th>
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<tr>
<td></td>
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<tr>
<td><strong>Language for Learning Group</strong></td>
</tr>
<tr>
<td>Percent Correct Assessment 1 (prior to instruction)</td>
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<td>Percent Correct Assessment 2 (after 2 weeks of instruction)</td>
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<tr>
<td>Percent Correct Assessment 3 (after 4 weeks of instruction)</td>
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<tr>
<td><strong>Corrective Reading Thinking Basics Group</strong></td>
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<td>Percent Correct Assessment 1 (prior to instruction)</td>
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<td>Percent Correct Assessment 2 (after 2 weeks of instruction)</td>
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<td>Percent Correct Assessment 3 (after 4 weeks of instruction)</td>
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quent responding, and choral responses in a group format. This is significant since group instruction may provide for greater efficiency in meeting students’ needs in diverse classrooms. In addition, providing instruction to students with ASD and DD in a group format may also better prepare them for participation in group situations within general education classrooms.

The majority of the students demonstrated below average performance in both language and cognitive ability (IQ). Four out of eighteen students’ IQs were within the average range and the remaining students’ IQs ranged from 51 to 83. The students’ language skills were significantly below average as well. One participant’s language standard score was within the average range (104). The remaining students’ language standard scores ranged from 44 to 61, with an average of 57. There is a limited body of reading research that includes students with ASD and DD who have significant cognitive and language deficits (Bradford et al., 2006; Flores & Ganz, 2007; Flores & Ganz, 2009; Flores et al., 2004). This study extended the research for that population by showing that students made progress after participating in comprehensive implementation of DI programs.

**Future Research**

The current pilot study was limited in the amount of time available for program implementation. Although students made progress and statistically significant gains, it is not known how a comprehensive implementation of DI comprehension and language instruction over the course of a school year would impact student performance. Future research is needed to assess the effects of a full-scale implementation. The setting was another limitation since it was conducted within a university-sponsored program with teachers who had received preparation for DI implementation with their coursework. This type of preparation may not be similar to the professional development received by typical classroom teachers. It is not known whether similar results would have been obtained if the implementation site were a typical public school. Future research should investigate the results of DI when instruction is delivered within typical classroom settings by teachers who receive typical professional development.

Although the current study extended the line of DI research to include a larger group of students, using a different research design, additional research is needed. Before this type of instruction can be recommended as an evidence-based practice, larger groups of students must participate. In addition, DI comprehension and language instruction should be compared to other instructional formats or strategies. It is not known whether DI resulted in learning that would have been different if the same content were delivered in one-on-one formats or through discrete trial teaching. Furthermore, it is not known whether DI resulted in gains different than may have been demonstrated by other explicit methods that research has shown effective for students with high incidence disabilities. Therefore, future research should include comparison between DI and other research-based methods as well as more sophisticated research designs and analyses.

**References**


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From Initial Phonics to Functional Phonics: Teaching Word-Analysis Skills to Students with Moderate Intellectual Disability

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Abstract: Reading instruction for students with MoID is typically limited to sight-word instruction. We developed a 2-part, phonetic instructional sequence based upon Direct Instruction teaching methodology to teach students with MoID word-analysis skills that generalize to untaught words encountered in their environment. Elementary and middle-school students with MoID learned word-analysis skills using simultaneous prompting procedures to explicitly teach verbal imitation of sounds, letter-sound correspondences, retrieval of learned letter-sounds to a predetermined rate of automaticity, and blending with telescoping. After demonstrating mastery of the word-analysis skills the students generalized taught blending skills to untaught CVC words; functional, community words; and environmental, connected-text phrases. A changing-criterion design embedded within a multiple baseline across sound and word sets was implemented for 3 elementary and 2 middle-school students diagnosed with MoID. Students reached mastery criterion for each phase of Initial Phonics and Functional Phonics, and a functional relation was demonstrated between the instructional sequence and students’ acquisition of word-analysis skills.

Students with moderate intellectual disability (MoID) who receive phonics instruction are provided the opportunity to learn generalizable word-analysis skills that increase the probability of decoding a novel, untaught word encountered in their environment. Word-analysis skills are considered an academic form of literacy and include phonological awareness, letter-sound correspondences, blending—saying each sound in a word slowly without stopping between sounds, and telescoping—saying the sounds quickly to read the word (Carnine, Silbert, Kame’enui, & Tarver, 2004; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997). For students with MoID, these generalizable word-analysis skills also can be considered a functional form of literacy because mastery of word-analysis skills allows greater access to community resources thereby increasing functional independence.

Until recently, however, phonics instruction seldom was provided for students with MoID. Joseph and Seery (2004) reviewed all forms of literacy instruction for students with all levels of intellectual disability and only found seven studies in which phonics instruction was provided, and of those studies, only one participant was diagnosed with MoID. Browder, Wakeman, Spooner, Ahlgrim-Delzell, and Algozine (2006) reported that almost 90% of published research studies examining reading instruction for students with moderate to severe disabilities (MSD) focused on acquisition of functional sight words. Sight-word instruction has been and remains the dominant form of literacy instruction to increase the functional independence of students with MoID.

The reason that educators rely on sight-word instruction for students with MoID is possibly because of the difficulty these students have with phonological coding hindering their acquisition of phonetic reading (Conners, Atwell, Rosenquist, & Sligh, 2001). However, students with severe reading disabilities who were thought to be unable to learn...
Phonetic skills have been shown to benefit from systematic instruction in phonemic awareness and decoding (Torgesen et al., 2001). Similarly, students with intellectual disability may have difficulty in these areas due to lack of instruction in phonetic skills (Stano-vich, 1985). A small body of research over the last 3 decades suggests that with effective instruction, students with MoID can learn generalizable word-analysis skills (Allor, Mathes, Roberts, Jones, & Champlin, 2010; Bracey, Maggs, & Morath, 1975; Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Cossu, Rossini, & Marshall, 1993; Davis, Fredrick, Alberto, & Gagné, 2010; Davis et al., 2013; Hoogeveen, Smeets, & Lancioni, 1989; Katims, 1996; Nietupski, Williams, & York, 1979; Waugh, Fredrick, & Alberto, 2009).

Bracey et al. (1975) demonstrated long ago that children with MoID can learn phonetic decoding skills. Through the use of a Direct Instruction (DI) program, Distar Reading (Engelmann & Bruner, 1969), students learned letter-sound correspondences, blended sounds into words, and spelled words using their sounds. Results in another early study by Nietupski et al. (1979), revealed that students with MoID could learn letter-sound correspondences through explicit instruction although not specifically a DI program.

These early findings are supported in more recent research. Working with middle-school students, Bradford, Shippen, Alberto, Houchins, and Flores (2006) demonstrated that students with MoID are capable of learning word-analysis skills including (a) letter-sound correspondences, (b) sounding out words, (c) blending sounds, (d) decoding irregularly spelled words, and (e) reading sentences and short passages at approximately a second-grade level. In only 6 months, these middle-school students learned phonetic decoding skills through the use of the DI Corrective Reading Program (Engelmann, Becker, Hanner, & Johnson, 1980), substantiating findings by Conners (1992) and Katims (2000).

Working with elementary-school students with MoID, Flores, Shippen, Alberto, and Crowe (2004) used systematic and explicit instruction to teach phonetic decoding by incorporating modified sequences and formats of the DI program, Corrective Reading: Word-Attack Basics, Decoding A (Engelmann, Carnine, & Johnson, 1988). All five of the students learned letter-sound correspondences, blending, and sounding out. All but one student mastered the four sounds taught and were able to blend the sounds slowly on both instructional and generalization words; however, they struggled with telescoping. Only one student was able to telescope novel consonant-vowel-consonant (CVC) words.

More recently, researchers demonstrated the effectiveness of time delay and simultaneous prompting procedures (Cohen, Heller, Alberto, & Fredrick, 2008; Waugh et al., 2009) for students with intellectual disability. Cohen et al. used time delay procedures with five participants—three with IQs in the mild-delayed range and two with IQs in the moderate range. All five students learned decoding skills with one of the student’s whose IQ was in the moderate range acquiring mastery the fastest. Through the use of simultaneous prompting procedures Waugh et al. found that three students with MoID learned letter-sound correspondences and applied blending skills to previously-learned sight words; although, not without difficulty in some areas. One student was unable to generalize the blending skill to novel, untaught words, while two students generalized blending to one untaught word but could not telescope.

Students with MoID can learn word-analysis skills when teachers use time delay (Cohen et al., 2008) and simultaneous prompting procedures (Waugh et al., 2009) based on Direct Instruction teaching strategies. However, some students have demonstrated difficulty in the areas of blending, telescoping, and generalization (Flores et al., 2004; Waugh et al., 2009). Difficulty with blending and telescoping could result from a lack of automatic retrieval of learned letter-sound correspondences. Automaticity with letter sounds is necessary for word reading to occur (LaBerge & Samuels, 1974), and consistent practice is necessary for automaticity to develop (Shiffron & Schneider, 1977). Shiffron and Schneider found that automaticity did not develop when tasks were inconsistent; moreover, the degree of automaticity depended upon the amount of consistency. Cohen, Dunbar, and McClelland (1990) found that the most important mechanism underlying automaticity is the strength-
enning of connections between stimuli and responses. Practice makes these connections stronger and performances are subsequently faster and less effortful. Taken together, these findings strongly support incorporating formal, systematic development of automaticity within reading instruction. Additionally, it is likely that once blending and telescoping skills are acquired students will need extensive practice before these skills generalize.

We designed an instructional sequence to provide many opportunities for students to learn verbal imitation of sounds, master letter-sound correspondences, become automatic with letter-sound correspondences to maximize phonological information processing efficiency, practice blending and telescoping, and then generalize these skills to novel, untaught words. The instructional sequence is based on DI teaching strategies such that it teaches components of word-analysis skills to mastery/automaticity (Carnine et al., 2004). To address automatic retrieval of letter sounds, we included a component not found in DI programs. That is, students practiced naming learned letter sounds to an individual mastery criterion that was determined by each student’s rate of naming speed demonstrated on the Rapid Object Naming (RON) subtest of the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999). Blending and telescoping sounds into words was not attempted until each student reached his or her individualized automaticity rate for taught letter-sound correspondences.

This study was part of a larger Institute of Educational Sciences (IES) research project to develop a comprehensive and integrated literacy curriculum (ILC) for students with moderate to severe disabilities (Alberto & Fredrick, 2007). The ILC includes three components. The Visual-Literacy Component provides instruction in picture and logo reading while the Sight-Word Component provides instruction in reading and demonstrating comprehension of individual sight words and connected text (Alberto, Waugh, & Fredrick, 2010). The research reported here is based on the Phonics Component of the ILC which was conducted to determine the effectiveness of the Phonics Component in teaching word-analysis skills to individuals with MoID.

The Phonics Component includes Initial Phonics and Functional Phonics. While both parts of the curriculum were designed to answer the research question through the use of the same instructional sequence, each part differed in some important aspects. Initial Phonics was introduced first to provide ample opportunities to develop initial emergent-literacy and phonological-awareness skills, to develop initial learning of instructional procedures, to teach a selection of individual letter-sound correspondences to be blended and telescoped into CVC words, and to provide many opportunities to generalize blending and telescoping skills to untaught, CVC words. That is, Initial Phonics was an opportunity for students to learn how to learn phonics. The second part of the Phonics Component, Functional Phonics, was introduced to students after they mastered all phases of Initial Phonics. The purpose of Functional Phonics was to build upon Initial Phonics by emphasizing instruction of common, functional community words and phrases. During Functional Phonics students continued to receive instruction in prerequisite skills such as phonological awareness; they were taught a much larger selection of individual letter-sound correspondences and letter-sound combinations; and they were taught to generalize blending and telescoping skills to more complex, functional words and to functional, environmental-connected text.

Method

Participants

Participants included five students with MoID and their classroom teachers. All students were between 7 and 14 years old with IQs in the 40–55 range. Students were identified by their classroom teachers based on the teacher’s report that the students communicated verbally, performed successfully in their current Edmark (Austin & Boekman, 1990) sight-word reading program, and did not have any behaviors that would interfere with 15 minutes of continuous instruction. Parents or guardians provided permission for all students. The students were served in two different self-contained special education classrooms for students with MoID, in two different schools (one elementary and one
middle), across two school districts. Two students were boys and three were girls; three students were African-American and two were Hispanic.

The students’ classroom teachers provided all of the instruction and conducted all of the data probes. The elementary students received 1:1 teaching sessions during Initial Phonics and the first two sound sets of Functional Phonics, and small-group instruction for the remaining sound and word sets of Functional Phonics. The two middle-school students received group instruction during both Initial and Functional Phonics.

Teacher Training

Teachers were trained prior to beginning instruction with students. Doctoral students who were part of the research project presented the overall program to teachers and modeled instructional steps for them. Teachers practiced implementing the instructional procedures by role playing with the researchers until they followed program steps with 100% accuracy based on the procedural fidelity instrument developed for the Phonics Component of the ILC. Researchers provided ongoing feedback and answered teacher questions for a minimum of one instructional sequence per week.

Independent and Dependent Variables

The independent variable (IV) was the Phonics Component of the ILC implemented with simultaneous prompting procedures. The dependent variables (DV) were the word-analysis skills that were taught in the Phonics Component—verbal imitation of sounds, letter-sound correspondences, automaticity, blending with telescoping, and generalization. Within the Phonics Component of the ILC the Blending Phase included both blending and telescoping such that students practiced saying the sounds in a word slowly without stopping between sounds and then saying the sounds quickly to read the word.

For Initial Phonics, a total of eight sounds were taught for the Sounds, Letter-Sound Correspondences, and Automaticity Phases, along with 14 blending words and 10 generalization words. For ease of learning, letter sounds were selected that had distinct auditory and visual characteristics. Words for Blending and Generalization Phases were common CVC words made up of previously-mastered letter sounds.

For Functional Phonics, a total of 16 sounds (four of which were previously-mastered sounds from Initial Phonics per the cumulative design) and four sound combinations were presented for the Sounds, Letter-Sound Correspondences, and Automaticity Phases along with 48 blending words, 15 functional generalization words, and 20 functional phrases. To select sounds and blending words for Sound Sets 1 through 4, we identified functional, community words such as “open” and “stairs.” The sounds from the functional words were taught in the Sounds, Letter-Sound Correspondences, and Automaticity Phases, and we chose words for Blending Phases that were comprised of those letter sounds. We used the originally-selected functional words as the untaught words to be blended within the Generalization Phases providing students the opportunity to generalize the skill of blending to novel, untaught words made up of previously-mastered letter sounds. For Word Sets 5 and 6 we selected two- and three-word environmental, connected-text phrases from lists of the most commonly-used functional, community phrases. For Word Set 5, we selected phrases that contained previously-mastered letter sounds and one previous generalization word from Sound Sets 1 through 4. Environmental, connected-text phrases for Word Set 6 were selected that were comprised of previously-mastered letter sounds from Sound Sets 1 through 4, yet all words within these phrases were novel words that the students had never been taught.

Assessment

Before instruction began, the RON subtest of the CTOPP (Wagner et al., 1999) was administered as a measure of naming speed. Naming speed is typically measured by asking students to name, as quickly and accurately as possible, an array of stimuli such as objects, colors, letters, or digits that are pictured on a page. Many students with MoID do not know the names of letters, digits, or colors, so the RON subtest was selected for use because it utilizes
pictures of everyday common objects such as ball, star, and chair.

Prior to the onset of instruction, in private testing areas of students’ schools, the RON subtest was administered individually by doctoral students. Raw scores were used because no standardized assessments have been developed to measure processing speed for this population.

**Design**

A multiple-baseline design across sound and word sets with an embedded changing criterion was used to determine the effectiveness of the Phonics Component. *Initial Phonics* stimuli were divided into three sound sets for a 3-tier, multiple-baseline design across sound sets. *Functional Phonics* stimuli were divided into four sound sets and two word sets for a 6-tier, multiple-baseline design across sound and word sets.

The embedded changing criterion occurred as the number of sounds and words accumulated across tiers of corresponding Sound, Letter-Sound, Blending, and Generalization Phases of the multiple baseline design. As the number of sounds and words increased across tiers, each set included at least 20% of the previously-mastered stimuli. For example, Sound Set 1 of *Initial Phonics* contained /a/ /m/ /t/ /s/ and Sound Set 2 contained the same sounds plus the new sounds /i/ and /f/. Therefore Sound Set 2 contained all previously-mastered sounds and new sounds to be learned making the entire set of sounds /a/ /m/ /t/ /s/ /i/ /f/. In the same manner, Sound Set 3 contained all previous sounds from Sound Sets 1 and 2, plus two additional sounds. Another example can be seen in Sound Set 1 of *Initial Phonics* in which the blending words were /mat/ /sam/ /at/ and /am/. Sound Set 2 blending words included the previously-mastered words from Sound Set 1 plus the words /fit/ /tim/ and /it/ thereby forming cumulative groups of blending words across sound sets (tiers). The exception was for the Automaticity Phase in which all sounds were cumulative across all sound and word sets. The total number of sounds and words increased across sound and word sets.

Each tier of *Initial Phonics* and *Functional Phonics* included six consecutive phases: a Baseline Phase and the five skill phases (verbal imitation of sounds, letter-sound correspondences, automaticity of letter sounds, blending, and generalization). After establishing stability within the Baseline Phase of each tier, each student reached mastery for a phase before beginning a subsequent phase. The mastery criterion for each Sound, Letter-Sound Correspondence, Blending, and Generalization Phase was 80% correct for two out of three consecutive sessions for group instruction and 100% correct for two consecutive sessions for individual instruction. The individualized mastery criterion for all automaticity phases was 100% of each student’s RON pretest rate for two consecutive sessions. Phase sequences across *Initial Phonics* and *Functional Phonics* are presented in Table 1.

Baseline data were collected for each student individually. All sounds and words to be taught were presented to each student prior to the onset of the study. Additional baseline probes were conducted for all sounds and words to be taught immediately prior to the onset of the respective sound or word set. All sounds and words were printed in 150 Comic Sans MS font on white 5 × 7 index cards. During the initial Baseline Phase and baseline probes, the teacher presented a sound or word card and asked the student to touch the card as a joint-attention prompt. Then the teacher said “What sound/word?” Correct and incorrect responses were recorded, but no feedback was provided.

**Daily Sequence for Initial and Functional Phonics**

Simultaneous prompting procedures were used to teach verbal imitation of sounds, letter-sound correspondences, and blending skills within the Phonics Component of the ILC. The daily sequence of activities consisted of priming activities, probes, and a teaching session. Learning was measured before each teaching session through the use of probes, described below. The stimuli for probes and teaching sessions consisted of the sounds or words of the particular phase in which students were working towards mastery.

**Priming activities.** The researchers wrote storybooks that included a controlled vocabulary (blending and generalization words) for respective sound sets, creating six storybooks.
for elementary students and two for middle-school students. Researchers made sock puppets for some of the characters and provided objects from the stories so students could interact with the storybooks thereby increasing student interest, attention, and comprehension. The overall purpose of the storybooks was to develop emergent-literacy skills, phonological awareness, and comprehension of blending and generalization words; and to ensure that the words students were expected to blend existed in the students’ receptive vocabulary. Teachers developed these skills through shared-storybook reading (Whitehurst & Lonigan, 1998) and language-expansion activities that included: modeling and having students track lines and words on pages, stressing a reading vocabulary, asking comprehension questions, and asking students to predict and retell stories. Magnetic letters also were used to promote phonological awareness through unstructured word-play activities. Teachers guided students in physical manipulation of magnetic letters to demonstrate combining sounds into words and breaking words into sounds. Priming activities also included practice naming previously-mastered letter sounds. No data were collected on priming activities.

Probe sessions. Teachers conducted one probe session in a 1:1 format for each participant prior to each instructional session using the same sound and word cards used in baseline and during instructional sessions. The data from these probe sessions are the data used to determine the effectiveness of the Phonics Component. Teachers recorded the number of correct and incorrect responses of each student on researcher-prepared, data-collection sheets. As in baseline, a joint-atten-

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**TABLE 1**

Instructional Sequence for the Phonics Component

<table>
<thead>
<tr>
<th>Initial Phonics</th>
<th>Functional Phonics</th>
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<tbody>
<tr>
<td>3 sound sets</td>
<td>4 sound sets, 2 word sets</td>
</tr>
<tr>
<td>1. Sounds</td>
<td>1. Sounds</td>
</tr>
<tr>
<td>2. Letter-Sounds</td>
<td>2. Letter-Sounds</td>
</tr>
<tr>
<td>(e.g., /a/ /m/ /n/ /s/)</td>
<td>(e.g., /a/ /m/ /n/ /s/)</td>
</tr>
<tr>
<td>3. Automaticity</td>
<td>3. Automaticity</td>
</tr>
<tr>
<td>4. Blending</td>
<td>4. Blending</td>
</tr>
<tr>
<td>(CVC words)</td>
<td>(CVC words)</td>
</tr>
<tr>
<td>(e.g., /mat/ /tam/ /fan/ /sam/)</td>
<td>(e.g., /mat/ /tam/ /fan/ /sam/)</td>
</tr>
<tr>
<td>5. Generalization</td>
<td>5. Generalization</td>
</tr>
<tr>
<td>(CVC words)</td>
<td>(Functional words)</td>
</tr>
<tr>
<td>(e.g., /sat/)</td>
<td>(e.g., /stairs/)</td>
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</table>

**Note.** Phases were mastered sequentially for each of 3 sound sets in Initial Phonics and for each of 4 sound sets and 2 word sets in Functional Phonics.
tion prompt was provided in all phases (e.g., touch the card). Unlike the Baseline Phase, if students made an incorrect response, the teacher provided the correct response, and if students made a correct response the teacher praised the student and repeated the correct response. During the Sounds Phase the teacher asked the student to repeat sounds she modeled (e.g., Say /s/). During the Letter-Sound Correspondence Phase the teacher presented a letter-sound card, asked the student to touch the card and then asked what sound? During the Automaticity Phase, the teacher presented a sound sheet with six rows each containing seven previously-learned letters and asked students to say the sounds as quickly as you can. The teacher recorded the number of correct sounds students provided in 1 minute. During the Blending Phase, the teacher presented a word card, asked the student to touch the card, say each sound in the word while pointing to the sounds, and then say the word fast. Probes during the Generalization Phase were conducted the same way as probes during the Blending Phase, except no corrective feedback was provided during the Generalization Phase. Probes were always conducted prior to teaching sessions in order to assess what students retained from previous teaching sessions; all correct responses counted toward mastery for that particular phase.

Teaching sessions. After probe sessions, teachers conducted a teaching session using simultaneous prompting procedures, that we adapted by adding a lead step for phonics students, in either a 1:1 or small-group format. The elementary-school students received 1:1 instruction for Initial Phonics and the first two sound sets of Functional Phonics, and small-group instruction for the remaining sound and word sets of Functional Phonics. The middle-school students received small-group instruction for both Initial and Functional Phonics. No data were collected during these teaching sessions because the controlling prompt was always provided before the students were asked to respond. During all teaching sessions simultaneous prompting procedures that included a model, lead, test sequence were repeated until students responded correctly and independently. The teacher provided the controlling prompt simultaneously with the instructional cue and then modeled for the students by providing the correct response. Next, the teacher provided the controlling prompt simultaneously with the instructional cue and asked the students to respond with her as a lead step. Finally, the teacher provided the controlling prompt simultaneously with the instructional cue and asked individual students to respond.

During the Sounds Phase, verbal imitation of sounds was taught for the respective group of sounds within each sound set. The teacher modeled continuous sounds (e.g., /m/, /s/) by saying them for 2 seconds and stop sounds (e.g., /t/, /b/) by saying them quickly without adding uh (e.g., tuh, buh). Students imitated each sound. During the Letter-Sound Correspondence Phase, letter-sound correspondences were taught for the respective group of letter sounds within each sound set. The teacher held up a letter-sound card (the same ones used in baseline) and said Touch the card. This sound is ___, what sound? following simultaneous prompting procedures of model, lead, test until the student responded correctly and independently.

During the Automaticity Phase automatic retrieval of learned letter-sound correspondences was taught for the respective group of letter sounds within each sound set. The authors created automaticity charts consisting of previously-mastered letter sounds in random order and in the same format as objects on RON charts. Students practiced naming the sounds as fast as they could for 1 minute until their naming rate, measured as correct sounds per minute (CSPM), matched their individual RON pretest rate. Only after students reached this level of automaticity was the skill of blending introduced.

During the Blending Phase for each sound and word set, students were taught to blend and telescope the previously-mastered letter sounds into words. Blending was operationally defined as holding each continuous sound (e.g., /s/, /m/) in the blending word for 2 seconds without stopping between sounds. This is called “saying the word slowly” and is a DI technique (Engelmann et al., 1988) used as an indicator that the student actually manipulated and blended sounds rather than having memorized the word as a sight word after seeing it in many teaching sessions. After
blending the sounds, the student was asked
to telescope, or to “say the word fast” in order
to practice the correct pronunciation of the
word. Teachers used simultaneous prompting
procedures that included a model, lead, test
sequence for students to practice saying the
words slowly and saying the words fast until
they responded correctly and independently.
After each correct blending and telescoping
response students selected the corresponding
object from an array of objects displayed on
the table. This motor demonstration of com-
prehension ensured that the students under-
stood the meaning of the words they read.

During the Generalization Phase of Initial
Phonics, students were presented with un-
taught consonant-vowel-consonant (CVC)
words made up of previously-mastered sounds
to test for generalization of blending and tele-
scoping. During the Generalization Phase of
Functional Phonics students were presented
with untaught, functional words made of pre-
viously-mastered sounds to test for generaliza-
tion. There was no instruction during the
Generalization Phase.

Procedural Fidelity
To measure procedural fidelity each week,
teachers and the researchers used video cam-
eras to record 20% of instructional sequences.
The investigator viewed the tapes while com-
paring procedures to a behavior checklist.
The total number of teacher behaviors ob-
served during the session was divided by the
total number of teacher behaviors on the be-
havior checklist and multiplied by 100%. Pro-
cedural fidelity for teacher implementation
ranged from 91% to 100% with a mean of
96%.

Interobserver Agreement
The researcher observed probe sessions on
video while simultaneously recording correct
and incorrect student responses. Data were
compared to data collected by the primary
data collector, the teacher. Interobserver
agreement was calculated using point-by-point
agreement. The total number of agreements
was divided by the total number of agree-
ments plus disagreements and converted to a
percent. Interobserver agreement was calcu-
lated for 20% of probe sessions and ranged
from 93% to 100% with a mean of 95%.

Social Validity
Teachers were provided with a social validity
rating scale to complete at the end of the study. They were asked to answer questions
pertaining to the usefulness of the study in
determining appropriate instruction for their
students, ease of implementation, and rele-
vance to curriculum development for students
with MoID. They also were asked how impor-
tant they felt phonics instruction was for their
students, and how likely they would be to con-
tinue to develop word-analysis skills and auto-
maticity with their students. Teachers rated
their responses on a 1 to 5 Likert-type scale
with 1 indicating strongly disagree and 5 indi-
cating strongly agree for a maximum positive
score of 25. Teachers’ scores ranged from 20
to 25 with a mean of 23.

Results
Visual analysis was conducted for all five par-
ticipants revealing a functional relation be-
tween the Phonics Component of the ILC and
mastery of word-analysis skills as evidenced by
a pattern of increase in correct responding
during intervention phases replicated across
sound and word sets. Due to space limitations
graphic presentation of data is provided for a
sample of one elementary student who re-
ceived individual and group instruction, and
for the middle-school group of two partici-
pants who received group instruction. The
data for each sample are displayed in a 3-tier
(Initial Phonics) and a 6-tier (Functional Pho-
nicos) multiple baseline design across sound
and word sets with an embedded changing
criterion, depicting the number of correct re-
sponses on the left y-axis and the number of
correct sounds per minute on the right y-axis.
Dashed lines across each phase indicate the
criterion for that phase and the numbers in
parentheses indicate the actual number of
correct responses needed for mastery. Also,
we have provided a table that includes the
mastery criterion for all Blending and Gener-
alization Phases as well as the number of ses-
sions required to reach mastery for the ele-
mental student and for the middle-school
group of students, highlighting the change in rate of learning across sound and word sets.

Taniesha represents the elementary students who received individual instruction during Initial Phonics (see Figure 1). Taniesha demonstrated mastery of all phases of Initial Phonics except the Generalization Phase of Sound Set 1 (Tier 1). Her learning was replicated across subsequent tiers representing Sound Sets 2 and 3. Baseline data points of zero indicate that Taniesha did not know any sounds or blending words before instruction began and an increase in word-analysis skills did not occur until treatment was introduced in each phase. Baseline probes were conducted immediately prior to the onset of each sound set to measure her most current knowledge of verbal imitation of sounds, letter-sound correspondences, and words for each respective tier. The baseline probes just prior to instruction in each tier show that Taniesha retained previously-mastered sounds and words that were included in subsequent sound sets. As seen in Table 2, during Sound Set 1 Taniesha reached the mastery criterion of 12 correctly blended words in 14 sessions. In Sound Set 2 she reached the mastery criterion of 21 correctly blended words in 17 sessions, and in Sound Set 3 she reached the mastery criterion of 24 correctly blended words in 10 sessions. During generalization Taniesha read zero novel words in Tier 1, 12 in Tier 2, and 18 in Tier 3.

Taniesha also represents the elementary-school students who received instruction in Functional Phonics. They received individual instruction for Sound Sets 1 and 2, during which mastery for each phase was 100% correct responses for two consecutive sessions (Figure 2, Tiers 1 and 2). Students received group instruction for Sound Set 3 and 4 and for Word Sets 5 and 6, during which mastery was a group average of 80% correct responses for two out of three consecutive sessions. Tanie-
sha mastered all word-analysis skills in Sound Set 1 only after instruction was introduced for each phase. This is replicated across Sound Sets 2–4 and Word Sets 5 and 6. Baseline data for Sound Sets 1 through 4 show that Taniesha knew a range of two to three items and indicate that she retained the previously-mastered sounds and words from Initial Phonics. Baseline probes immediately prior to the onset of Sound Sets 2 through 4 also show that she retained previously-mastered items from previous Functional Phonics sound sets. Baseline data show that Taniesha did not know any of the functional, connected-text phrases prior to beginning Word Sets 5 and 6. Table 2 shows that during Sound Sets 1 through 4 Taniesha demonstrated mastery of 16, 24, 27, and 29 blending words in 8, 12, 8, and 4 sessions respectively. She correctly generalized the skills of blending and telescoping to 6, 10, 16, and 24 novel, functional words in 5, 4, 5, and 6 sessions respectively.

During Word Set 5 of Functional Phonics, Taniesha mastered 10 functional, connected-text phrases (in which one word was a previously-mastered generalization word) in 10 sessions, and during Word Set 6 she mastered 14 functional, connected-text phrases (in which all words were novel, untaught words) in eight sessions. During Word Set 5 Taniesha successfully generalized blending and telescoping skills to 14 functional, connected-text phrases (all novel, functional words) in 12 sessions. During Word Set 6, she successfully generalized these skills to 14 functional, connected-text phrases in 9 sessions (See Table 2).

Figure 3 displays average learning performance during Initial Phonics for a middle-school group of two students. For group instruction, mastery criterion was 80% correct for two out of three consecutive sessions for each phase. The group demonstrated mastery of all phases of Initial Phonics, and learning was replicated across subsequent tiers representing Sound Sets 2 and 3. Students knew a range of two to four items before instruction began for Sound Set 1. Increases in verbal imitation of sounds, letter-sound correspondences, automaticity of letter-sounds, blending, and generalization did not occur until treatment was introduced within each phase. Baseline probes were conducted immediately prior to the onset of each sound set and show that the students retained previously-mastered sounds and words that were included in previous Initial Phonics sound sets per the cumulative design. As seen in Table 3, during Sound Sets 1 through 3 the students reached the mastery criteria of 6, 11, and 13 correctly blended words in 5, 3, and 8 sessions respectively. During Generalization Phases of Sound Sets 1 through 3, the students successfully generalized the skills of blending and telescoping to 2, 6, and 10 novel words in 2 to 3 sessions.

Figure 4 depicts the learning performance during Functional Phonics for the middle-

### TABLE 2

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<tr>
<th>Initial Phonics – Elementary Student</th>
<th>Functional Phonics – Elementary Student</th>
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<tr>
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Figure 2. A multiple baseline design across sound sets with an embedded changing criterion design depicting the number of correct responses produced by one elementary student during functional phonics. Open square data points depict automaticity rates and correspond with the secondary Y-axis.
school group of two students, whose mastery criterion was a group average of 80% correct responses across two out of three consecutive sessions. The students mastered all phases of Tier 1, and mastery of all phases was replicated across each tier representing Sound Sets 2, 3, and 4 and Word Sets 5 and 6. Initial baseline data for Sound Sets 1 through 4 show that the students knew a range of two to four items and indicate that students retained the previously-mastered sounds and words from Initial Phonics. Baseline probes immediately prior to the onset of Sound Sets 2 through 4 show also that students retained previously-mastered items from previous Functional Phonics sound sets. Students did not know any of the functional, connected-text phrases prior to beginning Word Sets 5 and 6. During Sound Sets 1 through 4 students mastered blending and telescoping of 13, 19, 27, and 29 words in 3, 5, 3, and 5 sessions, respectively. The students generalized these skills to 5, 8, 16, and 24 novel, functional words in 2 to 3 sessions (see Table 3).

During Word Set 5 of Functional Phonics, the middle-school group mastered 10 functional, connected-text phrases (in which one word was a previously-mastered generalization word) in three sessions, and during Word Set 6 they mastered 14 functional, connected-text phrases (in which all words were novel, untaught words) in four sessions. During Word Set 5 they generalized blending and telescoping skills to 14 functional, connected-text phrases (all novel, functional words) in three sessions. During Word Set 6, the students generalized these skills to 14 functional, connected-text phrases in five sessions (See Table 3).

Discussion
This study supports and extends previous demonstrations of the effectiveness of simultaneous prompting procedures in teaching
word-analysis skills to students with MoID (Waugh et al., 2009). All five students acquired word-analysis skills that included verbal imitation of sounds, letter-sound correspondences, retrieval of letter-sound correspondences to a level of automaticity, blending of the learned letter sounds to words by holding each sound for 2 seconds without stopping (“saying it slowly”) and producing each sound quickly without stopping (telescoping), and generalizing the skill of blending to untaught words and connected-text phrases. A clear rise to mastery is shown for all phases, compared to baseline phases, for all students except Taniesha’s first opportunity to generalize the skill of blending to a novel word during Sound Set 1 of Initial Phonics. We anticipated that students with MoID needed many more opportunities to generalize phonetic skills to untaught words than have been provided in the past (Bracey et al., 1975; Bradford et al., 2006; Flores et al., 2004). Our cumulative data within the changing-criterion across tiers buoyed this important aspect of the Phonics Component. Per the design, Taniesha was provided additional opportunities to practice and master precursor word-analysis skills before attempting to generalize the skills to untaught words. The next set of generalization words included the original generalization word (sat) plus three additional, untaught words (mat, at, am), and she was able to read all of them. In addition to identifying and addressing blending and generalization as specific areas of difficulty, we have shown that repetition of systematically presented stimuli is an effective approach to successful learning of phonetic skills for students with MoID. Historically, teachers may have “given up” before students received sufficient systematic repetition to facilitate learning, leading to the generally accepted assumption that students with MoID cannot learn phonics.

The use of cumulative stimuli within the design revealed another important finding. As the students progressed through sound sets of Initial Phonics and Functional Phonics the number of sessions required to reach mastery often decreased even though the mastery criterion increased. Students began mastering more items in progressively fewer sessions. As seen in Table 2, during Initial Phonics Taniesha reached the mastery criteria of 12, 21, and 24 correctly blended words in 14, 17, and 10 sessions, respectively. During Generalization Phases Taniesha did not read any novel words in Tier 1, but read 12 in Tier 2, and 18 in Tier 3.

In Sound Set 1 of Functional Phonics Taniesha demonstrated mastery of 16 words in eight blending sessions and generalized blending and telescoping to six novel, functional words in five sessions. In Sound Set 4, she correctly read 29 words in half as many sessions as she read 16 words in Sound Set 1, and she generalized blending and telescoping to 24 novel, word-analysis skills to students with MoID (Waugh et al., 2009). All five students acquired word-analysis skills that included verbal imitation of sounds, letter-sound correspondences, retrieval of letter-sound correspondences to a level of automaticity, blending of the learned letter sounds to words by holding each sound for 2 seconds without stopping (“saying it slowly”) and producing each sound quickly without stopping (telescoping), and generalizing the skill of blending to untaught words and connected-text phrases. A clear rise to mastery is shown for all phases, compared to baseline phases, for all students except Taniesha’s first opportunity to generalize the skill of blending to a novel word during Sound Set 1 of Initial Phonics. We anticipated that students with MoID needed many more opportunities to generalize phonetic skills to untaught words than have been provided in the past (Bracey et al., 1975; Bradford et al., 2006; Flores et al., 2004). Our cumulative data within the changing-criterion across tiers buoyed this important aspect of the Phonics Component. Per the design, Taniesha was provided additional opportunities to practice and master precursor word-analysis skills before attempting to generalize the skills to untaught words. The next set of generalization words included the original generalization word (sat) plus three additional, untaught words (mat, at, am), and she was able to read all of them. In addition to identifying and addressing blending and generalization as specific areas of difficulty, we have shown that repetition of systematically presented stimuli is an effective approach to successful learning of phonetic skills for students with MoID. Historically, teachers may have “given up” before students received sufficient systematic repetition to facilitate learning, leading to the generally accepted assumption that students with MoID cannot learn phonics.

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Figure 4. A multiple baseline design across sound sets with an embedded changing criterion design depicting the average number of correct responses produced by one middle school group of two students during functional phonics. Open square data points depict automaticity rates and correspond with the secondary Y-axis.
During Word Set 5 of Functional Phonics, Taniesha mastered 10 connected-text phrases (in which one word was a previously-mastered generalization word) in 10 sessions, and during Word Set 6 she increased her mastery of connected-text phrases to 14 while decreasing the number of sessions required for mastery. During Word Set 5 Taniesha generalized blending and telescoping to 14 connected-text phrases (all words within phrases were novel functional words) in 12 sessions. During Word Set 6, she generalized to 14 connected-text phrases and decreased the number of sessions to nine.

As can be seen on Table 3, during Sound Set 1 of Initial Phonics the middle-school group reached a mastery criterion of six correctly blended words in only five sessions. By Sound Set 3 they reached a mastery criterion of 13 correctly blended words in eight sessions. For Generalization Phases, during Sound Set 1 the students reached a mastery criterion of two correctly-blended words in two sessions, and by Sound Set 3 generalized to 10 untaught words in only three sessions. Although, the data do not show the same decrease in number of sessions to mastery as for Taniesha, students mastered progressively more items in approximately the same number of sessions. Also, they began mastering skills in fewer sessions than Taniesha (e.g., 14 vs. 5 sessions for mastery of the Blending Phase during Sound Set 1 of Initial Phonics). The older students might have learned more quickly because they had better-developed attention skills, more prior practice with in-seat behavior, and more opportunities to interact with reading stimuli because of additional years in school.

As the students acquired basic word-analysis skills, and then applied them to words and phrases that increased in number and complexity, they demonstrated that word-analysis skills are strategy-based skills that once learned can be applied to many, unanticipated words in an individual’s environment. This use of a strategy-based skill remains in contrast to sight-word reading that requires the same amount of memory load for every word memorized, and does not prepare an individual to read untaught words that have a functional use in the individual’s environment.

In addition to the word-analysis skills targeted in this study, students developed prerequisite-reading skills for which we did not collect data. These prerequisite-reading skills developed during Automaticity Phases and storybook-priming activities. When presented with an automaticity chart consisting of 42 previously-mastered letter sounds, and asked to name the sounds as quickly as they could for one minute, most of the students could not attend to individual stimuli on a page nor track left to right and from one line to the next. To address this we alternated between red and black font for each line, and used hand over hand guidance until the students learned to attend to each stimulus on the page and to track independently. Not only were students increasing their ability to retrieve letter sounds quickly and accurately, they learned the emergent-literacy skill of tracking and improved their attention skills.

The shared-storybook activities facilitated their learning of prerequisite-reading skills including, phonological awareness, emergent literacy, comprehension, language expansion, and vocabulary. The age-appropriate storybooks corresponded with the curriculum and as the students participated in the interactive reading we observed these skills begin to emerge. As the study progressed, students began to make predictions about events in the stories, identify sentences and words on pages, provide a motor demonstration of comprehension of reading vocabulary, read individual sounds in CVC words, and practice saying CVC words slowly and quickly.

Phonological awareness and emergent literacy are prerequisite skills for phonetic-reading acquisition (Ehri, 2004; Share, Jorm, MacLean, & Matthews, 1984). Prior to participating in this study, our students had not been systematically taught these prerequisite skills because phonics instruction is seldom provided for children with MoID (Browder et al., 2006). Because sight-word instruction is the most common method of reading instruction for students with MoID, these prerequisite-reading skills are often not acquired, with the exception of some emergent-literacy skills.

When word-analysis skills have been taught (Bracey et al., 1975; Bradford et al., 2006; Flores et al., 2004) they have not included an automaticity requirement. Automaticity training was one of the most unique aspects of the
Phonics Component. Due to limited working-memory capacity, we speculated that the students needed to learn to retrieve letter-sound correspondences to some level of automaticity before attempting to blend them into words. For the Automaticity Phase mastery criterion we selected each student’s rate on the RON subtest as the best reflection of the individual student’s phonological processing rate. All students blended successfully after first reaching mastery in Automaticity Phases suggesting that automaticity practice facilitated the skill of blending. However, we do not know if the criterion for automaticity that we selected is a necessary threshold for successful blending, or if the automaticity practice is sufficient with a less stringent criterion.

The Phonics Component included academic-literacy and functional-literacy goals. Historically, the definition of literacy instruction has been binary. Academic literacy has been viewed as the approach for typically-developing students and has involved phonetic-decoding skills while functional literacy has been viewed as the approach for individuals with developmental delays and has included sight-word instruction (Cegelka & Cegelka, 1970). We have shown that the two types of goals can be combined. With this alignment of goals, students with MoID can be taught phonetic-decoding skills to promote optimal participation in their community. Typically-developing students are taught phonics as a method of obtaining information from connected-narrative text which includes sentences and passages. Students with MoID should be provided the same opportunity even if their full potential may be connected-environmental text which consists of functional words and short phrases.

Limitations and Future Recommendations

One limitation of this study is a change that we made to the changing-criterion requirement. The elementary students began phonics instruction before the middle-school students. As originally designed the elementary students had three trials in each session. Because of the increase in the number of sounds and blending words in Functional Phonics, the number of trials was reduced from three to two trials per session and we applied this new criterion to all future participants. By the time the middle-school students began Initial Phonics the criterion had changed to two trials per session. The mastery criterion for 1:1 instruction was 100% correct for two consecutive sessions and the criterion for group instruction was a group average of 80% correct across two out of three consecutive sessions. The elementary-school students received 1:1 instruction throughout Initial Phonics and the first two sound sets of Functional Phonics, and the middle-school students received group instruction throughout the study.

Considering our participants were from multiple schools in multiple districts, and at multiple age levels, we were not able to control for their previous literacy experiences beyond the Edmark program that all of the participants received prior to this research. Further, all students with MoID may not be equally successful. There were only three elementary-school students and two middle-school students who completed the Phonics Component limiting the external validity.

We have not found the floor effect of cognitive ability for students who can learn to read phonetically. Future research should include different students with MoID with varied previous literacy instruction and cognitive abilities. It will be important to examine cognitive and language skills such as vocabulary level, processing speed, and working memory as possible predictors of phonetic reading ability to better understand what skills need to be developed to be successful in this program. Close inspection of underlying cognitive processing skills for reading can facilitate identification of students who are prepared to learn to read phonetically.

Future research also should include a close examination of automaticity requirements for blending acquisition. In this study all students mastered Blending and Generalization Phases after mastering individual automaticity requirements. However, it is possible that students could have mastered Blending and Generalization Phases with lower levels of automaticity than what were required in this study.

Finally, it would be helpful to collect data on the development of phonological-awareness skills. Anecdotally, we observed important phonological-awareness skill acquisition,
but without systematic measurement and careful inclusion of this in the design of our study, it is impossible to know the extent to which the shared-storybook activities impacted the development of phonological-awareness skills.

References


Employment Instruction for Secondary Students with Autism Spectrum Disorder: A Systematic Review of the Literature

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Abstract: Individuals with autism spectrum disorder (ASD) often struggle with features of adult life, including obtaining and maintaining gainful employment. Many factors seem to contribute to this issue, such as: (a) access to financial resources, (b) interaction between the unique characteristics of ASD and employment settings, and (c) curriculum and instructional practices in secondary special education that may not focus specifically on the procurement of employment. An additional area that may be a factor is the paucity of research on employment development for students with ASD while attending middle and high school programs. This article examined the research on teaching strategies used to develop employment skills among secondary students with ASD between the ages 14–22. Twelve studies were identified with a total of 55 participants with ASD. A summary of the articles meeting the inclusion criteria is provided along with recommendations for future research.

Questions about how adolescents and adults with developmental disabilities can and should be taught functional skills have been a focus in the literature since the introduction of the criterion of ultimate functioning as a guiding principle in special education (Brown, Nietupski, & Hamre-Nietupski, 1976). What should be taught and how is a major consideration for any instructional program. The literature is replete with studies demonstrating the effectiveness of systematic instruction techniques used to teach a wide range of skills to adolescents with various disabilities (Test et al., 2009). Clearly, teaching employability and daily living skills, among others, has enjoyed some of this attention (Test et al., 2009). There does, however, seem to be a gap in the literature reporting on adolescents with ASD receiving direct instruction in employment skills, or job skills, while in middle and high school. Most of the intervention research on individuals with ASD has focused on young children with very little attention given to adolescents (Gerhardt & Weiss, 2011), including employment skills (Hendricks, 2010; Hendricks & Wehman, 2009).

Recent prevalence data place the occurrence of ASD in the United States at an average rate of 1 in 110, representing a sizable increase over the last two decades (Centers for Disease Control and Prevention, 2011). In their report to Congress, the United States Department of Education (US-DOE, 2007) reported that the prevalence of ASD in the American school system increased by 410% among children ages 6–11 from 1996 to 2005. During that period, there was a 514% increase among students with ASD ages 14 and older, and there was a 317% increase among students with ASD ages 18–21 (US-DOE, 2007). This represents a substantial increase in the number of students with ASD requiring programming at the secondary level and a formidable challenge for schools (Gerhardt & Weiss, 2011).

Concomitant increases have been reported among adults with ASD seeking services. Cimera and Cowan (2009) reported a 121% increase in the number of adults with ASD requesting assistance from Vocational Rehabilitation (VR) between 2002–2006. This unprecedented increase in the number of individuals with ASD clearly leads to a need for more services, particularly as this population...
begins to age. Unfortunately, post-school options remain limited, and many adults with ASD struggle with features of adult life, particularly, employment. Indeed, the overall unemployment rate for people with disabilities is as high as 68% (Harris Interactive, as cited by The President’s Committee for People with Intellectual Disabilities, 2009). It is estimated that this rate increases to 80% for those with intellectual disability (InD, The President’s Committee for People with Intellectual Disabilities, 2009), and this rate may be even higher for those with ASD when considering both unemployment and underemployment (National Autism Society, as cited by Holmes, 2007). Moreover, the overall unemployment rate for people with disabilities has not changed very much over the last three decades, indicating a disturbing, yet stable trend (Harris Interactive, as cited by The President’s Committee for People with Intellectual Disabilities, 2009).

Supported employment (SE) is a service to help people with disabilities achieve gainful employment (Rusch & Hughes, 1989). Although SE was designed to improve the prospects of gainful employment for most individuals, in spite of need, it remains quite elusive for people with severe disabilities (Rusch & Braddock, 2004), including those with ASD deemed “too disabled” to benefit from SE or other assistance through VR (Cimera & Cowan, 2009; Lawer, Brusilovskiy, Salzer, & Mandell, 2009). For those individuals with ASD who do qualify for VR and SE services, the costs of the supports are higher than all other disability groups except for people with sensory impairments (e.g., vision and hearing impairments, Cimera & Cowan, 2009). Furthermore, when compared to other workers with disabilities receiving VR services, those with ASD tend to work fewer hours and earn a lower weekly wage (Cimera & Cowan, 2009).

Considering the unemployment/underemployment rates, the higher costs associated with VR services, and that some individuals with ASD are considered “too disabled” by VR to receive SE services, it seems clear that many individuals with ASD are exiting public school ill-prepared to obtain employment. Undeniably, post school outcomes for people with ASD and other disabilities are likely the function of a multifaceted problem involving the unique characteristics of the individual (Gerhardt & Weiss, 2011), school practices (Getzel & deFur, 1997), adult service agency providers (Parsons, Reid, Green & Browning, 1999; 2001), and funders (Rusch & Braddock, 2004; Wehman, 2006), to name a few. The limited body of research available to guide educators’ instructional practices does not make policy or practice any easier and may actually be an underlying contributing factor to the limited success now reported (Hendricks, 2010, Hendricks & Wehman, 2009).

A closer examination of the supports offered to individuals with ASD, and specifically, the instructional supports and tactics used with secondary students, may help frame a complete understanding of how these students are prepared for employment once they exit school. Educator knowledge of evidenced-based tactics for use with transition-aged students with ASD may even lead to the development of student skills that result in qualitatively different post-school outcomes for older adolescents and adults with ASD. Recently, Test et al. (2009) analyzed studies that investigated instructional tactics used to teach a variety of skills to transition-aged students with various disabilities. Included in the review were studies on employment and job skills. However, the studies reviewed were not exclusive to students with ASD, as many of the included participants experienced other disabilities. In another recent review of the literature, Hendricks (2010) reported studies focusing on factors related to employment for adults with ASD. Included in this article was a review of SE programs for adults with ASD, as well as a limited number of intervention studies targeting adults. Although a number of SE programs and promising studies were reviewed, there were limited studies with a central focus on specific instructional tactics that were used to teach adolescents with ASD. In another study, Hendricks and Wehman (2009) provided a comprehensive review of programming for students with ASD transitioning from school to post-school environments. Many of the studies reviewed that were related to instructional strategies focused on topics such as behavior reduction programming, language development, and literacy. Few of the studies included any discussion of targeted job skill development. Thus, the pri-
mary purpose of the current investigation was to conduct a systematic review of the literature on instructional tactics used to teach employment skills to secondary students with ASD. A secondary purpose was to refine the scope of the literature reviews reported by Hendricks and Wehman (2009) and Hendricks (2010) by limiting the current review along three dimensions: (a) age of the participants, (b) employment skills as the goal, and (c) teaching strategies. In that vein, the following research questions were posed:

1. How many studies were reported in the peer-reviewed literature with a focus on teaching employment skills to individuals with ASD between the ages of 14–22?
2. What were the instructional tactics used to teach employment skills to secondary students with ASD between the ages of 14–22?
3. What was the efficacy of the instructional tactics used to teach employment skills to secondary students with ASD between the ages of 14–22?

Method

Journal articles from the peer-reviewed literature from 1995–2010 with a focus on teaching employment skills to secondary students (ages 14–22 years) with ASD were reviewed. For this review, autism spectrum disorder included autistic disorder, Asperger Syndrome, and Pervasive Developmental Disorder-Not Otherwise Specified. Additionally for this review, employment skills included job specific skills and social skills that are likely to benefit one’s employment status. Hand searches were conducted in the following journals: Autism, Career Development for Exceptional Individuals, Education and Training in Autism and Developmental Disabilities, Focus on Autism and Other Developmental Disabilities, and the Journal of Applied Behavior Analysis. Electronic databases were also searched including, ERIC, Education Full Text, EBSCO, PsychINFO, and PsychArticles. Keywords for the database search included the word “autism” paired with each of the following: Vocational instruction, employment instruction, secondary education, vocational education, employment, and employability. Finally, a bibliographic search of the research reports meeting the inclusion criteria and relevant reviews of the literature on the topic was conducted (Wolery & Lane, 2010).

Publications selected for review met the following criteria. First, two-thirds of the participants had to be between the ages of 14–22. The two-thirds ratio was selected to capture studies with secondary special education programming as a central focus, and to eliminate studies comprised of a majority of younger students (e.g., preschool and elementary) as well as adult participants who completed their schooling. Additionally, this age range was selected because it represents the period when transition planning and instruction should occur. Second, 50% of the participants had to have a diagnosis of ASD. This criterion was chosen so that studies reviewed had at least a balanced representation of individuals with ASD in their participant pool. Third, the independent variable had to be an intervention designed to improve the participants’ employment skills. Fourth, the independent variable had to be job related skills or social skills related to employment, exclusive of reducing problem behavior. Studies that focused on preference assessments to increase work performance were also included in the review. Finally, studies had to be published in the peer-reviewed literature between 1995–2010.

Results

Twelve studies met the inclusion criteria. Overall, each study focused on some aspect of employment instruction for adolescents and young adults with ASD. At least 50% of all the participants in the studies reviewed had a diagnosis on the autism spectrum, and two-thirds of the participants were between the ages 14–22, with the exception of the study by Agran et al. (2005). In that study, 2 of the 6 participants were identified as having ASD and one was in the process of being diagnosed with ASD. The total participants with ASD among all reviewed studies was n = 55 (see Table 1).

In response to research question one, there were very few studies that met the inclusion criteria. One study met the criteria from 1995 to 2004. However, 11 studies met the inclusion criteria from 2005–2010, with an increasing
trend during this period. Notwithstanding this publication increase over the last few years, there remains a paucity of literature examining employment skill development among adolescents with ASD (see Figure 1).

In response to research question two, all the studies examined various tactics to increase independent completion of employment tasks or behaviors related to employment. The studies were conducted in vocational classrooms, academic classrooms, non-classroom school settings, stores, homes, and other community settings (see Table 2). Four of the studies investigated self-management strategies to enhance task completion. These studies taught self-management using component strategies of Behavior Skills Training (BST) (e.g., instruction, modeling, practice, and feedback). They also used ancillary materials to facilitate self-management, including token systems, picture prompts, and Personal Digital Assistants (PDAs). Six studies explored the effects of video modeling (either singularly, as part of an intervention package, or as part of a comparison of tactics) on skill development/enhancement. An additional study examined BST with and without a text message cueing system, as well as the reverse. The remaining study investigated the effects of high v. low preferred items on task completion.

In response to research question three, many of the studies reported positive effects resulting from the intervention, or detailed more effective strategies for those studies comparing instruction tactics. Two studies presented a more modest appraisal of the effects of the intervention on employment skills (Allen, Wallace, Renes, Bowen, & Burke, 2010; Copeland & Hughes, 2000). Finally, several studies reported details regarding various degrees of generalization and/or maintenance of the targeted skills (see Table 2).

Discussion

The purpose of the current study was to examine the extant literature on teaching employment skills to individuals with ASD be-

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**TABLE 1**

**Articles and Participant Characteristics**

<table>
<thead>
<tr>
<th>Author(s) (year)</th>
<th># of Participants with ASD</th>
<th>Age of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agran, Sinclair, Alper, Cavin, Wehmeyer, &amp; Hughes (2005)</td>
<td>2 with ASD; 1 being evaluated for ASD; 3 InD</td>
<td>13–15 yrs. (66% above 14 years old)</td>
</tr>
<tr>
<td>Allen, Wallace, Greene, Bowen, &amp; Burke (2010)</td>
<td>3 with ASD</td>
<td>17–22</td>
</tr>
<tr>
<td>Allen, Wallace, Renes, Bowen, &amp; Burke (2010)</td>
<td>4 with ASD</td>
<td>16–25 (75% between 14–22)</td>
</tr>
<tr>
<td>Burke, Andersen, Bowen, Howard, &amp; Allen (2010)</td>
<td>Study 1: 3 with ASD Study 2: 3 with ASD</td>
<td>Study 1: 20–27 (66% below 22 years of age) Study 2: 18–20</td>
</tr>
<tr>
<td>Cihak &amp; Schrader (2008)</td>
<td>4 with ASD</td>
<td>16–21</td>
</tr>
<tr>
<td>Copeland &amp; Hughes (2000)</td>
<td>1 with ASD/InD; 1 with InD</td>
<td>15–16</td>
</tr>
<tr>
<td>Ganz &amp; Sigafoos (2005)</td>
<td>1 with ASD; 1 with InD and Other Health Impaired</td>
<td>19–20</td>
</tr>
<tr>
<td>Gentry, Wallace, Kvarfordt, &amp; Lynch (2010)</td>
<td>22 with ASD</td>
<td>14 and older (all high school students)</td>
</tr>
<tr>
<td>Graff, Gibson, &amp; Galiatsatos (2006)</td>
<td>2 with ASD, 1 with a chromosomal disorder, &amp; 1 with Attention Deficit/ Hyperactivity Disorder</td>
<td>14–15</td>
</tr>
<tr>
<td>Mechling, Gast, &amp; Seid (2009)</td>
<td>3 with ASD</td>
<td>16–17</td>
</tr>
<tr>
<td>Mechling &amp; Gustafson (2008)</td>
<td>6 with ASD</td>
<td>15–21</td>
</tr>
<tr>
<td>Van Laarhoven, Van Laarhoven-Myers, &amp; Zurita (2007)</td>
<td>1 with ASD; 1 with Down Syndrome</td>
<td>Both were 18</td>
</tr>
</tbody>
</table>
tween the ages of 14–22. The primary finding from this inquiry was that there is a significant gap in the literature pertaining to this topic as only 12 studies were identified that met the search criteria. Although not specifically focused on teaching employment skills to students of this age group, other researchers reported similar findings in their reviews of the literature on transition planning and employment outcomes for individuals with ASD (e.g., Hendricks, 2010; Hendricks & Wehman, 2009).

Recent education legislation requires instructional strategies and interventions to be evidenced-based. What constitutes an evidence-based practice has generated debate and resulted in the development of guidelines for determining the quality and scope of research investigating a given instructional strategy (Odom et al., 2005). Although the purpose of this paper was not to evaluate whether the individual studies reviewed constituted evidence-based practices, we contend that the amount of studies available addressing employment skill development to be limited in scope along several dimensions laid out by Horner et al. (2005) and Kratochwill et al. (2010). First, there was a limited amount of studies addressing job specific skill instruction. Second, no studies were identified that targeted social skills needed for employment. Deficits in social skills are a core aspect of the disability (American Psychiatric Association, 2000), and many have declared that difficulties in this area are a major barrier to meaningful community inclusion, including obtaining gainful employment (Gerhardt & Weiss, 2011; Hendricks, 2010; Hendricks & Wehman, 2009; Targett & Wehman, 2009). Clearly, additional studies examining strategies to improve social skills for employment for adolescents and adults with ASD are desperately needed. Next, there were too few participants with ASD at the secondary level included in the current literature base on employment development. Many studies were excluded from the investigation because there was a lack of participants with ASD, as well as a lack of students between 14–22 years old. Finally, there were too few research teams producing research on this topic. Indeed, three of the 12 studies were by the same team investigating similar tactics (see Table 2). An increase in research productivity is clearly needed so that educators become better informed about practices to adopt in their secondary special education classrooms.

Undoubtedly, much of the current literature on the education and treatment of individuals with ASD has centered on young chil-
TABLE 2
Characteristics of Selected Studies

<table>
<thead>
<tr>
<th>Author(s) (year)</th>
<th>Intervention</th>
<th>Skills Taught</th>
<th>Setting</th>
<th>Generalization and/or Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agran, Sinclair, Alper, Cavin, Wehmeyer, &amp; Hughes (2005)</td>
<td>Self-monitoring taught via behavior skills training</td>
<td>Following Directions</td>
<td>Multiple classrooms</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Burke, Andersen, Bowen, Howard, &amp; Allen (2010)</td>
<td>Study 1: BST and PDA cueing system (when needed)</td>
<td>Perform in Air-Inflated Mascots</td>
<td>Warehouse</td>
<td>Study 1: Both</td>
</tr>
<tr>
<td></td>
<td>Study 2: PDA cueing system and BST (when needed)</td>
<td></td>
<td></td>
<td>Study 2: Both</td>
</tr>
<tr>
<td>Cihak &amp; Schrader (2008)</td>
<td>Video self-modeling vs. video adult modeling</td>
<td>Vocational and pre-vocational tasks</td>
<td>Faculty work room and classroom</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Copeland &amp; Hughes (2000)</td>
<td>Self-monitoring via picture prompts</td>
<td>Vocational task completion</td>
<td>Faculty dining room &amp; Hotel Classroom</td>
<td>No</td>
</tr>
<tr>
<td>Ganz &amp; Sigafoos (2005)</td>
<td>Self-management via using a token system</td>
<td>Task completion for student with ASD</td>
<td></td>
<td>Generalization noted anecdotally</td>
</tr>
<tr>
<td>Graff, Gibson, &amp; Galiatsatos (2006)</td>
<td>Used preference assessments and reinforcer assessment to evaluate the effects of high preferred vs low preferred items on task completion</td>
<td>Task completion</td>
<td>Classroom</td>
<td>No</td>
</tr>
<tr>
<td>Mechling, Gast, &amp; Seid (2009)</td>
<td>Video, auditory, &amp; picture prompts on PDA</td>
<td>Cooking</td>
<td>Classroom</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Mechling &amp; Gustafson (2008)</td>
<td>Static picture prompts vs. video modeling</td>
<td>Cooking</td>
<td>Classroom</td>
<td>No</td>
</tr>
<tr>
<td>Van Laarhoven, Van Laarhoven-Myers, &amp; Zurita (2007)</td>
<td>Video modeling package consisting of video rehearsal, video feedback, and error correction</td>
<td>Vocational skills</td>
<td>Restaurants</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

dren (Gerhardt & Weiss, 2011; Hendricks, 2010). Although the present investigation reveals that some instructional strategies that were effective with younger students can be effective with older students, knowledge of the parameters of using these and other instructional tactics with adolescents is relatively unknown. The application of these strategies...
may require different approaches when applied with older students. Pertinent questions such as (a) the density of instruction for secondary vs. elementary students, (b) the application of strategies to community-based settings, and (c) implementing employment instruction in community settings with potentially decreased support represent just a few questions with limited answers regarding employment instruction for students with ASD. This issue becomes particularly important considering recent years have seen a burgeoning growth of students with ASD at the secondary level (US-DOE, 2007), as well as associated increases reported in agencies serving adults who completed school (Cimera & Cowan, 2009; Lawer et al., 2009). This trend is likely to continue considering the increasing elementary population reported by the US DOE. The results from the current study do not bode well with these prevalence data, and the brevity of research on secondary special education programming applied to students with ASD could be a contributor to the poor employment outcomes experienced by these individuals now and in the future.

Similar arguments can be made regarding the application of instructional tactics used with students with other disabilities. Unquestionably, a number of studies on employment instruction and related transition practices have been reported in the literature (Test et al., 2009). Nevertheless, the characteristics of students with ASD are different from other disabilities and they can present unique challenges. Tactics used with other students may prove to be applicable to students with ASD; however, this remains an empirical question yet to be answered.

Despite the scarcity of research on employment instruction for students with ASD, several studies were reviewed that may contribute to preparing secondary students with ASD for employment. Many of the studies reviewed examined tactics to increase independent employment skills through self-management packages or video modeling with favorable results. Some studies included features of both self-management and video modeling (e.g., Mechling, Gast, & Seid, 2009). Others compared the type of model (self v. another adult) used in the video, showing both to be effective, but self-modeling possibly more efficient for some participants (Cihak & Schrader, 2008). Still other studies along this line compared static picture prompts to video modeling, highlighting that the video-based instruction may be more effective for some adolescents with ASD (Mechling & Gustafson, 2008). In addition to the studies on self-management and video modeling, an intervention package comprised of Behavior Skills Training (BST) and text message cueing was used in another study with encouraging results (Burke, Andersen, Bowen, Howard, & Allen, 2010). Finally, Graff, Gibson, and Galatsatos (2006) provided an illustration of highly preferred items being more effective than less preferred items as a maintaining variable of task completion. This finding is encouraging and has been demonstrated with varying populations and tasks (e.g., Carr, Nicolson, & Higbee, 2000; DeLeon et al., 2001). Together, these studies represent a budding literature base for teaching, or enhancing, employment skills for students with ASD.

The current findings should be interpreted in the context of the following limitations. It is possible that our search criteria were too narrow. Again, this review included studies composed of at least half of the participants being identified with ASD, and 66% of the participants between the ages of 14–22. Perhaps additional instructional strategies would have been located had different ratios of participant diagnoses been used, as well as different age ranges. Indeed, there were studies that explored these issues with participant groups composed of less than 50% of individuals with ASD (e.g., Riffel et al., 2005) and individuals outside the age range criteria of the current study (e.g., Lattimore, Parsons, & Reid, 2006). Importantly, however, the diagnostic ratio and age ranges used in this study were deemed germane to this literature review on developing employment skills specifically for students with ASD involved in secondary and transition programming. The journals selected for the hand search, the keywords used for the database search, and the databases searched may have limited the findings, as well. It is possible that other studies exist that fell outside these search criteria, and future investigators may locate additional studies not identified in this review by modifying the search criteria.
For reasons yet to be fully explained there is an increase in the student population of children with ASD served by public schools at all grade levels (US-DOE, 2007). Using the prevalence data provided by the US DOE on children with ASD between the ages of 6–11, we can expect to see continuing growth of the student population at the secondary level and beyond. Therefore, it behooves our field, and the children and adolescents we serve, to begin rigorous lines of research exploring the most effective means of preparing them for employment.

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Research on Curriculum for Students with Moderate and Severe Intellectual Disability: A Systematic Review

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Abstract: Curriculum content is an essential component of the field of special education for students with moderate and severe disabilities. This study updates the twenty-year curriculum content review by Nietupski, Hamre-Nietupski, Curtin, and Shrikanth (1997) and provides an overview of the last 15 years of research on this topic. A hand search of ten relevant journals within the field was conducted to identify and categorize the research on curriculum content for students with moderate and severe intellectual disability. Results indicate a very low percentage of the research literature focused on curriculum content for this population. Curricular articles published in the past fifteen years primarily focused on functional life skills, with a recent increase in cognitive academics. The articles consist mainly of quantitative methods and non-data based studies. Over half did not clearly list the educational context of focus. Implications of these findings for the education of students with moderate and severe intellectual disability and directions for future research are discussed.

Curriculum has been described as the content of instruction (Williams, Brown, & Certo, 1975) as well as a “defined course of study” (Browder, 2001, p. 2). Curriculum, a foundational component of education, can be simply referred to as the “what” of teaching or the knowledge and concepts driving pedagogy and assessment in instruction. However, curriculum in public education does not exist absent of controversy (Giroux, 1994). Discussion of curriculum can lend itself to conversation on the intent of education (e.g., job creation, citizenship; see Beane, 1998) or the role of science as a knowledge base (e.g., evolution, climate change; see Aguillard, 1999). Curricular research has played a significant role in the identity and continual formation of the field of special education for students with moderate and severe intellectual disability (Dymond & Orelove, 2001; Nietupski, Hamre-Nietupski, Curtin, & Shrikanth, 1997).

Curriculum in the Research Literature

Dymond and Orelove (2001) summarized the history of special education for students with moderate and severe intellectual disability. The curricular content of the 1970’s was dominated by the idea of developmental stages followed by an emphasis in the mid 1970’s toward functional life skills and the criterion of ultimate functioning (Brown, Nietupski, & Hamre-Nietupski, 1976). In the 1980’s an ecological approach to curricular content (Brown et al., 1979) dominated the research literature followed by an emphasis on social inclusion as a curricular element. More recently, concepts such as self-determination (Wehmeyer & Schalock, 2001) and emphasis on the adoption of the general education curriculum (Agran, Alper, & Wehmeyer, 2002; Browder et al., 2007; Cushing, Clark, Carter, & Kennedy, 2005) have guided the research and services for this population of students.

During this time, Nietupski et al. (1997) completed a review of the literature on curricular content for students with moderate and severe intellectual disability. Nietupski et al. presented the trends in curricular research in terms of quantity, focus, and research methodology. The authors reported a low and declining number of curricular-focused articles over the twenty-year span of 1976-1996. Their
results in terms of research focus coincided with the curricular practice timeline presented by Dymond and Orelove: nearly half (44%) of the curricular articles during the time frame focused on functional life skills content. However, research on inclusive practices experienced an increase from the beginning to the end of the twenty-year span, and by the end functional life skills and inclusion were the primary topics of curricular content. In terms of methodology, the researchers found quantitative methods and non-data based studies dominated the curricular literature of the time with very little examples of qualitative methodology. From the beginning (1976–1980) to the end (1991–1995) of the study, quantitative methodology increased from 48% to 69% and non-data based (i.e. position papers, theoretical papers, and program descriptions) literature experienced a significant decline from 52% to 27%. The review by Nietupski et al (1997) highlighted the future directions and needs within curricular research, namely greater emphasis on overall content in the research, more variety in research methodology, and an increase in research incorporating multiple skills together.

**Legislative Influence on Curricular Research**

Curriculum does not exist in a vacuum—even for students with moderate and severe intellectual disability (Bouck 2008; Milner, 2003). Aside from shifting philosophies, curriculum, practice, and research are influenced by a range of factors including federal legislation (i.e., The Individuals with Disabilities Improvement Act [IDEA], 2004). IDEA (2004, § 601 [c] [5] [A]) required that students eligible for special education services “have access to the general education curriculum in the regular classroom, to the maximum extent possible, in order to meet developmental goals.” The intention of access to the general education curriculum, although questioned by some (Ayres, Lowrey, Douglas, & Sievers, 2011), was to facilitate high expectations for students with disabilities and help elevate the poor post-school outcomes of students, including those with the most severe intellectual disability (IDEA, 2004). Despite dispute of the terms or conditions of sufficient access (Halle & Dymond, 2008) and what constitutes the general education curriculum (Spooner, Dymond, Smith, & Kennedy, 2006), an abundance of research is focused on providing general curriculum access for students with moderate and severe intellectual disability (Agran et al., 2002; Browder et al., 2007; Cushing et al., 2005; Fisher & Frey, 2001; Spooner et al., 2006; Wehmeyer, Lattin, & Agran, 2001). Within the shifting philosophy in the field and legislation is the mounting tension between an emphasis on curricular content from the general education curriculum and that of functional life skills (Alwell & Cobb, 2009; Ayres et al., 2011; Spooner et al., 2006). The evident division draws attention to the potential for an emphasis on academic content to overshadow functional life skills and vice versa (Ayres et al., 2011).

Regardless of the debate or its outcome, curricular research related to the education of students with moderate and severe intellectual disability is important and needed. First and foremost, curricular research guides practice—or in other words, the education which students with moderate and severe intellectual disability receive (Browder, 2001). The curriculum students are provided can impact their assessment in school as well as post school outcomes school (e.g., access to vocational experiences and skill development, skills in independent living; Ayres et al., 2011; Browder, 2001; Downing, 2006; Kearns et al., 2010; Kleinert, Browder, & Towles-Reeves, 2009). Further, curriculum can and should impact teacher preparation (Browder, 1997, Ryndak, Clark, Comroy, & Stuart, 2001). Hence, there is a significant value in having a pulse on curriculum related literature for this population.

In light of the significance of the findings from the past review (Nietupski et al., 1997), current legislation (IDEA, 2004; NCLB, 2002) affecting special education, as well as the current tensions in direction of curricular content for this population (Ayres et al., 2011), an updated review of the recent trends in curricular research is in order. The purpose of this systematic review is to examine the last fifteen years of curricular research for students with moderate and severe intellectual disability. Specific questions in the present investigation included: (a) how was curricular research represented in the overall research of the ten key
journals?, (b) what was the curricular foci of the past fifteen years?, (c) what methods were used to conduct curricular research?, and (d) which educational environments were highlighted in the curricular research?

Method

Using ten key journals significant to the field, this systematic review applied a structured approach to identify and describe the research literature relative to curriculum content for students with moderate and severe intellectual disability. Each journal was examined for articles with a focus on curricular content for this population of students. The identified articles where then systematically categorized by focus, research methodology, and context and finally checked for inter-rater reliability.

Journals Reviewed

Journals were selected for their emphasis on special education and inclusion of research specifically related to students with moderate and severe intellectual disability. All journals are referred to by their current title as of 2011. All issues under previous names are implied by the use of the current journal title. The six journals reviewed by Nietupski et al. (1997) were retained in this present study due to their continued applicability within the field of special education for this population: Education and Training in Autism and Developmental Disabilities, Intellectual and Developmental Disabilities, Teaching Exceptional Children, The Journal of Applied Behavior Analysis, Research and Practice for Persons with Severe Disabilities, and The Journal of Special Education. Four additional journals were included in this review to reflect the breadth of research for this population in broadly focused special education journals (i.e., Exceptional Children and Remedial and Special Education) and specific disability-focused journals including students with intellectual disability (i.e., Focus on Autism and Other Developmental Disabilities and Research in Developmental Disabilities).

Procedure

Each journal was reviewed over the 15-year time span of 1996 through 2010. Specifically, each article within each issue of each journal was screened against the predetermined inclusion and exclusion criteria. To do so, the first author read each article’s abstract for meeting the inclusion criteria, and, if necessary, the entire text to make a determination. To assure adherence to the criteria, inter-rater reliability was conducted with regards to the inclusion of articles.

Articles were excluded if they were (a) an editorial, reader comment, introduction to special topics, annotated bibliography, interview, or special feature on a historical figure or (b) primarily focused on behavior management or intervention, pedagogy, or technology applications. Articles were included if they (a) focused on enhancing skills or participation; (b) included at least one individual or a population with moderate, severe, or profound intellectual disability by described by name or IQ score (below 55), regardless of a co-occurring diagnoses; (c) included at least one individual or a population between the age of 3–22; (d) used or focused on school or school-based community settings within the United States; and (e) the location of the research or practice occurred within a U.S. school-based setting.

Categorization

Following identification as curricular articles, 25% of the curricular articles were categorized individually by both authors in terms of primary focus, research methodology employed, and curricular context used or focused on. Disagreements in this test of categorization led the authors to further clarify the distinctive labels within each category (e.g., specific definitions for functional life skills, or the general education context). These refined categorization labels were then used to categorize all included curricular articles by primary focus, research method, and context.

Curricular Focus

Seven categories existed for curricular focus. Six were retained from the previous review (Nietupski et al., 1997): functional life skills, interactions, communication, sensorimotor, cognitive-academic, and other. The present study in-
cluded the category mixed to classify curricular articles that presented an equal combination of two or more of the original six categories.

**Functional life skills.** A curricular focus of functional life skills represented articles addressing “the variety of skills that are frequently demanded in natural domestic, vocational, and community environments” (Brown et al., 1979, p. 83). Brown et al. further defined functional life skills as age appropriate, meaning activities typically performed by an individual’s same-age peers without disabilities. Included within this category was content addressing domestic or self-help, community, vocational preparation and training, and recreation and leisure skills (Brown et al.). Studies in this category also included those related to instruction in self-determination (e.g., Wehmeyer, Garner, Yeager, & Lawrence, 2006), choice making (e.g., Guess, Benson, & Siegel-Causey, 1995), and health and safety (e.g., Madaus et al., 2010) due to their impact on functioning in everyday life.

**Interactions.** Articles in this category exhibited a clear focus on curricular activities specifically intended to increase or enhance interactions of individuals with moderate or severe intellectual disability with their peers without disabilities. Included articles focused on specific skills and issues regarding the content of instruction for including students in classroom, school, or community settings.

**Communication.** The primary emphasis of articles deemed communication-focused was student expression. Specifically, the category of communication represented content in expressive and receptive communication as well as augmentative and alternative communication.

**Sensorimotor.** Sensorimotor refers to developmental skills involving one or more senses (e.g., vision or ambulation; Nietupski et al., 1997). Articles were included within this area when the primary focus was on building or maintaining sensorimotor skills alone and not on sensorimotor skills as a means to achieve an end, such as learning to move one’s hand in order to make a choice (i.e., this example would instead be described as a functional life skill).

**Cognitive-Academic.** Articles deemed cognitive or academic in nature included a focus on cognitive development or traditional academic subjects (i.e., mathematics, science, reading, social studies, writing, and spelling). Included within this category were articles focused on general academic standards, pre-academic skills, or specific general curriculum content related skills.

**Mixed.** Mixed articles represented those decidedly split between two or more of the topics listed above. One example included a study on curricular content taught in a personnel preparation program for pre-service teachers of students with severe disabilities, including a range of topics (i.e., self-care skills, reading, and social skills; Agran & Alper, 2000).

**Other.** Articles that met the criteria for inclusion yet did not clearly fit into any of the categories listed above were grouped as other. For example, Ault’s (2010) review of the literature on religion in special education and transition planning was included within this category.

**Methodology**

Classification of articles by research methodology was also used to describe the curricular literature. Five classifications were used to categorize the methodologies: quantitative, qualitative, and non-data based—as in the initial review (Nietupski et al., 1997); two additional classifications were added—literature review and mixed methods. Quantitative studies included those with single subject, group comparison, meta- or other statistical analyses designs. Qualitative research was comprised of studies under the qualitative umbrella such as case studies and ethnographies (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005). Non-data based studies included position papers, theoretical papers, and program descriptions. The literature review category was created to group studies from the quantitative and non-data based categories with a shared primary focus on reviewing the previous literature and reporting those findings. These articles were described as having a central focus on discussion or summary of a compilation of previous research on the topic. The mixed methods category included those articles with a clear mix of quantitative and qualitative research methodologies, such as
Browder et al.’s content analysis of alternate assessments (2003).

Context. Context was used to categorize curricular articles through a focus on the environment utilized in a research study or the context highlighted in a non-data based article. Seven location categories were used to discriminate studies: general education, special education, community, special school, mixed, other, and unspecified. General education included the classroom or other areas within a school not primarily occupied by students with disabilities (e.g. general education classroom, cafeteria, playground). The special education context referred to settings occupied solely or primarily by students with disabilities (e.g., segregated special education classroom, speech therapy room). Community represented school-sponsored settings apart from school grounds (e.g., grocery store, restaurant). The special school context was used to describe schools that serve only students with disabilities. Mixed contexts referred to articles conducted at or focused on two or more settings. Other included contexts not listed above, such as one article conducted in a laboratory setting (Fidler, Most, & Guiberson, 2005). “Unspecified” signified research or non-data based articles that did not clearly state the location of the investigation or contextual focus.

Reliability

Data from both the inclusion search and categorization was initially coded by the first author and checked for reliability by the second. Inter-rater reliability was conducted for 25% of the 5,812 articles for inclusion (n = 1,454) and 29% of the 134 (n = 39) included curricular articles. Reliability was calculated by dividing the sum of agreements by the sum of the agreements plus disagreements, multiplied by 100. Reliability for inclusion criteria among raters was 97% with a range of 91%–100% among the ten journals. Within the curricular categorization of articles, data indicated 85% reliability for both focus and methodology and 69% reliability for context. Specific details and implications of the low context reliability are provided in the discussion section.

Results

A total of 5,812 articles represent the 15-year span of research from the ten selected journals. Results are reported both as an overall representation of the fifteen years and also summarized in three five-year spans (1996–2000, 2001–2005, and 2006–2010) to illustrate the trends in the research, as well as to maintain consistency with Nietupski et al.’s (1997) original review.

Inclusion

Of the 5,812 articles searched, 2% (n = 134) were found to have a curricular focus. Table 1 provides a depiction of the distribution of curricular articles among selected journals. Within the five-year spans, the percentage of curricular articles ranged from 2% (n = 48) of the 1,941 published articles in 1996–2000 to 3% (n = 47) of the 2,067 articles published in 2001–2005 and back to 2% (n = 39) of the 1,804 published articles in 2006–2010. Over the three five-year spans, the curricular research identified among the journals declined. In the initial span, 1996–2000, 48 articles were identified as primarily curricular, which accounts for 36% of the curricular articles over the fifteen years. The following span, 2001–2005, produced 47 articles (35%
of the included literature), followed by 39 in the final span of 2006–2010 (29% of the included literature). Curricular research experienced a 19% reduction in quantity from the first to the last five-year span. On average, the ten journals yielded 9.6 curricular articles per year in the first span (1996–2000), followed by 9.4 (2001–2005), and 7.8 per year in the final span (2006–2010), for a fifteen-year average of 8.9 articles per year.

The highest percentage of curricular articles per total published articles over the fifteen-year span were found in the journals Research and Practice for Persons with Severe Disabilities (6% of the published articles, n = 23), Education and Training in Developmental Disabilities (5% of the published articles, n = 28), and Exceptional Children (4% of the published articles, n = 15). Over half (56%, n = 74) of the curricular articles identified from all published articles (n = 134) came from the three journals: Education and Training in Autism and Developmental Disabilities (21% of the curricular articles, n = 28), Research and Practice for Persons with Severe Disabilities (17% of the curricular articles, n = 23), and Teaching Exceptional Children (17% of the curricular articles, n = 23). The remaining 44% (n = 60) of curricular articles came from the other seven journals included in the search.

**Categorization**

**Focus.** Nearly half of all identified curricular articles (43%, n = 58) were focused primarily on functional life skills (see Figure 1 for a graphical representation of article focus overall as well as for each of the five-year spans). The following two most frequent curricular foci included cognitive-academics (19% of the curricular literature, n = 25) and mixed content (16% of the curricular literature, n = 21). Over the five-year spans, functional life skills experienced a 4% increase from 1996–2000 to the 2006–2010 span. Articles with a focus on cognitive and academic related content saw a substantial 365% increase from 6% in the initial five year span to 36% in the final span of the included studies. Research with a focus on interactions saw a decrease over the three time spans from 6% in 1996–2000 to 2% in 2001–2005 and finally to 0% in 2006–2010 with a fifteen year average of 3%. Communications related curricular studies decreased by 90% over the five-year spans from an initial 21% of the literature base in 1996–2000 to merely 3% of the articles in the 2006–2010 span. Articles focused on sensorimotor and other remained relatively stable minorities of the included studies, 2% (n = 3) and 6% (n = 8) respectively.

![Figure 1. Percentage of Curricular Article Focus by 5-Year Span. Note: FLS = Functional Life Skills, INT = Interactions, COM = Communication, SEN = Sensorimotor, COG = Cognitive-Academic, MIX = Mixed, OTH = Other](image-url)
Research Methodology. Over half of the curricular articles used one of two methods: quantitative design (34%, n = 46) and non-data based (30%, n = 40) (see Figure 2 for a graphical representation of research methodology across the 15-year span). Literature reviews (19%, n = 25), qualitative studies (15%, n = 3) followed in prevalence. All of the designs remained relatively stable over the five-year spans, with the exception of qualitative studies, which dropped from 21% of curricular articles in 1996–2000 to 8% in 2006–2010.

Context. Unspecified contexts (i.e., those settings that could not be determined from the text) accounted for over half (52%, n = 70) of the included curricular studies. Together, unspecified and mixed contexts represented 81% (n = 109) of the settings of included articles. The remaining one-fifth were special education (7%, n = 9), general education (6%, n = 8), special schools (3%, n = 4), community and other settings (combined at 3%, n = 4). General education settings experienced a slight increase from 2% in 1996–2000 to 10% of the literature in 2006–2010. Research with unspecified context also experienced an increase in prevalence from 46% in the first five-year span to 51% in the final five-year span. Figure 3 provides an overview of the distribution and trends on reported context in the curricular articles.

Discussion

This study employed a systematic review to highlight the current status and trends of curricular research for students with moderate and severe intellectual disability from 1996–2010. Findings indicate that curricular articles constitute a very low percentage of the research published in the primary journals devoted to special education and individuals with moderate and severe intellectual disability. Within the limited literature, the majority of curricular articles over the fifteen-year span focused on functional life skills content while instruction in cognitive academic skills experienced a significant increase over the review span to rival functional life skills as the most common focus of curricular research from 2006–2010. However, problematic is that the majority of curricular studies did not provide a clearly defined environmental context or focus. Results of this review shed light on the themes and directions of curricular research for students with moderate and severe intell-
lectual disability during 1996–2010 and extended the findings of the previous review by Nietupski et al. (1997).

Curricular articles represent a very small portion (2%) of the overall literature among the ten journals within the fifteen-year span. The set of 134 curricular-related articles in the present study is drastically less than those reported by Nietupski et al. (1997). On average, the present review found 77% fewer articles per five-year span than the previous review, which raises the question “why?” The authors hypothesize at least two possible explanations for this discrepancy: (a) a previous saturation within the literature reduced the publication of curricular research, or (b) a shift in emphasis from curricular content specific to students with severe disabilities to adaptation of the general education curriculum. In terms of the saturation perspective, it is important to consider whether or not there is a need for curricular research focused on students with moderate and severe intellectual disability. Nietupski et al. (1997) indicated curricular content, although not dominant, accounted for 16% of the literature from 1976–1995; the present authors question whether this research alone is sufficient to guide and support practice. Educational opportunities for students with disabilities change and in many cases improve over time due to technological advances and changes in social perspectives of disability (Rose & Meyer, 2000). IDEA (2004) alone more pointedly refers to access to the general education curriculum as a mandate for instruction of all students with disabilities. The fifteen-year span (1996–2010) reviewed here includes concepts such as self-determination and college inclusion, as well as new technological applications adding to the curricular content repertoire for these students. With this in mind, we conclude the field is in fact not saturated with curricular research and hence saturation is not a plausible explanation for the lack of research. Instead, more research is necessary to continue to keep track with the advances in education and society so as to provide high quality opportunities and experiences for individuals with moderate and severe intellectual disability.

Another, more plausible, explanation for the lack of prevalence of curricular research may be the increased emphasis on access to the general education curriculum and standards (Browder, Spooner, Wakeman, Trela, & Baker, 2006; Cushing et al., 2005; Downing, 2006; Lee et al., 2006). Both the 1997 and 2004 reauthorizations of IDEA emphasized the access of all students to the general education curriculum. An increased legislative emphasis on the general education curricular

![Figure 3. Percentage of Context of Curricular Articles By 5-Year Span. Note: GEN = General Education, SPED = Special Education, COMM = Community, SPES = Special School, Mix = Mixed, OTH = Other, UNSP= Unspecified](image-url)
content for this population could explain the overall decrease in curricular focused articles. However, a focus on general education curricular content creates some concern as it is unclear that the general curriculum can sufficiently ensure the basic principles of IDEA and assist students in making successful post-school transitions (Ayres et al., 2011; Dymond & Orelove, 2001). Ayres et al. equated an exclusive focus on general education standards for instructional content as a denial of students’ individualized education rights afforded by IDEA.

Related to the argument that the small amount of curricular research for students with moderate and severe intellectual disability can be explained by a shifting focus (i.e., access), is an increasing emphasis on cognitive/academic curriculum in the literature. Although, functional life skills emerged as the most prevalent topic (43%) of curricular articles across the 15 years, the most recent five-year (2006–2010) time span experienced an increased prevalence of articles addressing cognitive academics nearly equal to functional life skills focused articles. While the prevalence of articles on functional life skills suggests Brown et al.’s (1979) seminal work in this topic has remained an essential component of the curriculum for students with moderate and severe intellectual disability, based on the emerging data trend over the fifteen-year span, cognitive academics may surpass functional life skills as the most researched curricular content in the future. The focus on increased academic curricular content aligns with the shifted focus on access to the general education curriculum and further highlights the growing philosophical divide between functional life skills and general academics (Ayres et al., 2011).

Taking a closer look at the cognitive-academic data indicates half of the articles in 2006–2010 are non-data based and the majority of these do not clearly specify the educational context. Several articles stand as exceptions to this data such as Mims, Browder, Baker, Lee, and Spooner’s (2009) study on increasing comprehension during shared stories and Kliewer’s (2008) ethnographic research on literacy access. However, given the importance for specificity in research context for the purpose of applicability in practice and future research and the need for rigorous research methodologies (Browder et al., 2007; Odom et al., 2005), the recent surge in academics-related curricular articles as a whole leaves something to be desired. In order to effectively guide practice and scholarship, research in the area of cognitive and academic curricula should increasingly employ research methodologies such as quantitative, qualitative, and mixed methods. In addition, this research should increasingly provide explicit descriptions of the context, to increase the applicability of the research (Odom et al., 2005).

Although what and where to teach are two separate issues, the context of instruction is often closely tied to the content (Jackson, Ryndak, & Wehmeyer, 2008). Due to the breadth of the continuum of educational contexts for this population, curricular researchers have a duty to specify the context used in order to accurately describe the environment and conditions for the purpose of replication and application (Odom et al., 2005). Additionally, the increased rigor demanded of educational research (NCLB, 2002), the recent debate between functional life skills and academic content, and the large number of unspecified contexts observed in this study indicate the need for future research to include more clarity in context descriptions.

Limitations and Future Directions

Limitations of this study include the extent to which comparison of the findings in this review can be made with those in the previous review (Nietupski et al., 1997). Although careful planning and consideration were given to the procedures and operational definitions used in the review by Nietupski et al., the researchers in this study deemed some changes necessary for the purpose of additional clarity (i.e., the added restriction of U.S. only studies to avoid conflicts in disability terminology). In addition, the authors added four relevant journals for this review. Exceptional Children and Research in Developmental Disabilities provided a substantial amount of the curricular-related literature, followed by Remedial and Special Education. However, the journal, Focus on Autism and Other Developmental Disabilities,
produced the least amount of curricular articles per journal (2%), yet accounted for 7% of the articles searched for inclusion. While inclusion of this journal may have lowered the overall percentages of curricular articles within the literature, the general consistency in results from each journal combined as well as the results from the previous study (6%-34% range among journals containing curricular articles) and the pertinent focus of the journals led the researchers to justify their inclusion as contributing to the overall findings of this study.

While the inter-rater reliability for inclusion, focus, and methodology were all reported at or above 85%, the inter-rater reliability for context was much lower at 69%. Upon closer review, it was found that in each of the disagreed upon articles, one reviewer used either unspecified or mixed contexts to describe the location. Hence, both reviewers were able to identify clear-cut contexts (e.g., special education, general education, community-based settings), but struggled with mixed and unspecified contexts, which reiterates the lack of clarity over context within the research. Future research should include more precise definitions for the curricular context of focus.

The minimal research based on instructional content is particularly troubling as it leaves a gap for directing the educational opportunities and experiences for this population. While potentially limiting the pool of curricular research, articles focused on technological applications (e.g., Cihak, Fahrenkrog, Ayres, & Smith, 2010) and instructional methodology (e.g. Browder, Ahlgrim-Delzell, Spooner, Mims, & Baker, 2009) were not included in this review. Although these studies may imply instructional content, the primary focus did not include the content of instruction. Clear curricular-specific research that helps to direct the field in content plays a vital role in the education of students with moderate and severe intellectual disability by informing practice and building the knowledge base of the field (Nietupski et al., 1997). Future research in moderate and severe intellectual disability should include an increased concentration on curricular content.

**Conclusion and Implications**

What is the current state of curricular research for students with moderate and severe intellectual disability? The results of this study indicate curricular research continues to be a minority of the literature within the field. As research inevitably guides practice and helps build field as a whole (Browder, 1997), an increased emphasis on the content of instruction is necessary. The current pool of curricular articles suggests scholarship in special education for this population continues to be rooted in functional life skills but is experiencing a rapid emergence of general curriculum-related academics. In addition, the increased variety in research methodology observed can be said to have a strengthening effect on the research base as a whole. The reported lack of clarity in context among curricular articles can lead to reduced research replication as well as difficulty in accurately applying the research findings to practice. It is imperative that clarity in reporting context in scholarship becomes more common. Overall, our assessment of the literature on curricular content for this population is cautiously optimistic. There are many exciting studies from the previous fifteen year span that significantly add to the knowledge base of instructional content, however much work yet to be done, particularly in the area of increased quantity of articles and clarity in reporting context.

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Individuals with Disabilities Education Act of 2004, P.L. 108-44.


Comparison of Peer and Self-video Modeling in Teaching First Aid Skills to Children with Intellectual Disability

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Abstract: The purposes of this study were to (1) compare peer and self-video modeling in terms of effectiveness and efficiency in teaching first aid skills to children with intellectual disability, (2) analyze the error patterns made in probe sessions, (3) determine whether the children who took the role of sufferers during the first aid skill sessions acquired the first aid skills by observing their peers, and (4) whether the research findings have social validity. Participants consisted of three children (two females and one male) between the ages of nine and 14 who have intellectual disability. An adapted alternating treatments design was used to compare the effects of peer and self-video modeling. According to the data, both peer and self-video modeling are equally effective and efficient. The errors made by the children mostly consisted of sequential and topographical errors. The children who played the role of sufferers acquired both skill sets by only observing their peers. The social validity data is positive. Results, implications, and opportunities for future research are discussed.

Children are exposed to accidents all the time, no matter how old they are. For instance, in Turkey, according to data obtained in 2002, accidents cause 13.9% of deaths of children between the ages of one and 14 (Bahadir, Oral, & Guven, 2011). It is possible to ensure that children are protected from accidents or to lessen the harm they suffer by taking a few precautions against accidents they may be exposed to at home, at school, or in the community. It is important that all children, especially those with disabilities, learn the necessary skills to prevent potential dangers and to react appropriately when unsafe situations occur in order for them to function independently as much as possible in community settings (Collins, Wolery, & Gast, 1992).

First aid skills are safety skills that are required to be taught to children who have disabilities (Collins et al., 1992). Various research has been done regarding teaching first aid skills to children with disabilities, such as how to identify first aid materials (Tekin-Iftar, Acar, & Kurt, 2003), seeking adult assistance when injured (Christensen, Lignugaris/Kraft, & Fiechtl, 1996; Christensen, Marchand-Martella, Martella, Fiechtl, & Christensen, 1993; Timko & Sainato, 1999), treating abrasions (Marchand-Martella, Martella, Christensen, Agran, & Young, 1992a; Marchand-Martella et al., 1992), treating burns (Gast & Winterling, 1992; Marchand-Martella & Martella, 1990; Marchand-Martella et al., 1992), treating cuts (Gast & Winterling, 1992; Marchand-Martella et al., 1992), treating injuries (Marchand-Martella & Martella, 1990; Marchand-Martella et al., 1992b; Spooner, Stem, & Test, 1989), treating insect bites (Gast & Winterling, 1992), applying plastic bandages, and helping someone who is choking (Spooner et al., 1989).

It is possible to draw some conclusions from the available research on teaching first aid skills to children with disabilities. First, in most of the studies, the children apply first aid to themselves or to a puppet (Christensen et al., 1993, 1996; Marchand-Martella & Martella, 1990; Marchand-Martella et al., 1992a, 1992b; Timko & Sainato, 1999), and they apply first aid to another person only in generalization sessions (Gast & Winterling, 1992; Marchand-
However, applying first aid to oneself is different from applying first aid to someone else. Second, they focus on applying first aid to specific parts of the body (e.g., elbow, knee, or hand, although an abrasion, a burn, a cut, or another injury can happen to any part of the body) (Christensen et al., 1996; Gast & Winterling, 1992; Marchand-Martella et al., 1992a; Timko & Sainato, 1999). Third, in most of the research, only one type of first aid material is used, while alternative materials that could serve as replacements are preferred in a limited number of studies (Marchand-Martella et al., 1992). Fourth, although it is important to understand the error patterns involved in complicated skills like first aid in order to organize the training in a study, error patterns were only analyzed in a limited number of studies (Gast & Winterling, 1992; Marchand-Martella et al., 1992).

The present research was carried out to extend the previous research that has been done regarding the teaching of first aid skills. This research differs from the previous research in a number of ways: (1) first aid skills to be used on another person who is in need were taught to children with intellectual disability; (2) sufficient exemplars (different sufferers, different body parts, and different first aid materials) were used to ensure generalizability of the results to teaching other first aid skills; (3) error patterns were analyzed to determine what kinds of errors the children made; (4) whether the children who played the role of sufferers learned the first aid skills by observing their peers; and (5) whether the research findings were socially valid.

Video modeling, which is one of the most effective methods of teaching various skills to children with disabilities, consists of watching a video recording of a peer or an adult performing the target behavior and then having the child perform the same behavior afterward (Haring, Kennedy, Adams, & Pitts-Conway, 1987; Rehfeldt, Dahman, Young, Cherry, & Davis, 2003). A variation of video modeling is self-video modeling. In self-video modeling, the child performs the target behavior by following prompts or instructions, and the child’s performance is recorded. Later, a new recording is obtained by deleting the errors made and combining the steps through editing. The child watches as he or she performs the target behavior using the new video, and then he or she performs the behavior afterward (Buggey, Toombs, Gardener, & Cervetti, 1999; Dowrick, 1999; Wert & Neisworth, 2003).

Both peer video modeling and self-video modeling are effective tools for teaching various skills to children with disabilities (e.g., Bidwell & Rehfeldt, 2004; Buggey et al., 1999; Dowrick, 1999; Haring et al., 1987; Rehfeldt et al., 2003; Wert & Neisworth, 2003). However, little research has been done to determine which kind of video modeling is more effective. For instance, two studies compared peer and self-video modeling in the literature (Marcus & Wilder, 2009; Sherer et al., 2001). The effects of peer and self-video modeling were compared in the research carried out by Sherer et al. (2001) regarding teaching conversation skills to children with autism and in the research conducted by Marcus and Wilder (2009) about teaching Greek and Arabic letters to children with autism. Both of these studies looked at children with autism, included discrete behaviors, and used children with normal development as models. However, it is important that peer models be similar to the participants in terms of age, gender, competence, and status in order to ensure that learning is achieved (Bandura, Ross, & Ross, 1961; Marcus & Wilder, 2009). Thus, there is a need for the current research, which differs from and expands upon previous research by comparing the effects of peer and self-video modeling using peers with intellectual disability.

The purpose of this study was to extend research on teaching first aid skills to children with intellectual disability by comparing peer and self-video modeling in terms of effectiveness and efficiency. To achieve this, the research looked at the following questions: (1) Is there any difference between peer and self-video modeling in terms of effectiveness? (2) Is there any difference between peer and self-video modeling in terms of efficiency (i.e., number of training sessions, training trials, errors, and total training time required before criteria are met)? (3) What error patterns do the children show in the probe sessions? (4) Can the children who take the role of sufferers in the probe sessions acquire the first aid skills?
skills by observing their peers? and (5) Are the findings of the research socially valid?

**Method**

**Participants**

Participants were three children (two females and one male) between the ages of nine and 14 who have intellectual disability. All of the children attended a unified special education class in the same public elementary school. The children were expected to be able to accomplish the following prerequisite behaviors: (1) pay attention for at least 10 minutes, (2) imitate verbal and motor behaviors, and (3) use a mouse or clicker. The researcher spoke to the class teacher beforehand and arranged an observation time to determine whether the children were able to accomplish these behaviors. During the observations, the researcher determined that all of the children fulfilled the prerequisite behaviors. All of the children had systematic instruction with video modeling before the study.

Nesrin, age 9 years and 4 months, was a female student with intellectual disability. She was a third grader in the unified special education class and showed age-appropriate development in receptive language, expressive language, and gross and fine motor skills. She needed supportive education in social, daily life, and cognitive skills. She could count to 100 in ones, twos, fives, and tens, and she could count backwards from 100 in ones. She could also add two three-digit numbers by carrying and subtract a two-digit number from another two-digit number, which required breaking tens. She could also identify the digits of two- and three-digit numbers and count in twos on the multiplication chart. She could write down sentences that she remembered from a paragraph she listened to or that she was told.

Ferdi, age 13 years and 4 months, was a male student with intellectual disability. He was a sixth grader in the unified special education class and showed age-appropriate development in receptive language, expressive language, and gross and fine motor skills. He needed supportive education in social, daily life, and cognitive skills. He could count to 100 in ones, twos, fives, and tens, and he could count backwards from 20 in ones. He could add two-digit numbers without carrying, and he could subtract a two-digit number from another two-digit number, which required breaking tens. He could also identify the digits of two- and three-digit numbers and count in twos on the multiplication chart. He could write down sentences that he remembered from a paragraph he listened to or that he was told.

Figen, age 13 years and 7 months, was a female student with intellectual disability. She was a seventh grader in the unified special education class. She was not competent in receptive language and expressive language skills, but she showed age-appropriate development in her gross and fine motor skills. She needed supportive education in social, daily life, and cognitive skills. She could count to 100 in ones, twos, fives, and tens, and she could count backwards from 50 in ones. She could count to 100 in ones, twos, fives, and tens, and she could count backwards from 50 in ones. She could add two three-digit numbers by carrying and subtract a two-digit number from another two-digit number, which required breaking tens. She could also identify the digits of two- and three-digit numbers and count in twos on the multiplication chart. She could write down sentences that she remembered from a paragraph she listened to or that she was told.

Three additional children with intellectual disability, who were classmates of the participants, joined the study to play the role of sufferers. At the end of the study, probe sessions were arranged to determine whether these children acquired the first aid skills simply by observing their friends, without having any further training. The characteristics of the children who joined the study as both participants and sufferers are shown in Table 1.

**Setting**

All sessions occurred (12:00–3:00 p.m.) three days per week, in a one-on-one instructional format. The training sessions were carried out in the guidance teacher’s room, which is near the students’ bathroom in the school and measured 3 m × 4 m. In the room, there was a desk, two office armchairs, one bookcase, one couch, and four guest armchairs appropriate to an office. An undergraduate student who studied special education was also in the room. During instruction, a notebook computer with a mouse was placed in the middle of the desk, and the children and instructor sat side-by-side so they could both see the computer screen. In the full probe, probe, and maintenance sessions, a first aid kit was placed on the desk. The child who was being
trained and the child who was playing the role of the sufferer stood next to each other while the instructor watched them from a distance. All sessions were recorded with a digital video camera.

Materials

First aid bag. A first aid kit with a Red Crescent symbol on it was used in the study. The kit contained the following items: two pairs of disposable gloves, two rolling bandages, two units of sterile gauze cloths in two different sizes (5 cm × 5 cm and 10 cm × 10 cm), two units of sticky cover dressing in three different sizes (5 cm × 5 cm, 10 cm × 10 cm, and 15 cm × 15 cm), two units of adhesive bandages in three different sizes (1 cm × 4 cm, 3 cm × 3 cm, and 2 cm × 5 cm), a paper plaster roller (30 m), five safety pins, blunt-tipped scissors, two plastic bags, paper, and a pen.

Videos. Two videos, a peer modeling video and a self modeling video, were made for each child using the Windows Movie Maker program. The videos were made by recording the children as they performed two skill sets using instructions and prompts. Then, new recordings were made by cutting/editing the instructions and prompts in the videos. Thus, six videos (two for each child) were prepared. In order to help the children realize with which method the training was being made, the peer video began with the sentence “My friend is applying first aid for the bleeding/burn. I must watch him/her” appearing on the screen, and the self-video began with the sentence “I’m doing first aid for the bleeding/burn. I must watch” appearing on the screen. In both videos, the sufferer who was bleeding or had a burn on part of his or her body then appeared. After the sufferer appeared, the video showed images of children carrying out the first aid steps for bleeding or burns. The children watched the video of their peers in the peer video modeling and their own images in the self-video modeling. Both the peer and self modeling videos included only one trial. The videos lasted an average of three minutes for bleeding and eight minutes for burns. The videos portraying the first aid for burns lasted longer because the first aid instructions required that the burnt body part be held underwater for four to five minutes.

Bleedings and burns. In the study, makeup materials and paints with different features and colors were used to illustrate simple bleeding and burns. For bleeding, makeup was used to create a 1–2 cm long cut, and red paint was used for the blood. For the burns, makeup was used to create a pinkish-brown circle with a diameter of 2–3 cm. For bleeding,

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Age</th>
<th>Grade</th>
<th>Score</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nesrin</td>
<td>Female</td>
<td>9 y, 4 mo</td>
<td>3rd</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Ferdi</td>
<td>Male</td>
<td>13 y, 4 mo</td>
<td>6th</td>
<td>51</td>
<td>Stanford Binet Intelligence Test</td>
</tr>
<tr>
<td>Figen</td>
<td>Female</td>
<td>13 y, 7mo</td>
<td>7th</td>
<td>51</td>
<td>Stanford Binet Intelligence Test</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer</th>
<th>Sex</th>
<th>Age</th>
<th>Grade</th>
<th>Score</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arda</td>
<td>Male</td>
<td>8 y, 4 mo</td>
<td>2nd</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Selin</td>
<td>Female</td>
<td>9 y, 1 mo</td>
<td>2nd</td>
<td>43</td>
<td>Leiter International Performance Scale</td>
</tr>
<tr>
<td>Belgin</td>
<td>Female</td>
<td>13 y, 2 mo</td>
<td>6th</td>
<td>55</td>
<td>Leiter International Performance Scale</td>
</tr>
</tbody>
</table>
26 body parts, including right and left fingers, palms, upper parts of the hands, wrists, forearms, elbows, upper arms, legs, and knees, were used. For burns, 22 body parts were used, including the same ones listed for bleeding, except the legs and knees. A video camera, notebook, and data collection forms were also used in the study.

**Task Analysis**

Researcher determined the skills (first aid for simple bleeding and burn) with the children’s classroom teacher by considering the Individualized Education Plans (IEPs) of the children. Before starting her undergraduate education, the researcher completed four years of nursing education, after which she served as a nurse for four years in various health establishments. Relying on her professional experiences and the teaching materials entitled “Reliable Behavior and First Aid Training,” which were created for children between the ages of 6 and 14 by the Turkish Red Crescent (www.kizilay.org.tr), the researcher created two skills analyses for use in the study. After she developed the initial skills analyses, they were reviewed by a nurse and a health technician, who had served in an emergency room for at least 10 years. In light of their opinions, she altered the analyses and created the final versions shown in Tables 2 and 3.

**Procedure**

**Baseline sessions.** Before the training, baseline sessions were arranged to determine the performances of the children regarding the first aid skills. Before the baseline sessions, the researcher prepared simulated bleeding or burns on the sufferer-peers and told the peers to act as if the wounds were real. During

---

**TABLE 2**

**Task Analysis of First Aid for Bleeding**

<table>
<thead>
<tr>
<th>Task Analysis of First Aid for Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Aid for Bleeding</strong></td>
</tr>
<tr>
<td>1. He/she tells his/her friend “Take it easy, I will help you.”</td>
</tr>
<tr>
<td>2. He/she opens the first aid kit.</td>
</tr>
<tr>
<td>3. He/she takes out a pair of disposable gloves.</td>
</tr>
<tr>
<td>4. He/she puts on the gloves.</td>
</tr>
<tr>
<td>5. He/she takes the sterile gauze cloth packet and scissors out of the first aid kit.</td>
</tr>
<tr>
<td>6. He/she cuts open the sterile gauze cloth packet.</td>
</tr>
<tr>
<td>7. He/she puts the scissors on the table.</td>
</tr>
<tr>
<td>8. He/she takes one of the sterile gauze cloths out of the packet without touching it with his/her hand.</td>
</tr>
<tr>
<td>9. He/she puts the sterile gauze cloth down on the bleeding part.</td>
</tr>
<tr>
<td>10. He/she takes the other sterile gauze cloth out of the packet without touching it with his/her hand.</td>
</tr>
<tr>
<td>11. He/she puts the second sterile gauze cloth down on the bleeding part.</td>
</tr>
<tr>
<td>12. He/she takes out the cover dressing that is the appropriate size.</td>
</tr>
<tr>
<td>*He/she takes out the roller plaster.</td>
</tr>
<tr>
<td>13. He/she takes the scissors in his/her other hand.</td>
</tr>
<tr>
<td>14. He/she cuts open the packet of the cover dressing.</td>
</tr>
<tr>
<td>*He/she cuts the roller plaster to an appropriate length.</td>
</tr>
<tr>
<td>15. He/she puts the scissors in the first aid kit.</td>
</tr>
<tr>
<td>16. He/she takes the cover dressing out of the packet.</td>
</tr>
<tr>
<td>17. He/she opens the cover dressing by pulling its handles.</td>
</tr>
<tr>
<td>18. He/she takes the sticky bandage behind the plaster off.</td>
</tr>
<tr>
<td>19. He/she sticks the cover dressing on the sterile gauze cloth.</td>
</tr>
<tr>
<td>*He/she sticks the plaster on the cover dressing.</td>
</tr>
<tr>
<td>20. He/she raises the bleeding part above the sufferer’s heart level.</td>
</tr>
<tr>
<td>21. He/she takes the gloves off.</td>
</tr>
<tr>
<td>22. He/she asks for help from an adult.</td>
</tr>
</tbody>
</table>

* Functionally equivalent step
the session, the researcher presented the target stimulus to the child who was going to be trained, saying, “Your friend’s arm is bleeding. Your friend’s arm has a burn. Give first aid to him/her” and then walking away in order to watch the child’s response. The researcher waited for 10 seconds for the child to start the first step.

When the child carried out the first step correctly, the researcher marked a plus (+) sign on the data collection sheet, reinforced the child verbally, and observed the child to see whether he or she started the next step within 10 seconds. If the child did not carry out the first step of the skill correctly or did not respond within 10 seconds, the researcher marked a negative (−) sign on the data collection sheet and ended the session.

Post-video-creation probe sessions. Probe sessions were arranged after the videos were made for each child and each skill to determine whether the learning took place. These sessions were arranged like the baseline sessions.

Training sessions. During the training sessions, a laptop computer was placed in the middle of the desk, the child sat in front of the computer, and the researcher sat next to the child. The researcher turned on the computer and then asked the child if he or she was ready (“Are you ready?”). After receiving an affirmative response, the researcher told the child to

### TABLE 3

**Task Analysis of First Aid for Burns**

<table>
<thead>
<tr>
<th>Task Analysis of First Aid for Burns</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Aid for Burns</td>
</tr>
<tr>
<td>1. He/she tells his/her friend “Take it easy, I will help you.”</td>
</tr>
<tr>
<td>2. He/she opens the first aid kit.</td>
</tr>
<tr>
<td>3. He/she takes out a pair of disposable gloves.</td>
</tr>
<tr>
<td>4. He/she puts on the gloves.</td>
</tr>
<tr>
<td>5. He/she takes the sterile gauze cloth packet and scissors out of the first aid kit.</td>
</tr>
<tr>
<td>6. He/she cuts open the packet of sterile gauze cloth.</td>
</tr>
<tr>
<td>7. He/she puts the scissors on the table.</td>
</tr>
<tr>
<td>8. He/she takes one of the sterile gauze cloths out of the packet without touching it with his/her hand.</td>
</tr>
<tr>
<td>9. He/she takes his/her friend to the bathroom.</td>
</tr>
<tr>
<td>10. He/she turns on the faucet so the water is flowing at a low pressure.</td>
</tr>
<tr>
<td>11. He/she holds the burnt part under the flowing water.</td>
</tr>
<tr>
<td>12. He/she counts to 100 twice.</td>
</tr>
<tr>
<td>*He/she waits for four minutes.</td>
</tr>
<tr>
<td>13. He/she wets the gauze cloth in his/her hand.</td>
</tr>
<tr>
<td>14. He/she turns off the tap.</td>
</tr>
<tr>
<td>15. He/she puts the wet gauze cloth on the burnt part.</td>
</tr>
<tr>
<td>16. He/she takes his/her friend back to the original setting.</td>
</tr>
<tr>
<td>17. He/she takes out the cover dressing that is the appropriate size.</td>
</tr>
<tr>
<td>*He/she takes out the roller plaster.</td>
</tr>
<tr>
<td>18. He/she takes the scissors in his/her other hand.</td>
</tr>
<tr>
<td>19. He/she cuts open the packet of the cover dressing.</td>
</tr>
<tr>
<td>*He/she cuts the roller plaster to an appropriate length.</td>
</tr>
<tr>
<td>20. He/she puts the scissors on the table.</td>
</tr>
<tr>
<td>21. He/she takes the cover dressing out of the packet.</td>
</tr>
<tr>
<td>22. He/she opens the cover dressing by pulling its handles.</td>
</tr>
<tr>
<td>*He/she takes the adhesive bandage behind the plaster off.</td>
</tr>
<tr>
<td>23. He/she sticks the cover dressing on the gauze cloth.</td>
</tr>
<tr>
<td>*He/she sticks the plaster on the cover dressing.</td>
</tr>
<tr>
<td>24. He/she takes his/her gloves off.</td>
</tr>
<tr>
<td>25. He/she asks for help from an adult.</td>
</tr>
</tbody>
</table>

* Functionally equivalent step
start the video (“Click on the video icon and start.”). After the child clicked on the video icon and started the video, the researcher presented the target stimulus (“Please, watch the video carefully.”). When the child asked a question while watching the video, the researcher answered it. If the child began to pay attention to something else, the researcher redirected him or her to the video. At the end of each session, the child’s participation and cooperation behaviors were reinforced verbally. The teaching methods, peer video modeling, and self-video modeling were defined randomly for each child and each skill. The distribution of the methods according to the children and the skills are shown in Table 4. The training process was the same for both the peer and self-video modeling. The only difference between the two methods is that the model in the videos was either the child’s peer or the child. In peer video modeling, the children watched their peers doing the skill, and in self-video modeling, they watched themselves doing the skill. The training sessions continued until the children showed a 100% correct response in three subsequent sessions.

**Probe sessions.** During the study, probe sessions were arranged after every training session to determine whether the children learned the skill being taught. The probe sessions were carried out using a format similar to the baseline sessions.

**Generalization and maintenance sessions.** Because sufficient stimulus exemplars were used in the research to ensure the generalizability of the results, other generalization sessions were not included (Westling & Fox, 2004). As cited in Westling and Fox, to increase the generalizability, Stokes and Osnes (1988) recommended varying the materials, setting, and persons in the training process. Thus, in this research, the researcher tried to increase the generalizability by varying the peers that played the role of sufferers, the body parts where the bleeding and burns existed, and the first aid materials used.

Follow-up sessions were conducted to determine at what level the children maintained the skills they had gained after the training was over. The follow-up sessions were arranged one or two weeks after the training finished; a longer follow-up period could not be used due to the summer break. The follow-up sessions were arranged in a format similar to the baseline sessions but reinforcements were withdrawn. At the end of each session, students’ participation and cooperation behaviors were reinforced verbally.

**Observational learning sessions.** Observational learning sessions were conducted before and after the training to determine whether the children who played the role of sufferers acquired the target behaviors by observing their peers carrying out the first aid skills on them. Whether learning by observing took place was tested via pre-test post-test manner. One session was arranged for each child who had played the role of the sufferer and for each skill. They were conducted using the same format as the baseline sessions. In these sessions, the children who were trained took over the role of the sufferer.

**Experimental Design**

The dependent variable of the research was the percentage of correct responses regarding the first aid skills for bleeding and burns; the independent variables were peer and self-video modeling. An adapted alternating treatments design was used to compare the effects

---

**TABLE 4**

**Participants, Procedures, and Skills**

<table>
<thead>
<tr>
<th>Participant</th>
<th>First Aid for Bleeding</th>
<th>First Aid for Burns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nesrin</td>
<td>Self video modeling</td>
<td>Peer video modeling</td>
</tr>
<tr>
<td>Ferdi</td>
<td>Peer video modeling</td>
<td>Self video modeling</td>
</tr>
<tr>
<td>Figen</td>
<td>Peer video modeling</td>
<td>Self video modeling</td>
</tr>
</tbody>
</table>

---
of the peer and self-video modeling in teaching first aid skills (Holcombe, Wolery, & Gast, 1994; Sindelar, Rosenberg, & Wilson, 1985; Tekin-Iftar & Kircaali-Iftar, 2004) and was replicated across the three subjects. In the study, multiple procedures were covered in one day. One of them was done at noon (12:00–1:00 p.m.), and the other was done in the afternoon (2:00–3:00 p.m.). The order of procedures was randomly chosen, and the procedures were performed in equal numbers in a balanced way. The experimental control occurred when the change that the level of an dependent variable had on its affiliated independent variable happened faster than the change that the level of the dependent variable had on the other independent variable (Tekin-Iftar & Kircaali-Iftar, 2004).

Reliability

Inter-observer agreement and procedural reliability data were collected for each child and each condition in at least 30% of the sessions. Inter-observer agreement was calculated using the point by point method (Tekin-Iftar & Kircaali-Iftar, 2004). The number of agreements was divided by the number of agreements plus disagreements multiplied by 100. The percentage of agreement for all children for all situations was 100%.

Procedural reliability was calculated by dividing the number of instructor behaviors observed by the number of planned instructor behaviors multiplied by 100 (Billingsley, White, & Munson, 1980). Procedural reliability was measured in the baseline, post-video-creation probe, probe, and maintenance sessions regarding the following behaviors: (1) getting attention, (2) giving target stimuli, (3) response-time interval, (4) reinforcing verbally, and (5) terminating the session. Procedural reliability was 97% for baseline and post-video-creation probe sessions, 90% for probe sessions, and 100% for maintenance sessions. Procedural reliability was measured in the training sessions regarding the following behaviors: (1) getting attention, (2) starting the training video or telling the child to start the video, (3) giving instruction for watching, (4) reinforcing the child for watching the video when necessary, (5) reinforcing participation, and (6) terminating the session. Procedural reliability was 88% for training sessions.

Social Validation

In order to determine the social validity of the research findings, the performances of the children regarding the skills were evaluated by two nurses, one of whom served on the National Medical Rescue Team. To determine social validity, a grading scale was created with three options—“acceptable,” “unacceptable,” and “undecided”—opposite each step in the skill analyses. The videos of the sessions in which the children met the criteria in both analyses were given to the nurses on a CD. The nurses were asked to watch the videos and then to grade each of the skill steps in terms of their fulfillment, order, and time.

Results

Effectiveness Data

Figures 1, 2, and 3 show the percentage of correct responses for Nesrin, Ferdi, and Figen in the baseline, post-video-creation probe, probe, and maintenance sessions. The data show that both the peer and the self-video modeling are equally effective in teaching the first aid skills for simple bleeding and burns to children with disabilities. That is, the three children who participated in the study acquired the first aid skills for both bleeding and burns at a level of 100%. All of the children failed to carry out the skills in the baseline sessions (0%), but after the peer and self-video modeling were completed, the children performed the criteria at a level of 100%, which they maintained in the maintenance sessions.

The effect sizes of the methods were also calculated using the percentage of non-overlapping data (PND) and the percentage of data points exceeding the mean (PEM). The results of these calculations are shown in Table 5. For Nesrin, both of the methods were highly effective according to the PND and PEM calculations. As for Ferdi and Figen, both methods were effective according to the PND calculations; according to the PEM calculations, both methods were moderately effective (Ma, 2006; Olive & Franco, 2007;
Scruggs & Mastropieri, 1998, 2001; Scruggs, Mastropieri, Cook, & Escobar, 1986). The results of the calculations made to determine the effect sizes show that there is not an important difference between the two methods in terms of their effectiveness.

Figure 1. Percentage of correct responses for Nesrin. Note: SVM = Self-video Modeling PVM = Peer Video Modeling

Figure 2. Percentage of correct responses for Ferdi. Note: SVM = Self-video Modeling PVM = Peer Video Modeling
Efficiency Data

For peer and self-video modeling, the data regarding number of sessions, number of errors, and total training time required until the criteria were met are shown in Table 6. The efficiency data are complex. For peer video modeling, the total number of sessions carried out before all the children met the criteria was 24; for self-video modeling, it was 23. The total number of errors committed by the children before the criteria were met was 15 in peer video modeling and 13 in self-video modeling. Although peer video modeling was more efficient for Nesrin, self-video modeling was more efficient for Ferdi in terms of the total number of sessions carried out and the errors made before the criteria were met. As for Figen, there was no difference between the two methods in terms of the total number of sessions carried out and the errors made before the criteria were met. Before the criteria were met, the children spent a total of 3 hours, 38 minutes, and 47 seconds in peer video modeling training and 4 hours, 42 minutes, and 49 seconds in self-video modeling training. Peer video modeling seemed to be more efficient than self-video modeling in terms of the total time spent on training before the criteria were met.

Error Pattern Analysis

The errors made by all of the children before the criteria were met for peer and self-video modeling are shown in Table 7. Sixteen errors were made during only six of the 22 steps of first aid skills for bleeding. For burns, 12 errors were made during only six

### TABLE 5

<table>
<thead>
<tr>
<th>Participants</th>
<th>Peer Video Modeling</th>
<th>Self Video Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PND</td>
<td>PEM</td>
</tr>
<tr>
<td>Nesrin</td>
<td>100%</td>
<td>1</td>
</tr>
<tr>
<td>Ferdi</td>
<td>89%</td>
<td>.89</td>
</tr>
<tr>
<td>Figen</td>
<td>89%</td>
<td>.89</td>
</tr>
</tbody>
</table>

Figure 3. Percentage of correct responses for Figen. Note: SVM = Self-video Modeling, PVM= Peer Video Modeling
of the 25 steps of the first aid skills. It is worth noting that, of the errors that occurred during the first aid skills for bleeding, 10 of the 16 mistakes were sequential errors, five were topographical errors, and one was a time error. Of the errors that occurred during first aid skills for burns, eight of the 12 were topographical errors, three were sequential errors, and one was a time error. For first aid skills for bleeding, the greatest number of errors was made during the 20th step, “raise the bleeding part above the sufferer’s heart level.” For first aid skills for burns, the greatest number of errors was made during the ninth step, “taking the friend to the bathroom.”

| TABLE 6 |
| Efficiency Data |

<table>
<thead>
<tr>
<th>Participant</th>
<th>Procedure</th>
<th>Skill</th>
<th>Number of sessions required to meet criteria</th>
<th>Number of errors made before meeting criteria</th>
<th>Training time required to meet criteria (h:min:s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nesrin</td>
<td>*PVM</td>
<td>Burns</td>
<td>6</td>
<td>3</td>
<td>01:34:48</td>
</tr>
<tr>
<td>**SVM</td>
<td></td>
<td></td>
<td>8</td>
<td>4</td>
<td>00:56:33</td>
</tr>
<tr>
<td>Ferdi</td>
<td>PVM</td>
<td>Bleeding</td>
<td>9</td>
<td>63</td>
<td>01:00:36</td>
</tr>
<tr>
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<td>Burns</td>
<td></td>
<td>6</td>
<td>3</td>
<td>01:31:27</td>
</tr>
<tr>
<td>Figen</td>
<td>PVM</td>
<td>Bleeding</td>
<td>9</td>
<td>6</td>
<td>01:03:23</td>
</tr>
<tr>
<td>SVM</td>
<td>Burns</td>
<td></td>
<td>9</td>
<td>6</td>
<td>02:14:49</td>
</tr>
</tbody>
</table>

* PVM = Peer Video Modeling
** SVM = Self Video Modeling

| TABLE 7 |
| Error Patterns for Children during Probe Sessions |

<table>
<thead>
<tr>
<th>Step of task analysis</th>
<th>Nesrin</th>
<th>Ferdi</th>
<th>Figen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of errors</td>
<td>Type of error</td>
<td>Number of errors</td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
<td>1</td>
<td>Duration</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>Sequence</td>
<td>3</td>
</tr>
<tr>
<td><strong>Burns</strong></td>
<td>4</td>
<td>Duration</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Sequence</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>Topographic</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

* Only steps during which an error was made are shown.
Observational Learning

While the children who played the role of sufferers and were not trained in any way performed at 0% in both skill sets in the probe sessions conducted before the study, they performed at a level of 100% in the probe sessions conducted after the training. According to these findings, the three children who played the role of sufferers acquired both skill sets by only observing their peers.

Social Validation

The nurses who evaluated the social validity of the research findings reported generally positive opinions regarding the acceptability of the skill steps in terms of their topography, sequence, and duration. One of the nurses found 23 of the 25 steps completed by Nesrin regarding first aid skills for burns acceptable, and the other one found 25 steps acceptable. As for the steps for first aid skills for bleeding, one nurse found 19 of the 22 steps acceptable, and the other one found 21 steps acceptable. For Ferdi, one of the nurses found 23 of the 25 steps he completed regarding first aid skills for burns acceptable, while the other one found 24 steps acceptable. For first aid skills for bleeding, one of the nurses found 17 of the 22 steps acceptable, and the other found 18 steps acceptable. For Figen, one of the nurses found 25 of the 25 steps she completed regarding first aid skills for burns acceptable; the nurse also found 21 of the 22 steps for first aid skills for bleeding acceptable. The other nurse found all of the steps completed by Figen to be acceptable for both skill sets.

Discussion

The aim of this research was to determine the difference between peer and self-video modeling in terms of effectiveness and efficiency in teaching first aid skills with sufficient exemplars to children with intellectual disability. The study also aimed to determine the error patterns made during probe sessions, whether the children who took on the role of sufferers acquired the first aid skills by observing their peers, and whether the research findings have social validity. In light of the data gained from the research, the following conclusions can be drawn.

First, in teaching first aid skills to children with intellectual disability, peer and self-video modeling were found to be equally effective in the phases of acquisition and maintenance. This finding is consistent with previous research findings regarding the effectiveness of peer and self-video modeling (Bidwell & Rehfeldt, 2004; Rehfeldt et al., 2003; Wert & Neiswoth, 2003). While the findings are consistent with research that compared peer and self modeling in terms of effectiveness (Sherer et al., 2001), they differ from another study that found self-video modeling was superior to peer video modeling (Marcus & Wilder, 2009). The latter two previous studies both focused on discrete behaviors taught to children with autism using children with normal development as models. This research aimed at teaching linked behaviors to children with intellectual disability using peers with intellectual disability as models. Therefore, due to these differences in the research, this study contributes to the current literature.

Second, it is difficult to determine whether peer or self-video modeling is more efficient based on the findings. In terms of the total number of sessions carried out and the number of errors made before the children met the criteria, peer video modeling was more efficient for one child, but self-video modeling was more efficient for another child, and there was no difference between the two methods in terms of efficiency for the third child. It is possible to state that peer video modeling seems more efficient than self-video modeling in terms of the total time spent in training before the criteria were met, but this difference between the two methods is really based on the difference between the times required to accomplish each skill. The first aid skills for burns lasted five minutes longer than the first aid skills for bleeding because the burnt part must be held underwater for four to five minutes. Therefore, it is not appropriate to state this difference between the methods is a reflection of their efficiency. In addition, in both skills, the children spent a long time on the step in which they had to put on disposable gloves, which led to longer total times. Although the previous studies did not include a step in which children with disabil-
ities were required to put on disposable gloves, it is important that those providing first aid protect their own lives by putting on disposable gloves before beginning first aid, as recommended by health specialists (www.ilkyardim.org.tr). While one of the nurses whose social validity data was collected found that using gloves was necessary, the other stated that using gloves before attending to simple bleeding and burns was not necessary and that the children took a long time to put on the gloves.

Third, during the probe sessions, the errors made by the children generally centered on one step for each skill, and the types of errors mostly consisted of sequential and topographical errors. In this research, most of the time, the children made a sequential error by skipping to the next step and forgetting to raise the bleeding part above the sufferer’s heart level. They made a topographical error by failing to correctly carry out the step of taking the friend to the bathroom in order to hold the burn underwater. In the research carried out by Marchand-Martella, Martella, and Agran (1992) and Gast and Winterling (1992), the children generally made topographical or sequential errors but almost no time errors. Therefore, the findings of this research are consistent with previous research. A training program considering the steps at which the errors were commonly made may be recommended to instructors and parents working in this field.

Fourth, the three children who took the role of sufferers acquired both sets of first aid skills by only observing their peer. This finding supports other research findings that showed first aid skills are learned by observing (Christensen et al., 1996; Timko & Sainato, 1999). In previous research, the participants watched the complete training process. However, in the current research, the children who played the role of sufferers did not watch the training process in any way; they only took part in the probe sessions in which their peers carried out first aid skills on them. Therefore, the research contributes to the current literature regarding observational learning. Instructors and parents in the field are recommended to make as many observations as possible regarding the skills they want to teach to children.

Fifth, the social validity of the findings was evaluated by two nurses, who found the social validity of the findings was high. The social validity findings are also consistent with previous research findings (Gast & Winterling, 1992; Timko & Sainato, 1999). The social validity of the training purposes is high because the skills for which the students received training were selected from the skills included in their IEPs.

Moreover, making the peer and self modeling videos was easier and took less than the time the instructor expected. In addition, the instructor applied both methods with a high reliability and ease. Therefore, these methods may be comfortably used by parents, teachers, or teacher candidates to teach most of the skills.

These findings should be interpreted by considering the following limitations. First, the processes for carrying out the two sets of first aid skills were quite different from one another. The first aid skills for burns lasted four to five minutes longer than the first aid skills for bleeding. This situation prevented a comparison of the efficiencies of the two modeling methods in terms of training time spent before the criteria were met. This may be considered a limitation. Second, adapted alternating treatments may include only the baseline and comparison phases, only the comparison and better treatment phases, or ideally, only the comparison phase (Holcombe, Wolery, & Gast, 1994). However, in this research, baseline, comparison, and maintenance phases took place, baseline sessions were not returned to again or with better treatment, and the application was sustained. This may also be assessed as a limitation. Third, the researcher tried to ensure the social validity of the instruction objective, and the social validity of the research findings was subjectively assessed. Although it was observed anecdotally that the children who participated in the study generally liked the self-video modeling better, any systematic data regarding the social validity of the methods applied to the children were not collected. This situation may be a limitation for the comparison of the two methods. Fourth, while the study used peers with characteristics similar to the children who took part in the study for the peer video modeling, it did not consider peer pref-
ferences when choosing the peers. In the literature, considering peer preferences is recommended when using peer video modeling. Therefore, this situation may also be seen as a limitation. Fifth, owing to the fact that the setting in which the training was carried out was not suitable, the steps in the first aid skill set for burns regarding taking the sterile gauze cloth out in the first place and holding the burn underwater took place in a different order than they would in daily life. This can also be seen as an important limitation.

Based on these findings and limitations, some recommendations for future research may be made. The repetition of this research with different participants, teaching different skills, and by different researchers is recommended. In addition, research should be conducted in which peer and self-video modeling are compared for teaching two skills that take the same amount of time to complete. In this research, the children who took the role of sufferers learned the skills only by observing their peers. Future research could study the effectiveness of training a small group in which the participants are both the first aid practitioners and the sufferers. In addition, in future research, social validity data regarding the methods should be collected directly from the participants. For peer video modeling, research should also be designed in which the peers are chosen based on peer preferences. Research studies in which wearing gloves is not a step in the first aid process could also be seen as an important limitation.

Based on these findings and limitations, some recommendations for future research may be made. The repetition of this research with different participants, teaching different skills, and by different researchers is recommended. In addition, research should be conducted in which peer and self-video modeling are compared for teaching two skills that take the same amount of time to complete. In this research, the children who took the role of sufferers learned the skills only by observing their peers. Future research could study the effectiveness of training a small group in which the participants are both the first aid practitioners and the sufferers. In addition, in future research, social validity data regarding the methods should be collected directly from the participants. For peer video modeling, research should also be designed in which the peers are chosen based on peer preferences. Research studies in which wearing gloves is not a step in the first aid process could also be designed.

References
Assessing the duration of first-aid treatments by elementary-aged students with disabilities. *Child and Family Behavior Therapy, 14*, 33–52.


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Video Self-Modeling: A Job Skills Intervention with Individuals with Intellectual Disability in Employment Settings

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Abstract: The purpose of this study was to explore the effectiveness of video self-modeling (VSM) to teach chained job tasks to individuals with intellectual disability in community-based employment settings. Initial empirical evaluations have demonstrated that VSM when used in combination with other instructional strategies, are effective methods to teach chained tasks to individuals with intellectual disability. However, no study has investigated the effectiveness of VSM as a stand-alone intervention to teach chained tasks. In this study, the effectiveness of VSM alone to teach chained job tasks was first evaluated before the addition of other instructional strategies (i.e., instructor feedback and practice) to the VSM intervention package. Three adults with intellectual disability participated in this study. A within participant multiple probe design across targeted job tasks, replicated across the three participants, was used to evaluate the effectiveness of VSM in this study. All of the participants demonstrated increased task acquisition with the VSM intervention; however, the effectiveness of VSM alone, or in combination with feedback and practice, varied across participants and job tasks. Limitations of the study and implications for future research are discussed.

For many adults with intellectual disability, having a job is a significant stepping-stone in life. Aside from providing for a means towards independent living, the employment setting allows for the formation of meaningful friendships and community participation. Without a doubt, employment is an important factor to the quality of life of an adult with intellectual disability (Rusch & Millar, 1998). At a minimum, in order to obtain and maintain employment, adults with intellectual disability must be able to demonstrate their ability to acquire and maintain job skills with a certain level of proficiency and job independence. A substantial body of research has focused on strategies for teaching employment skills to individuals with intellectual disability (Test & Mazzotti, 2011). Many job skills (e.g., photocopying, food preparation, cleaning) are chained tasks that require an individual to perform a series of steps to complete the whole task or a work routine. Historically, systematic instruction has been commonly used to teach chained job tasks to adults with intellectual disability (Snell & Brown, 2011). With systematic instruction, a task analysis is first carried out to analyze and break the job task into multiple individual steps, then a prompting procedure (e.g., constant time delay, system of least prompts, simultaneous prompting) is used to teach the individual steps (e.g., Chandler, Schuster, & Stevens, 1993; Maciag, Schuster, Collins, & Cooper, 2000). In addition, antecedent prompts (e.g., picture, audio prompts) have been used to facilitate the acquisition of a complex job tasks by providing employees with prompts for each step of the task, and then teaching them to use the prompts independently to guide their own performance (e.g., Cihak, Kessler, & Alberto, 2007; Riffel et al., 2005).

More recently, with the advent of video technology, researchers have begun to explore the feasibility and effectiveness of video strategies, such as, video modeling, video prompting, and computer-based video
instruction, for promoting the acquisition and maintenance of chained tasks (Mechling, 2005). Research using video technology with individual with intellectual and developmental disability has focused on teaching daily living skills (e.g., Goodson, Sigafos, O’Reilly, Canella, & Lancioni, 2007; Shipley-Benamou, Lutzker, & Taubman, 2002), and to some extent, employment skills (e.g., Allen, Wallace, Renes, Bowen, & Burke, 2010; Mechling & Ortega-Hurndon, 2007).

Video-modeling, in particular, has received much attention recently. Video modeling is the procedure where a participant watches a video demonstration of a skill and is then required to perform the skill at a later time. The video model is usually a same-age peer or a familiar instructor; however, subjective viewpoint videos, where the video recordings are made from the participant’s point of view or eye level, have also been used. Research evaluating the effectiveness of video-modeling with chained tasks typically included additional instructional strategies, such as, behavioral rehearsal and response prompting systems (e.g., Branham, Collins, Schuster, & Kleinert, 1999; Van Laarhoven, Zurita, Johnson, Gridder, & Gridder, 2009). The addition of other instructional strategies occurred either during the video viewing session or the performance observations, and, sometimes, both. However, video-modeling alone, without the addition of other instructional strategies, has also been found to be effective in teaching chained tasks (e.g., Mechling, Gast, & Gustafson, 2009; Shipley-Benamou et al., 2002).

Applications of video-modeling to chained tasks have been emerging, however, there has been limited demonstrations of using video-modeling in employment settings (e.g., Allen et al., 2010). One video strategy that has yet to be explored for teaching chained job tasks in employment settings is video self-modeling (VSM). Instead of observing a model perform a task on video, as in video modeling, VSM involves the process of repeated observation of oneself on edited videotapes that depict only appropriate or desired behaviors (Dowrick, 1991). The strongest theoretical basis for VSM is social learning theory (Bandura, 1969) that suggests that learning can occur by observing the behavior of others and the consequences they experience. In addition, according to social cognitive theory (Bandura, 1986), the closer the model resembles the observer, the greater the effect it will have on the target behavior. In VSM, since the observer is also the model, the anticipated effect on the target behavior and feelings of self-efficacy, should be theoretically enhanced (Bandura, 1986; 1997).

Although VSM has not been evaluated in employment settings with individuals with intellectual disability, VSM has been examined and found to be effective for a variety of training and therapeutic applications with diverse populations (such as children and adults with or without disabilities) and settings (including home, school and community settings) (e.g., Dowrick, 1999; Hitchcock, Dowrick, & Prater, 2003; Meharg & Woltersdorf, 1990). Research studies examining VSM have demonstrated its effectiveness with the following target behaviors: improving physical skills (e.g., Dowrick & Raeburn, 1995), teaching academic skills (e.g., Dowrick, Kim-Rupnow, & Power, 2006), reducing problem behaviors, and increasing prosocial skills (e.g., Buggey, 2005; Wert & Neisworth 2003).

VSM has strong potential for job skill training in employment settings. First, VSM research studies conducted with adults with traumatic brain injury in home settings (e.g., McGraw-Hunter, Faw, & Davis, 2006) and children with autism in school settings (e.g., Buggey, 2005; Wert & Neisworth, 2003) have shown strong maintenance effects and good generalization effects across novel tasks and across settings. Additionally, once a VSM video has been produced, it could be used to program for maintenance. Third, VSM interventions are unintrusive, and therefore may be a good match for inclusive employment settings. Except for time used to capture the videos, the VSM intervention itself may only require viewing a 2–5 minute video outside of actual work situation (Dowrick, 1991). Thus, if effective, the employee can learn new job skills without direct prompting from the instructor or job coach during actual work situations. This has the potential of reducing stigma and time needed for training on the job. Lastly, in studies where social validity assessment was conducted, participants evalu-
ated the intervention positively (e.g., Buggey, 2005; Cihak & Schrader, 2008).

Few studies have evaluated VSM with chained tasks but these studies have found that the VSM interventions were effective for promoting task acquisition (i.e., Cihak & Schrader, 2008; Lasater & Brady, 1995; McGraw-Hunter et al., 2006; Van Laarhoven et al., 2009). However, these research studies included other instructional strategies (e.g., behavior rehearsal, system of least prompts) as part of the VSM intervention package and they did not assess the effectiveness of VSM alone to teach chained tasks. Therefore, it was not known if VSM alone, without the addition of other instructional strategies, would be sufficient for task acquisition. While, in comparison, few studies have shown that video-modeling alone (e.g., Mechling et al., 2009; Shipley-Benamou et al., 2002), without the addition of other instructional strategies, can be effective in teaching chained task to children and young adults with disabilities, the number of demonstrations are limited.

The purpose of this study was two fold. The first purpose was to evaluate the use of VSM to teach chained job tasks to individuals with intellectual disability in employment settings. The second purpose was to continue to systematically explore the feasibility and effectiveness of using VSM alone or in combination with other instructional strategies to enhance effectiveness. The effectiveness of VSM alone was first evaluated by implementing VSM without any other instructional strategies. If VSM alone was not sufficient to increase acquisition of a chained task, instructor feedback was added to the VSM intervention. Finally, if VSM and feedback did not lead to task acquisition, the participants would practice the steps of the tasks during video viewing. Both instructor feedback and practice occurred only during video viewing session and not during the performance observations.

Method

Participants

Three adults (2 male and 1 female) with intellectual disability, receiving services from a university-affiliated supported employment program, participated in this study. The supervisors of the supported employment program nominated the participants, and the first author conducted further observations to determine if the nominated individual met the selection criteria. An individual was selected if he/she had: (a) regularly scheduled employment/job training participation, (b) the ability to model behavior observed on short video clips, and (c) no demonstrated aversion to viewing self on video.

Daniel was a 53-year-old male with mild intellectual disability and bipolar disorder. Daniel had good verbal and gross motor skills and was able to complete many tasks in his daily routines independently. At the beginning of the study, Daniel had been working part time at the thrift store as a part time janitor and merchandise associate for about one year. His job duties at the thrift store included sorting, arranging, and shelving merchandise, and simple janitorial tasks (e.g. sweeping, emptying the trash, cleaning the restrooms). Daniel was easily distracted and required regular prompts from his job coach to remain on-task. Daniel would often times lose his spatial orientation during some of his job tasks (e.g., sweeping the floor). For example, during his job task of removing empty hangers from a clothing rack, instead of continuously working and moving towards his right, he would go from right to left to right again, thus not progressing through the whole rack at a competitive rate. Daniel also required constant reminders from his job coach regarding appropriate social behaviors in the workplace. Daniel’s employment goals were to expand his work responsibilities and to improve his competitive work rate.

Jonathan was a 47-year old male with mild intellectual disability. Jonathan was living independently in his apartment with part-time supports from a life-coaching agency. He was capable of independently completing most of his daily living activities. At the beginning of the study, Jonathan had been working part time at a department store for about eight years. His job responsibilities included opening boxes of merchandise, tagging the items with security tags, displaying the merchandise, and janitorial tasks. His job tasks were performed mainly in the warehouse of the department store. He required only minimal assistance from his job coach to complete his job.
tasks. Jonathan’s employment goals were to expand his job responsibilities and to maintain his work performance rate.

Maria was a 28-year old female with mild intellectual disability and autism. Maria was primarily receiving one-on-one job training from her job coach at the supported employment office. In addition, she was participating in job training experiences in the community including a thrift store. Maria had good verbal skills but she was shy and often appeared withdrawn in social situations. Although Maria was able to perform many of her job tasks, she tended to wait for prompts or assurance from her job coach before she proceeded with a task. Maria’s employment goals were to expand her work experiences, increase her independence at the job training settings, and secure a paid job.

Settings

Instructional settings. VSM sessions (i.e., video viewing and instruction) took place in a quiet area at the employment setting for both Daniel and Jonathan. For Maria, instruction took place in a quiet office space in the same building where the supported employment program was located. During instruction, only the instructor and the participant were present, with the exception of procedural fidelity checks at which times one additional observer was present.

Performance observation settings. Observations of the participant’s performance of the targeted job tasks were conducted in the relevant areas at the participant’s employment or job training setting. For Daniel, performance observations took place in the warehouse and the book room of the thrift store. For Jonathan, performance observations took place at the men’s fitting room and clothing department, shoe department, and the staff training room. For Maria, performance observations took place at the following places within the university building where supported employment program office was located: target office space, the hallways of the university building, and the photocopy room. During performance observations, only the job coach and the participant were present in the immediate vicinity except when interobserver agreement and procedural fidelity checks were being conducted at which times one additional observer was present. However, depending on the employment setting, other people (e.g., co-workers, customers) were occasionally present during performance observations.

Videotaping settings. Videotaping took place at the same settings where performance observations took place for each participant.

Target Job Tasks

Selected job tasks or routines were relevant to the participant’s employment or job training. To select the job tasks for training, the first author first obtained recommendations of potential target job tasks from the job coaches and supported employment supervisors. Then the first author observed the participant at his or her employment or job training setting to ascertain the participant’s current level of job performance. After that, the first author collaborated with the job coach and supervisors to finalize the job tasks for each participant.

Two chained job tasks were selected for Daniel (three job tasks were initially selected for Daniel but only two job tasks were targeted for instruction) and three chained job tasks were selected each for Jonathan and Maria. A task analysis was conducted to break each job task into smaller steps. Through discussions with the respective job coach and observations of each participant working at his or her employment or job-training site, the first author modified the task analyses based on the participant’s skill level. Table 1 provides the task analysis of the selected job tasks for each participant. The job tasks for the participants ranged from 9–15 steps.

Dependent Measure and Recording Procedures

Percentage of steps completed correctly. The primary dependent measure was the percentage of steps completed correctly on the task analysis for the job task or routine. A correct step was scored when the participant independently completed the step as operationally defined (See Table 1). An incorrect step was scored when the participant did not perform the step as operationally defined or did not respond within five seconds of the previous step or initial cue to begin. To determine the percentage of steps completed correctly for
TABLE 1

Task Analysis of Job Skills for the Participants

<table>
<thead>
<tr>
<th>Job Skill 1: Shoe Cleaning</th>
<th>Job Skill 1: Fitting Room</th>
<th>Job Skill 1: Conference Packet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Walk (with the basket) to</td>
<td>1. Check every fitting room and remove</td>
<td>1. Open up sample folder*</td>
</tr>
<tr>
<td>2. Pick up shoe cleaning spray*</td>
<td>all items*</td>
<td>2. Open a new folder*</td>
</tr>
<tr>
<td>3. Wipe shoe exterior (front,</td>
<td>3. Match clothing item (Item 1) to</td>
<td>3. Pick up a sheet of paper</td>
</tr>
<tr>
<td>sides, back)</td>
<td>hanger by size*</td>
<td>from each tray*</td>
</tr>
<tr>
<td>5. Pick up a rubber-band*</td>
<td>5. Match Item 2 to hanger by size*</td>
<td>in the correct pocket in</td>
</tr>
<tr>
<td>6. Place shoes together*</td>
<td>6. Hang Item 2 correctly</td>
<td>the folder</td>
</tr>
<tr>
<td>7. Check the style of the shoe (open box</td>
<td>7. Match Item 3 to hanger by size*</td>
<td>5. Pick up a booklet*</td>
</tr>
<tr>
<td>8. Place all shoes correctly in the</td>
<td>8. Hang Item 3 correctly</td>
<td>6. Place booklet in the</td>
</tr>
<tr>
<td>box</td>
<td>9. Walk out of fitting room with all items</td>
<td>correct pocket</td>
</tr>
<tr>
<td>10. Place the correct rack for the 1st item*</td>
<td>on the hangers*</td>
<td>7. Pick up a CD*</td>
</tr>
<tr>
<td>11. Place item correctly on the rack</td>
<td>10. Find the correct rack for the 2nd item*</td>
<td>8. Place CD in the correct</td>
</tr>
<tr>
<td>12. Find the correct rack for the 3rd item*</td>
<td>11. Place item correctly on the rack</td>
<td>pocket in the right position</td>
</tr>
<tr>
<td>13. Place item correctly on the rack</td>
<td>12. Find the correct rack for the 4th item*</td>
<td>9. Pick up a business card*</td>
</tr>
<tr>
<td>15. Press button to turn shredder off (green light goes off)*</td>
<td></td>
<td>to the pocket</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job Skill 2: Book Room</th>
<th>Job Skill 2: Paper Shredder</th>
<th>Job Skill 3: Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pick up all misplaced items and place into the shopping basket*</td>
<td>1. Press button to turn shredder on (green light goes on)*</td>
<td>1. Enter 5 digit password</td>
</tr>
<tr>
<td>2. Walk (with the basket) to a specific corner of the bookshelf</td>
<td>2. Lift up the shredder cover</td>
<td>(refer to notecard)*</td>
</tr>
<tr>
<td>3. Place basket on the floor by the bookshelf</td>
<td>3. Remove all the paper clips and staples*</td>
<td>3. Touch “ok” on the screen*</td>
</tr>
<tr>
<td>4. Place all books in the specific corner of the bookshelf</td>
<td>4. Count 5 pieces of paper</td>
<td>4. Remove posted post-it-note for the #)*</td>
</tr>
<tr>
<td>5. Walk (with the basket) to the CD &amp; cassette box</td>
<td>5. Put the stack of paper into the shredder</td>
<td>5. Enter “# of copies” on the keypad (refer to notecard)*</td>
</tr>
<tr>
<td>6. Place basket on the CD &amp; cassette box</td>
<td>6. Repeat until the stack of paper has been shredded*</td>
<td>6. Press button to turn shredder off (green light goes off)*</td>
</tr>
<tr>
<td>7. Place all CDs in the CD pile</td>
<td>7. Close the shredder cover</td>
<td>7. Open shredder door*</td>
</tr>
<tr>
<td>8. Place all cassette tapes in the cassette pile</td>
<td>8. Press button to turn shredder off (green light goes off)*</td>
<td>8. Remove the container*</td>
</tr>
<tr>
<td>9. Walk (with the basket) to the video shelf</td>
<td>9. Open shredder door*</td>
<td>9. Take the container to the paper recycling bin*</td>
</tr>
<tr>
<td>10. Place basket on the floor by the video shelf</td>
<td>10. Place all shredded paper into the recycling bin*</td>
<td>10. Place the container back</td>
</tr>
<tr>
<td>11. Place all videotapes on the video shelf</td>
<td>11. Walk back to the room with the container*</td>
<td>into the shredder*</td>
</tr>
<tr>
<td>12. Pick up all misplaced non-Book Room merchandise (clothing/shoes) and place items in the basket*</td>
<td>12. Place container back into the shredder*</td>
<td>12. Close shredder door</td>
</tr>
<tr>
<td>13. Walk (with the basket) to the back of the store</td>
<td>13. Place completed packet upright in the box</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Check every fitting room and remove</td>
<td>1. Enter 5 digit password</td>
<td>1. Press button to turn</td>
</tr>
<tr>
<td>all items*</td>
<td>(refer to notecard)*</td>
<td>shredder off (green light</td>
</tr>
<tr>
<td>2. Bring all items to the outside rack*</td>
<td>2. Touch “ok” on the screen*</td>
<td>goes off)*</td>
</tr>
<tr>
<td>3. Match clothing item (Item 1) to</td>
<td>3. Remove posted post-it-note for the #)*</td>
<td>3. Press start (green)</td>
</tr>
<tr>
<td>hanger by size*</td>
<td>4. Place original copy</td>
<td>button*</td>
</tr>
<tr>
<td>4. Hang Item 1 correctly</td>
<td>5. Enter “# of copies” on the keypad (refer to post-it-note for the #)*</td>
<td>6. Take the original copy</td>
</tr>
<tr>
<td>5. Match Item 2 to hanger by size*</td>
<td>6. Press start (green)</td>
<td>7. Take the photocopies</td>
</tr>
<tr>
<td>7. Match Item 3 to hanger by size*</td>
<td>8. Open up the plastic</td>
<td>keys simultaneously to end session</td>
</tr>
<tr>
<td>8. Hang Item 3 correctly</td>
<td>section</td>
<td></td>
</tr>
<tr>
<td>9. Walk out of fitting room with all items</td>
<td>9. Press yellow and red</td>
<td></td>
</tr>
<tr>
<td>on the hangers*</td>
<td>keys simultaneously to end session</td>
<td></td>
</tr>
<tr>
<td>10. Find the correct rack for the 1st item*</td>
<td>10. Open up the plastic</td>
<td></td>
</tr>
<tr>
<td>11. Place item correctly on the rack</td>
<td>section</td>
<td></td>
</tr>
<tr>
<td>12. Find the correct rack for the 2nd item*</td>
<td>12. Press button to turn</td>
<td></td>
</tr>
<tr>
<td>13. Place item correctly on the rack</td>
<td>shredder off (green light</td>
<td></td>
</tr>
<tr>
<td>14. Find the correct rack for the 3rd item*</td>
<td>goes off)*</td>
<td></td>
</tr>
<tr>
<td>15. Place item correctly on the rack</td>
<td>15. Close shredder door</td>
<td></td>
</tr>
</tbody>
</table>

Note. * Critical step that will affect the performance of subsequent steps.
each participant, the number of correct steps was divided by the total number of steps in the task analysis and multiplied by 100%.

Performance observations. Data were collected on the dependent measure during performance observations of the participant at the participant’s employment or job-training site for the duration of time required for the completion of the job task or routine. Performance observations occurred once daily, at least four times per week consistent with the participant’s regular work schedule throughout all phases of the study. Each performance observation consisted of only one trial or one opportunity to engage in the task analysis. The job coach set up the relevant area for performance observations with materials for the job task before the session began. Performance observation procedures were held constant across all phases of the study. See Baseline 1 for performance observation procedures. During performance observations, the job coach observed the participant and recorded the steps completed correctly and incorrectly by the participant using a data sheet on a clipboard.

Observer and Observer Training

Three job coaches employed by the supported employment program served as the primary observers during performance observations. The job coaches were selected as the primary observers to reduce the intrusiveness of having multiple observers at the employment or job training setting. The primary observers were trained on the steps of the task analyses, definitions of correct responses for each step, and methods of recording. They were also provided with examples of task related and non-task related prompts, and they were trained on the correct protocol during data collection. During data collection, the primary observers were directed to only provide non-task related prompts (e.g., “Just try your best”) and not task-related prompts (i.e., prompt initiation of a step in the task analysis) to the participants. The use of role-playing in the performance observation settings was utilized for observer training. Each observer was required to meet a criterion of 90% interobserver agreement for the primary dependent measure for at least two consecutive practice sessions. The observer was also required to meet a criterion of 100% procedural fidelity for the procedures (i.e., not providing any task-related prompts for each step of the task analysis) during the job task for at least two consecutive practice sessions.

Experimental Design

A within participant multiple probe design (Gast & Ledford, 2010) across targeted job tasks, replicated across three participants, was used to evaluate the effectiveness of VSM alone and combined with feedback and practice to teach chained job tasks. The multiple probe design was selected to avoid possible reactive effects from frequently requiring the participant to perform the second job task during a prolonged baseline condition. The experimental phases of this design consisted of (a) Baseline 1, (b) Baseline 2 (baseline assessment after videotaping), (c) VSM alone, (d) VSM plus feedback (VSM 2), (e) VSM plus feedback and practice (VSM 3), and (f) Maintenance.

Experimental Conditions

Baseline 1. During Baseline 1, performance observations began when the job coach provided the participant with an initial cue to begin the task. A total observation method was implemented. The participant was allowed to complete the task until either (a) s/he indicated verbally that s/he was done with the task, (b) s/he stopped responding for 15s, or (c) s/he could not move on to the next step due to an incomplete critical step. Similar to a single opportunity probe (Brown & Snell, 2011), whenever the participant made an error on a step, the job coach did not correct the task materials to allow for further responses. The job coach did not provide any instructional feedback. When the participant performed a step correctly, the job coach marked the step as correct on the data sheet. To insure sufficient motivation for the participant to continue through the task analysis, the job coach provided intermittent general praise to the participant for staying on task. When the participant asked a question that was related to the job task (e.g., “What should I do now?”), the job coach provided a general
statement to the participant to continue on with the task (e.g., "just try your best").

If the participant made an error (i.e., did not complete the step as operationally defined), the job coach marked that step as incorrect, without providing any feedback on incorrect responses. If the participant made an error during a critical step (See Table 1), without providing any feedback on incorrect responses, the job coach marked that step and all following steps that were linked to the critical step as incorrect. At the end of the performance observation, the job coach thanked the participant for working but did not provide any specific feedback regarding task performance.

Creation of the video. After Baseline 1 and prior to Baseline 2, in order to create the video for training, the participant was videotaped performing all the steps of the job task at his or her employment or job training setting using two different sets of materials for the job (e.g., different shoes for shoe cleaning). The video clips were then edited and two final edited videos were created for each job task for each participant.

Videotaping. A Flip Ultra™ camcorder, Canon PowerShot A570 IS digital camera, and tripod were used during videotaping. During videotaping, as the step was being videotaped, the first author and job coach directed the participant to perform each step of the job task. In order to prevent exposing the participant to the correct sequence, which may have influenced participant’s performance in the subsequent baseline phase, videotaping of each step did not follow the correct sequence in the task analysis. Additional narrations for the completion of each step in the task analysis were recorded with the participant separately.

For each step of the task, multiple video clips were shot to allow the researchers the flexibility of choosing the clearest video clips to be used in the final edited video. In addition, the multiple video clips with different exemplars also provided for variation in the final edited videos. The variation of materials shown in the different final edited videos was intended to reduce participant’s boredom and increase generalization of the skill. Additional video clips of the participant introducing himself or herself, smiling, and shots of the supervisor thanking the participant for a job well done were also videotaped. These video clips were added for aesthetic and motivational purposes.

Video editing. The iMovie HD6 software was used for video editing. During video editing, any incorrect or extraneous steps or verbalizations from the participant, job coach and the first author were edited from the video. Narrations of the correct steps were added to the video. Background music at a low volume was added to the video. Two final edited videos for each job task were created. The videos were formatted into a DVD movie and burned onto a DVD+R. Video editing took around 10 to 20 hours for each set of videos. Two doctoral students in special education evaluated the final edited videos and determined that all the steps of the task were present and clearly observable. When needed, more editing was done to improve the clarity of the videos.

Edited videos. A final edited video began with the participant stating the job task that s/he would be doing. Then the video showed clips of the participant performing each step of the task while the steps were being narrated simultaneously. In between natural segments of the task analyses in the video, a black screen with a number indicating the segment number was shown for several seconds. The video ended with a clip of the supervisor thanking the participant for a job well done. Throughout the video, background music at a low volume was audible. The two final edited videos of each job tasks were similar in length. The final videos ranged in length from 1 min 23 sec (i.e., Photocopier video for Maria) to 5 min 18 sec (i.e., Fitting Room video for Jonathan) because some job tasks, such as routines, took longer to complete.

Baseline 2. Performance observations during Baseline 2 were conducted exactly as in Baseline 1. The purpose of the Baseline 2 was to determine whether there was a change in performance in completing the job task after making the video. If the first three data points in Baseline 2 were similar to or lower than the data obtained in Baseline 1, VSM alone was implemented. If the data obtained in Baseline 2 showed an increase when compared with the data obtained in Baseline 1, then Baseline 2 continued until the performance stabilized.
VSM alone. In this intervention phase, the participant was asked to watch a video created in the prior phase. The video was presented on a Philips 7-inch screen portable DVD player. The first author conducted the instructional sessions. Instructional sessions took place once daily, at least four days a week. The instructor alternated the two final edited videos, thus the participant would watch each final edited video on alternate instructional sessions. During each instructional session, the participant would watch a video once, and immediately after viewing the video, the participant was given a choice to watch the video again. Within each instructional session, the participant watched the video at least once, and at the most three times.

At the end of the instructional session, the instructor directed the participant to perform the job task just as s/he had seen on the video. Immediately after the instructional session, the job coach observed the participant perform the job tasks during the regularly scheduled work routine. Performance observation procedures were conducted exactly like Baseline 1.

VSM alone procedures continued until the participant was able to correctly and independently complete 90% of the steps in the task analyses for three consecutive performance observations. If the participant achieved criterion with VSM alone, the Maintenance phase followed and further intervention phases were not implemented.

VSM plus feedback (VSM 2). If the participant reached a stable trend with no improvement demonstrated, then a second phase of the intervention, VSM 2, was initiated. During each VSM 2 session, the instructor directed the participant to watch the video. For each step of the task analysis that the participant was able to perform independently during the previous performance observation, the instructor provided praise to the participant for performing the step correctly. For steps that the participant performed incorrectly during the previous performance observations, the instructor first provided feedback using procedures described in VSM 2. Then the instructor requested the participant to demonstrate the step that was shown on the video. If the participant performed the step correctly, the instructor provided specific verbal praise. If the participant was not able to model the step, the instructor modeled the step for the participant. After
modeling the step to the participant, the instructor directed the participant to practice the step. The instructor then provided the participant another opportunity to practice the step one more time. The instructor repeated the same procedure with each step in the task analysis for which the participant was observed having difficulty or making errors during the previous performance observations.

At the end of the whole video, the instructor asked the participant if s/he would like to watch the video again. If the participant chose to watch the video again, the instructor replayed the whole video again. The procedures for the first viewing were implemented in the second viewing.

At the end of the VSM 3 session, the job coach observed the participant performing the job tasks during the regularly scheduled work routine. Performance observation procedures were conducted exactly like Baseline 1. VSM 3 procedures continued until the participant was able to correctly and independently complete 90% of the steps in the task analyses for three consecutive performance observations or until a stable trend was observed. If the participant achieved criterion with VSM 3 intervention, the Maintenance phase was conducted. If the participant did not achieve criterion performance, the intervention was terminated.

**Maintenance.** To assess maintenance effects of the intervention, after the participants met the training criterion for three consecutive performance observations, maintenance probes were conducted for three consecutive performance observations. Then delayed follow-up probes were conducted at one, two and four weeks following the immediate maintenance sessions. During maintenance and delayed follow-up performance observations, the participant performed the job tasks under Baseline 1 condition (i.e., without viewing the video and without feedback).

**Reliability and Procedural Fidelity**

Following the same procedures and criterion as in the primary observer training, secondary observers, naïve to the purposes of the study, were trained to conduct performance observations to establish interobserver agreement on the dependent measure. Interobserver agreement checks were assessed on at least 30% of the total performance observations and at least once in every condition for each participant for each job task. Interobserver agreement was calculated using point-by-point agreement and dividing the number of agreements by the number of agreements plus disagreements multiplied by 100. The interobserver agreements for Daniel, Jonathan, and Maria were 98.8% (range, 84.6–100%), 98.3% (range, 80–100%), and 97.7% (range, 77.8–100%) respectively.

Procedural fidelity data were collected by a second observer to determine if the procedures were implemented accurately and consistently across participants. Procedural fidelity data were collected for VSM sessions and performance observations. Procedural fidelity during VSM sessions was to determine whether the instructor adhered to the planned protocol during instruction. Procedural fidelity during performance observation was to determine if the job coaches adhered to the correct data collection protocol and procedures. Procedural fidelity checks were conducted during at least 25% of the sessions in each VSM phase. The procedural fidelity scores for VSM sessions averaged across the participants and tasks during VSM alone, VSM 2, and VSM 3 were 100%, 100%, and 94.0% (range, 80–100%) respectively. Procedural fidelity checks during performance observations were conducted during at least 30% of the sessions in each phase. The procedural fidelity for job coaches across all performance observations was 100%.

**Results**

Figures 1–3 show the data for each participant. Overall, the results showed idiosyncratic patterns across the three participants. Furthermore, the effects of VSM alone and/or in combination with other instructional components also varied across different tasks for each participant.

**Percentage of Steps Completed Correctly**

Daniel. Figure 1 presents the percentage of steps completed correctly across two job tasks for Daniel.
Shoe Cleaning. During both Baseline 1 and 2 sessions, Daniel correctly completed 0% of the steps in the Shoe Cleaning task analysis. The implementation of VSM alone resulted in an almost immediate change in the level of performance with a mean percentage of steps correctly completed of 23.8%, however, no increasing trend toward criterion was evident. Following the implementation of VSM 2 (i.e., VSM plus feedback), visual analysis suggested virtually no increase in level and trend of the percentage of steps correctly completed. During VSM 3 (i.e., VSM plus feedback and practice), Daniel’s highest performance level increased to 46.2% correct. However, the VSM 3 data were variable and indicated decreasing trend in steps completed. Since Daniel did not achieve criterion, maintenance data were not collected.

Book Room. During Baseline 1 and 2, the respective mean percentages of steps correctly completed by Daniel for the Book Room task analysis were 4.7% and 7.7%. With VSM alone, Daniel’s performance did not indicate any change in the level or trend of the task acquisition over Baseline 2. However, when VSM 2 was implemented, an immediate change in level and trend were evident and his performance eventually stabilized at 61.5% correct. With the implementation of VSM 3, Daniel achieved 100% steps completed correctly in two sessions and achieved criterion with another seven sessions. Daniel continued to show high performance for the immediate and delayed maintenance sessions.

Jonathan. Figure 2 displays the percentage of steps completed correctly across three job tasks for Jonathan.

Fitting Room. During Baseline 1, Jonathan correctly completed an average of 4.5% of the steps in the Fitting Room task. After the videotaping sessions, Jonathan’s performance showed an increase to an average of 34.2% steps correct during Baseline 2 but the data were variable (range, 0–73.3%). With the implementation of VSM alone, Jonathan’s initial performance was variable; however, after five sessions of VSM alone, Jonathan completed 100% of the steps correctly. After another four sessions, his performance stabilized and criterion was achieved. Immediate and delayed maintenance sessions indicated that Jonathan maintained the Fitting Room task at high levels (range, 86.7–100%).

Shoe Storing. During Baseline 1 and 2, the respective mean percentages of steps correctly completed by Jonathan for the Shoe Storing task analysis were 20.0% and 17.8%. Following
the implementation of VSM alone, Jonathan’s performance was variable but his task acquisition eventually stabilized at a higher level (40.0%) compared to Baseline 1 and 2 sessions. With the implementation of VSM 2, Jonathan immediately reached criterion. After VSM 2 was withdrawn, Jonathan’s performance remained at high levels (range, 84.6–100%) for the immediate and delayed maintenance sessions.

Computer. During Baseline 1 and 2 sessions, Jonathan correctly completed 0% of the steps in the Computer task. The implementation of VSM alone did not increase Jonathan’s performance above baseline level. With the implementation of VSM 2, Maria demonstrated minimal increase in performance to a mean of 5.1% steps correct. With the implementation of VSM 3, Maria showed rapid task acquisition and she achieved criterion in 15 sessions. Maria maintained the task at high levels (range, 90.9–100%) during the immediate and delayed maintenance sessions.

Conference Packet. During Baseline 1 and 2, Maria correctly completed 0% of the steps in the Conference Packet task. The implementation of VSM alone did not increase Maria’s performance above baseline level. With the implementation of VSM 2, Maria demonstrated minimal increase in performance to a mean of 5.1% steps correct. With the implementation of VSM 3, Maria showed rapid task acquisition and she achieved criterion in 15 sessions. Maria maintained the task at high levels (range, 90.9–100%) during the immediate and delayed maintenance sessions.

Paper Shredder. During Baseline 1, Maria’s performance averaged at 5% steps correct. After videotaping, Maria’s performance decreased and remained at 0% correct for the three Baseline 2 sessions. With the implementation of VSM alone, there was no change in the level or trend of Maria’s correct completion of the task analysis. Maria showed an immediate increase in task acquisition with the implementation of VSM 2. Maria achieved 86.7% correct in 10 sessions, which was close to criterion performance. Since Maria did not
achieve criterion, VSM3 was implemented, but further intervening with VSM 3 did not result in an increase in her level of performance. During immediate and delayed maintenance sessions, Maria maintained the Paper Shredder task at high levels.

Photocopier. During Baseline 1 and 2, the respective mean percentages of steps correctly completed by Maria for the Photocopier task analysis were 0% and 13.3%. The implementation of VSM alone did not result in any change in the level or trend of Maria’s performance. When VSM 2 was implemented, Maria correctly completed an average of 31.5% of the steps in the task analysis. The implementation of VSM 3 did not result in any change of her level of performance. Since Maria did not achieve criterion for the Photocopier task, maintenance data were not collected.

Discussion

In summary, while the results of the current investigation demonstrated that VSM can be effective in teaching new job tasks to adults with intellectual disability, the results did not provide conclusive evidence of the effectiveness of VSM alone or in combination with feedback and practice for the three participants in this study. The effects of the various VSM conditions varied across participants and across job tasks. All the participants, however, achieved criterion performance with one of the three VSM phases, except for Daniel with the Shoe Cleaning task and Maria with the Photocopier task who approached mastery. Only Jonathan achieved criterion (i.e., 90% steps completed correctly for three consecutive sessions) for the Fitting Room task with VSM alone. With VSM alone, some increase in performance was observed, but not to criterion level, for Daniel with the Shoe Cleaning task and Jonathan with the Shoe Storing task. For Maria with all three job tasks and Daniel with the Book Room task, VSM alone did not increase performance above Baseline 2 level.

With the addition the VSM2 (e.g., VSM plus feedback) and VSM3 (VSM plus feedback and practice), improvements in task performance were noted for certain participants and tasks over the VSM alone condition; however, not all participants reached criterion and even with the addition of the last VSM3 component, and substantial improvements over
the previous VSM2 condition did not occur for some participants and tasks.

There are several possible reasons for the variation in the effectiveness of VSM alone or in combination with feedback and practice across participants and job tasks. First, the participant’s previous experience with the job task itself may impact task acquisition using the VSM interventions. This may have been the case for Jonathan for the Fitting Room task, as it appeared that the simple exposure to the task during video creation produced caused an increase in performance during the second baseline, and criterion performance with VSM alone. It is interesting to note the participants in the studies by Lasater and Brady (1995) and McGraw-Hunter et al. (2006) had some initial level of proficiency in the tasks they were taught using the VSM intervention package. This could suggest that in order for VSM alone to have immediate and strong effects, the individual may require at least a moderate level of experience to the task being taught through the VSM video. The learning curve may be too steep for VSM alone if the individual has no or only minimal prior experience with the target job task.

Second, task complexity may be a factor in the success, or the lack of it, of the VSM intervention. The differences in the chosen job tasks for the participants may have led to some job tasks being more difficult than others. For example with the Computer and Photocopier tasks, with the multiple icons on the computer screen in the Computer task and multiple buttons on the keypad and touch-sensitive screen on the photocopier in the Photocopier task, completing one step did not necessarily present the beginning of the next step as clearly as in the Book Room or Paper Shredder tasks. Both these tasks posed difficulties for the participants who performed at mastery or near mastery levels for their other two tasks. In studies that found video-modeling alone to be effective, the chained tasks were relatively less complex. Mechling and colleagues (2009) used 10–20s videos to teach three fire-extinguishing skills that consisted of 3–6 steps each. While Shipley-Benamou and colleagues (2002) did not report the length of their videos, they investigated video-modeling with simple chained tasks, such as, making orange juice and table setting, and they found video-modeling alone effective for teaching these skills to children with autism. This may suggest that both VSM and video-modeling may be better suited to some tasks more than others.

Third, the participants’ history of job task performance, support needs, and degree of prompt dependency may have influenced acquisition of new job tasks. The level of independence at the work place varied across the three participants.

Fourth, the videos themselves may have had influences on the effectiveness of the VSM intervention. The VSM videos also included these recommendations by Mayer and Moreno (2003) to reduce cognitive load: (a) offloading, by using narration instead of visual words in the video; (b) segmenting, by allowing some time between successive segments of the video; (c) signaling, by adding arrows to focus on essential parts of the video; and (d) synchronizing, by presenting visual and auditory materials simultaneously. Even though these recommendations were incorporated to some extent in the VSM videos, the degree of clarity across steps in the videos could potentially be a factor in the success of the VSM videos.

Although the outcomes were variable, this study contributes to the literature in several ways. First, there are relatively few empirical evaluations of video-based interventions with individuals with intellectual and developmental disability (Wehmeyer, Palmer, Smith, Parent, Davies, & Stock, 2006) and an even smaller number of studies that examined the effectiveness of VSM with chained tasks. Although a few research studies have demonstrated the effectiveness of video-modeling alone to teach chained tasks (e.g., Mechling et al., 2009; Shipley-Benamou et al., 2002), thus far, no study has evaluated the effectiveness of VSM alone (i.e., without additional instructional strategies) to teach chained tasks. This study made an important contribution as it found that, with the exception of Jonathan with the Fitting Room task, VSM alone was not sufficient for job task acquisition for three adults with intellectual disability. The findings of this current study suggest that VSM alone may not have been the sole contributor to the effectiveness VSM intervention packages in previous VSM studies which taught chained
tasks (Cihak & Schrader, 2008; Lasater & Brady, 1995; McGraw-Hunter et al., 2006; Van Laarhoven et al., 2009).

The second contribution of this study is in the area of job skills training with adults with intellectual disability. Surveys have found that one of the top barriers to employment of individuals with disability is the lack of experience and skills training (Bruyère, 2000; Loprest & Maag, 2001). The current study suggests that, while VSM alone may be a weak intervention, VSM when combined with other instructional components is a promising alternative to traditional in-vivo job training in employment settings. Although the findings were variable, all the participants were able to demonstrate generalization, by demonstrating job tasks learned during VSM sessions to actual situations at the job site. Recall that during performance observations, no instruction or feedback of any kind was provided. This is a welcomed finding that may support the continued exploration of VSM or the use of VSM interventions to supplement in-vivo training of job tasks in employment settings.

The third contribution of this study is that the variable outcomes suggest that there may be multiple influences on performance that must be considered beyond VSM training. The success of VSM interventions may be influenced by any number of the following factors: (a) previous experience with the job task; (b) task complexity; (c) participant’s work performance ability (e.g., level of independent work performance, level of prompt dependency); and (d) the clarity of the videos, each of which requires further investigation before statements can be made about the general effectiveness of VSM for chained tasks.

Although this study raises numerous questions for future investigations, the findings should be interpreted within the context of several potential limitations. First, the use of single opportunity probes during performance observations (Brown & Snell, 2011) may have underestimated participants’ performance. Because no remediation of task steps took place, the participants were not able to continue after making an error on a critical step, and thus the performance observation did not allow performance on all possible steps.

Second, the absence of corrective feedback during performance observation may have inevitably reinforced the participants’ incorrect responses or decreased the participants’ motivation to respond. This may have led to the participants requiring more instructional sessions to unlearn previous incorrect steps. Since corrective feedback was not immediately provided (i.e., the feedback was provided during the next instructional session), the effectiveness of the feedback may have been reduced (Barbetta, Heward, Bradley, & Miller, 1994).

Third, the lack of uniform means for controlling task difficulty across job tasks for each participant and across participants limits the interpretation of the results of the effectiveness of VSM. Because the participants worked, or received job training, in different employment settings, the targeted job tasks for each participant were job tasks relevant to each employment setting. While targeting these relevant job tasks for intervention was beneficial for the participants as it increased their job repertoire in their respective employment or job training settings, this variation in the targeted job tasks may have led to greater variability in task acquisition. It also made comparisons between job tasks for each participant difficult. Since different job tasks were chosen for each participant, replication of the research design across participants was not successfully conducted.

The use of VSM and video modeling for teaching chained task is emerging, but more investigation is needed before we can conclude with confidence for whom and what skills VSM and video modeling should be used. One potential avenue would be to standardize the task analysis across multiple participants, so that the effectiveness of VSM alone may be better examined by controlling tasks and video differences. Of course, this would not eliminate individual differences, but with control over task difficulty, effects on participant characteristics may be better illuminated.

Another approach for future research would be to examine the effectiveness of VSM with tasks of varying complexity to determine if VSM is more suited for certain tasks. Future researchers may want to examine the effectiveness of VSM for shorter tasks. Furthermore, instead of presenting the entire VSM video
for a longer task, several shorter video clips of a longer task could be presented to the individual with intellectual disability, to reduce the attentional and retentional demands on the individual. This area of research would be closely in line with, and would be guided by, current research in video prompting to teach chained task (e.g., Mechling & Stephens, 2009; Sigafos et al., 2005).

Future research should examine the effects of adding in-vivo feedback and prompting procedures in addition to VSM to determine if the in-vivo feedback and prompting has an additive component to VSM or if in-vivo training alone was sufficient for job task acquisition. This is important in order to develop an effective and efficient job skills training package for individuals with intellectual disability. Furthermore, this may determine if VSM videos enhance acquisition in any way thus, settling the issue of whether the additional resources spent on videotaping and video editing adds an additional instructional or cost benefit.

Another approach for future research is in determining whether the use of other models, instead of self, in the videos could lead to better outcomes. Current studies in this area have found that certain individuals perform better with VSM and others, video modeling (e.g., Cihak & Schrader, 2008; Van Laarhoven et al., 2009). This is an important area of future research, as it has to do with the cost effectiveness of the video intervention. If video modeling is found to be effective and preferred by individuals with intellectual disability for employment skills training, it may be more cost effective to produce a generic job task video for all individuals, instead of producing a different video of each individual.

In summary, as one of the first studies to explore the use of VSM for teaching chained tasks and its applicability for employment settings, this study provides some initial evidence that VSM can be effective, but at the same time, raises numerous issues ripe for future investigations. Clearly this study suggests that VSM alone has limited effectiveness, but it has the potential to promote the acquisition of job tasks, without in-vivo instruction, when used in combination with other instructional components. Future research is needed to investigate optimal conditions in which VSM may be effective and beneficial in the work place.

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Collaborative Training and Practice among Applied Behavior Analysts who Support Individuals with Autism Spectrum Disorder

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Abstract: Increasingly, practicing behavior analysts play an integral role as interdisciplinary team members to develop instructional programs for students with autism spectrum disorder. However, there is a lack of research on collaborative training and practice as it relates to professionals in the field of ABA. In this study, 302 behavioral professionals, 95% of whom worked with individuals with ASD, were surveyed regarding what training they received in collaboration, the type and extent of collaborative interactions with other professionals, variables they perceive to inhibit and facilitate collaboration, and the extent to which they view collaboration as a valuable component of their practice. Results indicate that while applied behavior analysts frequently collaborate with a variety of professionals and view collaboration as important, on average they received little or no formal training in collaboration, were more likely to provide than to adopt programming recommendations from professionals except for those with similar training, and reported lower ratings with respect to the experience and value of collaboration in their practice. Collectively, results highlight a need to increase collaborative training of practicing behavior analysts, particularly in relation to providing recommendations to and adopting recommendations from non-behavioral professionals, and to conduct research on modes of collaboration that lead to best outcomes.

Research shows that strategies incorporating the concepts and principles of applied behavior analysis (ABA) are consistently effective for teaching children with autism spectrum disorder (ASD) at a variety of ages and functioning levels (Levy, Mandell, & Shultz, 2009; Vismara & Rogers, 2010; Vírués-Ortega, 2010). In recent years, the field of ABA has grown to accommodate the need for qualified professionals to develop ABA programs in response to increasing numbers of children with ASD receiving special education services (Travers, Tincani, & Krezmien, 2011). One measure of the field’s growth is increasing membership in the Association for Behavior Analysis International (ABAI), the discipline’s flagship professional and scholarly organization. As of August 2010, the organization reported a membership of nearly 13,500 members, 5,800 in U.S. chapters and over 7,000 in non-U.S. chapters in 30 countries with an average annual growth rate of 6.5% over the past 10 years. The Behavior Analyst Certification Board (BACB), which has been credentialing Board Certified Behavior Analysts (BCBAs) and Board Certified Assistant Behavior Analysts (BCaBAs) since 1998, has also documented substantial growth. The number of certificants increased from approximately 500 in 2000 to nearly 6,000 in 2007 (Shook & Favell, 2008; Shook & Neisworth, 2005). Furthermore, a number of states have passed legislation to license behavior analysts to work primarily with consumers with ASD. As one example, Nevada Revised Statute Chapter 641 provides for applied behavior analysts who work with children with autism in that state to be licensed (Nevada Legislature, 2012). Seventeen states now have laws mandating insurance coverage for treatment of children with autism which includes ABA (National Conference of State Legislatures, 2011).

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Practicing behavior analysts are increasingly recognized as pivotal related services providers who serve on multidisciplinary teams to develop and evaluate special education programs for students with ASD in public schools (Boutot & Hume, 2010). This means helping general and special education teachers, related services providers, and administrators to imbed behavioral teaching techniques within inclusive settings. Consequently, collaboration is integral in upholding the Behavior Analyst Certification Board’s (BACB) Guidelines for Responsible Conduct (2010). For example, Guideline 2.04 (Consultation) states that, “when indicated and professionally appropriate, behavior analysts cooperate with other professionals in order to serve their clients effectively and appropriately.” To underscore the importance of collaboration in professional training, the BACB’s Third Edition Behavior Analyst Task List, Content Area 10–6, indicates that practicing behavior analysts should, “provide behavior analysis services in collaboration with others who support and/or provide services to one’s clients.”

It is evident that collaboration between practicing behavior analysts and professionals with whom they work is essential for effective behavioral programming in public education and other settings. Conversely, lack of successful collaboration may inhibit the educational team’s ability to develop and implement interventions with high fidelity. However, because the practice of ABA is a relatively new discipline that evolved separately from the mainstream fields of education and special education, research on collaboration as it specifically applies to ABA is lacking.

What is Collaboration?

There is no standard operational definition for collaboration (Noell & Witt, 1999), hence the construct is conceptualized differently across disciplines. In the field of special education, collaboration is emphasized as it relates to many activities (e.g., co-teaching, problem solving, and consultation) with a focus on the interaction between the general educator and special educator. Collaboration is suggested in the field to be an essential element in service delivery that results in improvement in student outcomes as well as teacher knowledge and skill (Caron & McLaughlin, 2002; Santangelo, 2009; Shannon & Bylsma, 2004).

In education more generally, collaboration is emphasized as it relates specifically to the activity of consultation with a focus on the interaction between consultant (e.g., school psychologist) and consultee (e.g., teacher). Collaboration is noted as a common characteristic of a variety of consultation models (e.g., mental health, organizational and systems, behavioral, and collaborative models) that result in desirable client outcomes (Heron & Harris, 2001). A common theme emerging from research on consultation is that a collaborative approach involving shared decision making between professionals leads to improved consumer outcomes (Hunt, Soto, Maier, & Doering, 2003; Hunt, Soto, Maier, Liboiron, & Bae, 2004; Kelleher, Riley-Tillman, & Power, 2008; Ray, Skinner, & Watson, 1999), although some studies show little difference between collaborative and direct consultation approaches (e.g., Ratzon et al., 2009; Wickstrom, Jones, LaFleur, & Witt, 1998).

One model of consultation, behavioral consultation, embraces a four-stage problem solving process in which numerous dimensions of collaboration are involved: problem identification, problem analysis, treatment implementation, and treatment evaluation (Bergan, 1977; Bergan & Kratochwill, 1990). This model has been distinguished from other models due to its rigor in regards to methodology (Sheridan, Welch, & Orme, 1996). In a literature review from 1985 to 1995 by Sheridan et al. (1996), behavioral consultation and its variants (e.g., conjoint behavioral consultation) produced the most consistent desirable results of the various consultation models in regards to client achievement and social behavior. Targets for improvement included clients’ behavioral (48%) and academic (33%) concerns followed by consultee skills (22%) and attitudes (15%), changes in referral patterns (13%), and other system-related concerns (4%). Various measures were used to assess consultation outcomes including direct observations, ratings, tests, and referrals (with 52% using multiple measures). Of all behavioral consultation outcomes reported, 89%
were in the positive direction. Conjoint behavioral consultation (a variant that parallels in practice to traditional behavioral consultation) further supports the use of a collaborative problem-solving approach to consultation across environments (Sheridan & Colton, 1994; Sheridan, Kratochwill, & Elliott, 1990; Galloway & Sheridan, 1994). A major goal of conjoint behavioral consultation is to facilitate parent-teacher communication and a shared responsibility in educational decision making (Sheridan & Colton, 1994). For example, Sheridan et al. (1990) found an increase in social initiations in both the home and school setting when both the parent and teacher were actively involved in the consultation process. In addition, Galloway and Sheridan investigated the effects of an intervention with and without conjoint behavior therapy and found that gains were greater when the consultation process was implemented with teachers and parents together. Findings also suggested greater treatment integrity, maintenance of gains, and greater consumer acceptability.

Despite the apparent importance of collaborative strategies as part of the consultation process in education, the field of applied behavior analysis has conducted only limited research on this construct. Studies in the field of applied behavior analysis that have applied “collaborative” strategies as part of an intervention have specified the elements of the intervention, but have not lead to conclusive results (Hundert & Hopkins, 1992; Putnam, Handler, Ramírez-Platt, & Luiselli, 2003). For example, in the Hundert and Hopkins study it was unclear which of three components (supervisory training, consultation by resource teachers with classroom teachers, or the collaborative planning process) increased teacher behavior toward children with disabilities. In addition, in the study by Putnam et al., a bus-riding program that decreased disruptive behaviors simultaneously applied collaborative procedures, applied the invention (positive reinforcement contingent on defined appropriate behaviors) to all students, and applied preventative strategies; therefore, no conclusion about collaboration’s influence on the outcome as a separate variable could be made.

While collaboration is regarded as an important component of practice in ABA, the degree to which behavioral professionals are trained in collaboration is poorly understood. Given substantial recent growth in the field and increasing numbers of behavioral professionals working on interdisciplinary teams serving individuals with ASD, more information is needed on the type and extent of collaborative training and collaborative practices among ABA practitioners. Therefore, the goal of this descriptive study is to survey behavioral professionals to identify (a) what, if any, training they have received in collaboration; (b) the type and extent of collaborative interactions with other professionals; (c) variables that facilitate and inhibit collaboration; and (d) the extent to which they view collaboration as a valuable component of their practice. It is hoped that this information will inform the training of practicing behavior analysts, and will provide preliminary descriptive information for subsequent studies on how to improve behavior analysts’ collaborative interactions, which will in turn lead to enhancements in consumer outcomes.

**Method**

**Participants**

Participants were recruited through membership in an affiliated chapter or special interest group (SIG) of the Association for Behavior Analysis International (ABAI). Criteria for eligibility to participate in the research as stated in the consent form included: (a) holding a certification and/or license related to the field of applied behavior analysis, education, or human services (e.g., behavior analyst, special education teacher, psychologist) and (b) holding a current position working directly with consumers in the field. Participants were not compensated for their participation.

Consent to distribute the survey was obtained through approval of the contact person of chapters and SIGs affiliated with ABAI. Recruitment for the study consisted of a telephone call by the first author to each contact person of the 39 United States associated chapters and four SIGs (i.e., Autism, Behavior Analyst Online, Positive Behavior Support, and Practitioner Issues in Behavior Analysis) affiliated with ABAI. Initial contact informa-
tion for each organization was obtained from the ABAI website (www.abainternational.org). If the person contacted was not responsible for decisions regarding research solicitations to be distributed to members, the contact person forwarded the solicitation email to the leadership of the organization, or the first author was provided with an e-mail and/or phone contact of the organization’s leader to seek permission to distribute the survey.

Following verbal agreement through telephone or email, the first author sent an email to the contact person containing information about the research with an embedded link to the consent form and survey. Contact persons consented by forwarding the email to all members and the first author to confirm participation. Responses for the survey were collected from September 28, 2010 through October 22, 2010 through SurveyMonkey™, a web-based, commercial survey tool.

The following 20 state and regional affiliated chapters of ABAI participated in the study: Alabama ABA, Behavior Analysis Association of Michigan, California ABA, Delaware Valley ABA, Four Corners ABA, Georgia ABA, Hawai’ian ABA, Iowa ABA, Lone Star ABA, Louisiana ABA, Maryland ABA, Minnesota Northland ABA, Nevada ABA, Oregon ABA, Pennsylvania ABA, South Carolina ABA, Tennessee ABA, Utah ABA, Virginia ABA, and Wisconsin ABA. The authors were not able to obtain information regarding the number of emails sent to members of each organization; therefore, an exact response rate could not be calculated. However, twenty of 44, or 45% of ABAI affiliated chapters distributed the survey, representing Northeast, Mid Atlantic, Southeast, Midwest, Southwest, and Northwest regions of the U.S.

In addition, the Behavior Analyst Online Special Interest Group (SIG) and Practitioner Issues in Behavior Analysis SIG were contacted to distribute the survey. The contact person of Practitioner Issues in Behavior Analysis SIG forwarded the survey to members of the following four special interest groups: Behavioral Medicine SIG, Crime, Delinquency, and Forensic Behavior Analysis SIG, Military and Veteran SIG, and Policy SIG. Therefore, the final sample consisted of respondents from 26 affiliated chapters and SIGs throughout the United States.

Approximately one week prior to the deadline stated for survey responses (October 22, 2010), a reminder email was sent to each organization or special interest group for the designated contact person to distribute. Reminder emails were only sent to those chapters and groups that had distributed the survey at least one week earlier.

**Measures**

**Content validation.** A questionnaire was used as the measurement instrument for this study. For the purpose of content validation, a pending version of the survey was first sent to nine doctoral-level professionals with expertise in applied behavior analysis and consultation. Five out of nine professionals assessed the survey items for accuracy in measuring the content (e.g., current collaborative behavior, variables that facilitate and inhibit collaborative behavior, and professionals’ perspectives on collaborative behavior). Criterion for keeping a survey item was agreement by three or more experts and no experts indicating the item should be removed. One out of five experts suggested three items for removal. Given suggestions for modification, the three items were revised rather than removed. All 23 survey items were retained in the final survey with 18 modified given suggestions for modification from experts in the field.

**Survey.** Prior to sending out the final survey to participants, the primary investigator piloted the survey through SurveyMonkey™ to assure that the settings and functions were operating effectively. Participants had the option to complete any, all, or none of the survey items as well as re-enter the survey to change answers or complete it at another time up until the stated deadline. Participants were not able to complete the survey twice from the same IP address. Participants were not required to record any potentially identifying information (e.g., email address) and encryption was added to transmit information privately over the Internet.

The survey was designed to take participants 10–15 minutes to complete. Prior to accessing the survey, a consent form was presented immediately upon clicking the hyperlink contained in the email sent to participants. Participants consented to the study by clicking
the “Next” button at the end of the consent form and were then granted access to the survey items. The survey comprised four sections: (a) demographics, (b) current collaborative behavior, (c) variables that inhibit and facilitate collaborative behavior, and (d) perspectives on collaborative behavior.

In the first section, demographics, respondents were asked to indicate their current position(s), highest degree, certification(s)/license(s), work setting(s), age range(s) of those being served, diagnoses of those being served, and number of college/university course credits and workshops/trainings with the word “collaboration” in the title or description. Participants responded to questions by clicking one or more boxes to the left of text answers when given the direction to check all that apply or responded by clicking one of the circles to the left of text answers when given the direction to check one. For five out of eight questions, participants were also given the opportunity to select an answer of “other” and insert text.

The second section, current collaborative behavior, defined collaboration for respondents before presenting the opportunity to respond to questions regarding the construct. Collaboration was defined as the following: “A component of consultation involving voluntary, interpersonal interactions comprising of two or more professionals engaging in communication modalities (face-to-face meetings, e-mail, alternate means of feedback, etc.) for the purposes of shared decision-making and problem solving toward a common goal. Collaboration results in changes to tasks and solutions that would not have been achieved in isolation” (adapted from Friend & Cook, 2010; Idol, Paolucci-Whitcomb, & Nevin, 1995). Respondents were asked to use this specific definition of collaboration to answer questions that followed. Participants were asked how often they collaborated with professionals, by what mode, to identify each of the professionals with whom they collaborated with on a routine basis, how likely they were to provide a behavioral programming recommendation to each of 12 specified professionals, and to consider the degree to which they agreed with statements regarding collaboration resulting in major, minor, or no changes to tasks and solutions. The 12 specified professionals were as follows: board certified behavior analyst (BCBA), board certified associate behavior analyst (BCaBA), non-certified behavior analyst, psychologist, school psychologist, general education teacher, special education teacher, occupational therapist (OT), physical therapist (PT), speech and language pathologist (SLP), administrator (principal, supervisor, director, etc.), and health care provider. Participants responded to questions in the same way as specified in the first section; however, participants rated the likelihood of providing and adopting a recommendation on a 5-point Likert-scale where 1 = very unlikely and 5 = very likely via clicking on the corresponding circle to the right of each specified profession. In addition, participants reported the degree to which they agreed with three statements concerning the results of collaborative interactions on a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree via a drop-down menu.

The third section, variables that inhibit and facilitate collaborative behavior, asked respondents the degree to which they agreed with six specified variables as inhibiting or facilitating the collaborative process for themselves and others. The variables measured were ideology, perspectives, training of self, training of others, current contingencies, and time. Participants responded using a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree via a drop-down menu. Using the same scale and response mode, respondents considered the degree to which they agreed with four statements regarding collaboration being modeled and expected throughout their internship and/or practicum experience and the degree to which they agreed with four statements regarding their perspective on collaboration as part of ethical responsibility and professional development. No “other” responses were made available for this section.

The final section, perspectives on collaborative behavior, asked participants to rate importance (the degree to which collaboration results in desirable outcomes and/or prevents undesirable outcomes), their experience (the quality of recommendations provided and ad-
opted), and the value (the degree to which the tasks and/or solutions have changed) of collaborating with each of 12 specified professionals. An “other” option and field to insert text were available for all three questions in this section. Participants responded using a 5-point Likert scale for importance where 1 = very unimportant and 5 = very important. A 5-point Likert-scale was used for responding for both experience and value where 1 = very unproductive and 5 = very productive and where 1 = no value at all and 5 = very valuable, respectively.

Responses were collected at the end of the survey by clicking the “Done” button at the end of the last section of the survey.

Results

Demographics

In total, 302 participants completed the survey. Over half of participants reported being a board certified behavior analyst (BCBA) (56%). Participants also reported holding the following positions: special educator (22%), non-certified behavior analyst (19%), higher education (17%), psychologist (16%), board certified associate behavior analyst (BCaBA) (6%), general educator (3%), and/or school psychologist (3%). In addition, most participants held a master’s degree (57%). Thirty percent of participants held a doctoral degree and 13% held a bachelors degree.

The largest group of participants worked in the public school (38%) or private home (36%) setting and served those diagnosed with autism spectrum disorder (95%) and/or intellectual disability (74%). Participants also reported serving those with attention deficit hyperactivity disorder (55%), emotional or behavioral disorder (54%), oppositional defiance disorder (42%), anxiety (41%), obsessive compulsive disorder (39%), and/or depression (36%). Participants also reported to be currently working in the university (27%), residential (25%), private school (21%), clinic/hospital (15%), supported employment (6%), and/or charter school (3%) settings. Most participants reported serving school aged children and youth 5 to 21 years old (67%) with a smaller group of participants reporting serving those 21 years old or older (45%) and 0 to 3 years old (32%).

Training in Collaboration

Overall, respondents reported little formal pre-service or in-service collaborative training as per the study’s definition. The majority of participants (67%) had taken 0 courses toward a degree and/or certification with the word “collaboration” in the title or course description. In addition, the largest group of participants (45%) had taken 0 workshops and/or trainings toward professional development units with the word “collaboration” in the title or description of the training or workshop. Participants were more likely to have attended at least one workshop or training (57%) than have taken at least one course (33%) on the topic of collaboration.

Conversely, participants moderately agreed that collaboration was modeled throughout their internship experience (M = 3.58, SD = 1.22). However, participants also modestly agreed that they would have appreciated more modeling of collaboration throughout (M = 3.26, SD = 1.25). On average, respondents disagreed that collaboration was expected but not modeled (M = 2.52, SD = 1.03) and that collaboration was neither expected nor modeled (M = 2.05, SD = 1.01).

Type and Extent of Collaborative Interactions with Other Professionals

In general, respondents indicated that collaborative interactions were a frequent part of their behavioral practice. The majority of participants (62%) reported that collaboration with other professionals occurred on a daily basis. Twenty three percent reported they collaborated on a weekly basis, 10% reported they collaborated on a bi-weekly basis, 2% reported they collaborated every other week, and 3% reported they collaborated on a monthly basis. The primary modes by which professionals reported they collaborated were face-to-face (98%), e-mail (91%), and phone (71%). 27% reported they collaborated via texting/instant messaging, 11% reported they collaborated via video chat, and 3% reported they collaborated via blogs. The majority of respondents collaborated with a BCBA (78%),
administrator (69%), special educator (63%), and/or speech language pathologist (55%) on a routine basis.

Overall, as shown in Figure 1, professionals reported that they were more likely to provide a behavioral programming recommendation to a professional ($M = 3.71$, $SD = 1.18$) than to adopt a behavioral programming recommendation from a professional ($M = 3.29$, $SD = 1.11$), $t(2337) = 15.5$, $p < .001$, $d = .37$. The exception to this was the BCBA. Participants were more likely to adopt a recommendation from the BCBA ($M = 4.31$, $SD = 1.12$) than to provide a recommendation to the BCBA ($M = 4.01$, $SD = .89$) $t(241) = -4.20$, $p < .001$, $d = -.50$. The degree of likelihood in providing ($M = 4.24$, $SD = 1.01$) versus adopting ($M = 3.31$, $SD = .99$) was the most pronounced for the special educator, $t(189) = 10.98$, $p < .001$. $d = .93$. Participants were least likely to adopt a recommendation from the physical therapist (PT) ($M = 2.90$, $SD = 1.11$), general education teacher ($M = 2.92$, $SD = .98$), occupational therapist (OT) ($M = 2.95$, $SD = 1.08$), and health care provider ($M = 2.97$, $SD = 1.13$).

BCBA responses for providing recommendations to versus adopting recommendations from other BCBA's compared to persons who are not BCBA's are illustrated in Figure 2.

Variables that Inhibit and Facilitate Collaborative Behavior

Participants were more likely to rate ideology, perspectives, training of self, training of others, contingencies, and time as inhibitors for others ($M = 3.57$, $SD = .68$) than for themselves ($M = 3.05$, $SD = .68$), $t(223) = -11.78$, $p < .001$, $d = -1.54$. BCBA's reported that they were more likely to provide a recommendation to another BCBA ($M = 4.26$, $SD = .96$) than to provide a recommendation to a non-BCBA ($M = 3.85$, $SD = .66$), $t(135) = 5.21$, $p < .001$, $d = .50$. BCBA's reported that they were substantially more likely to adopt a recommendation from another BCBA ($M = 4.24$, $SD = .87$) than to adopt a recommendation from a non-BCBA ($M = 3.16$, $SD = .69$), $t(133) = 14.83$, $p < .001$, $d = 1.38$. Participants agreed that collaborative interactions with other professionals resulted in minor changes to tasks and solutions ($M = 3.89$, $SD = .94$). However, participants were less likely to agree that collaboration resulted in major changes to tasks and solutions ($M = 3.52$, $SD = 1.02$). Participants disagreed that collaboration with other professionals resulted in no changes to tasks and solutions ($M = 2.04$, $SD = .97$).
Participants reported perspectives as possible inhibitors for others ($M = 3.19$, $SD = 1.09$), but not for themselves ($M = 2.16$, $SD = 1.27$), $t(222) = 11.51$, $p < .001$. $d = .87$, and reported training of self as a possible inhibitor for others ($M = 3.04$, $SD = 1.09$) but not for themselves ($M = 2.00$, $SD = 1.08$), $t(222) = 11.23$, $p < .001$. $d = .96$.

Participants were less likely to rate ideology, perspectives, training of self, training of others, contingencies, and time as facilitators for others ($M = 3.64$, $SD = .79$) than for themselves ($M = 3.84$, $SD = .70$), $t(217) = -4.94$, $p < .001$. $d = -.27$; however, in most instances differences in ratings were small.

**Extent to Which Participants View Collaboration as a Valuable Component of Practice**

Participants strongly agreed that collaboration is an ongoing process and part of ethical practice ($M = 4.62$, $SD = .60$) and that collaboration contributes to skill building and professional development ($M = 4.61$, $SD = .58$). Participants agreed, although less strongly, that collaboration is a training tool for non-certified practitioners ($M = 3.69$, $SD = 1.27$). Respondents disagreed that collaboration is only necessary when one is not able to solve a problem on his or her own ($M = 1.86$, $SD = .83$).

Finally, participants rated the importance (the degree to which collaboration results in desirable outcomes and/or prevents undesirable outcomes) of collaborating with other professionals higher ($M = 4.00$, $SD = .86$) than ratings of the experience ($M = 3.22$, $SD = .76$), $t(238) = 11.89$, $p < .001$. $d = .96$ or value ($M = 3.02$, $SD = .86$), $t(256) = 15.54$, $p < .001$. $d = 1.14$ of collaborating with other professionals. Importance of collaborating with each professional was rated greater than experience or value of collaborating with each professional with the exception of the BCBA and BCaBA.

**Discussion**

The goal of this survey of behavioral professionals was to identify (a) what, if any, training behavioral professionals have received in collaboration; (b) the type and extent of collaborative interactions with other professionals; (c) variables that facilitate and inhibit collaboration; and (d) the extent to which behavioral professionals view collaboration as a valuable component of their practice.

The majority of participants had little to no formal training in the area of collaboration as indicated by survey responses. Sixty seven percent reported no coursework with collaboration in the title or description and 45% reported attending no workshops with collabor-
oration in the title or description. This indicates an overall lack of college and university coursework addressing collaboration as a content area, even though 62% of respondents reported collaborating with other professionals on at least a daily basis. Furthermore, collaborative skills are required as part of the task list by the BACB to obtain certification as a BCBA or BCaBA (Content Area #10: Systems Support: 10–6 “Provide behavior analysis services in collaboration with others who support and/or provide services to one’s clients.”). Therefore, this finding highlights a possible need to increase collaborative coursework for professionals practicing in the field. Respondents were more likely to have attended at least one training or workshop on collaboration (57%) than have taken at least one course (33%). This suggests that professional development providers are allocating relatively more workshops on collaboration; however, both pre-service and in-service training on collaboration appears to be lacking.

Participants moderately agreed that collaboration was modeled throughout their practicum experience ($M = 3.58$), suggesting that collaborative interactions may have been formally or informally taught during field experiences. However, they also modestly agreed that they would have appreciated more modeling on collaboration ($M = 3.26$). This result indicates that many professionals view collaboration as an intrinsic part of behavioral practice, but would appreciate more modeling of collaboration as part of their training. As the majority of participants reported that they collaborated on a daily basis, it is evident that practitioners are being required to collaborate often as part of service delivery to consumers. Given that respondents were most likely to collaborate on a routine basis with the BCBA, administrator, special education teacher, and speech and language pathologist, this highlights the need for collaboration as a skill set especially among these individuals. Successful collaboration with administrators is especially important given that administrators’ granting or restricting resources may affect the success of interventions (Santangelo, 2009).

Overall, as reflected in Figure 1, respondents (with the exception of the BCBA) were consistently more likely to provide ($M = 3.71$) than to adopt ($M = 3.29$) behavioral programming recommendations from other professionals. In general, these data suggest that collaboration among practicing behavior analysts and non-behavioral professionals is a unidirectional process, in which behavior analysts provide recommendations with or without team input. This finding is unsurprising given that behaviorally trained professionals tend to have more expertise in behavioral procedures than those from traditionally non-behavioral disciplines (e.g., general education). However, most noteworthy is the degree of difference between providing to (likely) and adopting from (less likely) the special educator. Research indicates that behavioral interventions developed without teacher input may not be implemented, may be implemented inaccurately, or may be abandoned prematurely (Peck, Killen, & Baumgart, 1989). Involvement of those who will implement the intervention in its development may be an important factor in whether the recommended intervention is actually implemented (Burgio, Whitman, & Reid, 1983). In addition, low ratings for the degree of likelihood of adoption of recommendations from the physical therapist, general educator, and occupational therapist, indicate that collaboration is occurring at lower levels across these professionals and their respective areas, at least in terms of behavioral programming recommendations. As individualized educational programs (IEPs) for students with disabilities require coordination of services across multiple service providers and team decision making, this could have deleterious effects with respect to student achievement when teamwork among these professionals is required.

On the other hand, there may be consultative situations in which a collaborative-directive approach is most beneficial (Tysinger, Tysinger, & Diamanduros, 2009). A collaborative-directive approach is one in which the consultant (e.g., BCBA) employs shared decision making and respects others’ rights to reject interventions, while making prescriptive recommendations where appropriate. For instance, a BCBA might allow the special education teacher to select behavior targets for intervention and accept input on which interventions are most feasible given the teacher’s skills, classroom resources, and
time constraints (Tincani, 2007), yet prescribe specific strategies that are supported by empirical evidence (e.g., story-based intervention package) and not others (e.g., facilitated communication) (National Autism Center, 2009).

On average, BCAs were more likely to provide and to adopt recommendations from other BCAs than non-BCAs. Most noteworthy is the difference between the likelihood of adopting from a BCBA (M = 4.24) versus a non-BCBA (M = 3.16). This finding is not surprising given that participants were more likely to provide than to adopt recommendations from professionals in other disciplines, generally. However, it suggests that when BCAs are working with a professional with similar behavioral expertise, they are more likely to incorporate his or her recommendations into practice.

One survey question asked respondents directly about outcomes of collaboration (i.e., to what degree does collaboration result in major, minor, or no changes in tasks and solutions). Although most disagreed with the statement collaboration results in no changes (M = 2.04), they did not agree strongly that collaboration resulted in major (M = 3.52) or minor changes (M = 3.89). The generally neutral response to this item may indicate that professionals may view their efforts as “collaboration” even when such efforts result in no changes to approaches or interventions, suggesting that the functional definition of collaboration per this study’s definition (that which results in changes to tasks and solutions) is not being implemented in actual practice.

On average, participants felt more strongly that ideology, perspectives, training, contingencies, and time were inhibitors for others (M = 3.57) than themselves (M = 3.05). While speculative, in situations where collaboration does not result in positive consumer outcomes, this finding illustrates a possible, “It’s not my problem; it’s theirs” perspective among behavioral professionals. In other words, they may be more likely to attribute lack of a successful collaborative outcome to skill deficits of the consultee, rather than a collective failure of the collaborative interaction. Collaboration (as an aspect of consultation) is a skill that requires persons to elicit responses from others and initiate the problem-solving process (i.e., identify the problem) (Bergan & Tombari, 1975). In addition, the other party specifies what the problem is and plays a major role in the development and implementation of solutions. Bergan and Tombari found that lack of consultant skill (e.g., interviewing) was likely associated with the failure to initiate the problem-solving process (i.e., starting with identifying the problem). This supports a call for more training in the area of collaboration as a bi-directional process to better serve consumers and promote successful outcomes.

Overall, participants strongly agreed with the statement that collaboration is ongoing and part of ethical practice (M = 4.62), indicating that participants do not have a resistance to addressing better collaboration methods and approaches as part of ethical practice. Respondents also rated the importance of collaboration with other professionals as important (M = 4.07), furthering the argument that participants view collaboration as part of best practice. However, although participants rated collaboration with other professionals as important, they did not indicate that the use of collaboration gained them much when used (experience) or that it had dramatic results when applied (value) when interacting with professionals other than the BCBA, BCaBA, and non-certified behavior analyst.

**Limitations**

There are three limitations of this study. The first limitation is that the survey is an indirect measure of professionals’ collaboration. It is unclear to what extent the reports reflect actual practice. While collaboration was defined for respondents as, “a component of consultation involving voluntary, interpersonal interactions comprising of two or more professionals engaging in communication modalities for the purposes of shared decision-making and problem solving toward a common goal and resulting in changes to tasks and solutions that would not have been achieved in isolation” (adapted from Friend & Cook, 2010; Idol et al., 1995), it is possible that participants responded differently based their own subjective definitions of collaboration. Related, the survey did not evaluate respondents’ specific collaborative behaviors. For instance, while the
survey asked respondents to rate the likelihood of adopting recommendations from other professionals, it did not ask them to define how they would adopt a recommendation (e.g., seek input on target behaviors, modify an intervention to meet another professional’s preferences). Finally, it is unclear how well this sample represents that larger sample of professionals working in the field of applied behavior analysis. While the survey sample (302 respondents) is relatively large and was recruited from organizations representing all major demographic regions of the U.S., the recruitment procedures did not allow the researchers to establish the number of non-responders, introducing the possibility of sampling bias in the survey (i.e., those who chose to participate responded in a manner unrepresentative of the target population). It is therefore possible that only participants with favorable views of collaboration took the time and effort to complete the survey.

*Future Directions*

Given the frequency with which behavioral professionals collaborate and the dearth of research on modes of collaboration that lead to best outcomes, an important direction for future research is to explore effects of collaborative strategies on professional’s adoption of behavioral interventions (i.e., treatment integrity) and changes in consumer’s target behaviors. Specifically, researchers could compare effects of directive versus collaborative consultation on critical outcome variables. Importantly, most of the survey’s respondents reported little to no formal collaborative training. Given the apparent importance of collaboration for practicing behavior analysts, future research should examine the most effective ways to teach collaboration skills, including the array of professionals identified in the current study, and to explore modes of collaboration that incorporate technology (e.g., email, video-based) beyond traditional face-to-face interaction formats.

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Impact of Online Training Videos on the Implementation of Mand Training by Three Elementary School Paraprofessionals

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Abstract: With the number of students with autism and related developmental disabilities increasing and a lack of trained professionals, solutions are needed to provide training on a large scale. Alternative training approaches need to be developed so that paraprofessionals can access training in an efficient and effective way. One such possibility is online training. A multiple baseline design across participants was used to evaluate the impact of online training videos (OTV) on the implementation of mand training with three paraprofessionals in a public school setting. The three paraprofessionals were of Hawaiian ancestry, ages 32, 34, and 42 years. Three elementary aged students with autism and developmental disabilities also participated in the study. They were ages, 6, 8, and 10 years, and also of Hawaiian ancestry. All participants lived in a rural area of Hawaii. After the OTVs, the percentage of correct implementation of mand training increased for all paraprofessional participants and maintained over time. Improvements in accurate teaching were also accompanied by increases in the rate of spontaneous manding by the students. Results support the use of online training as an effective alternative to inservice training for paraprofessionals.

The number of children diagnosed with autism spectrum disorders (ASD) served under the Individuals with Disabilities Education Act (IDEA) has increased by more than 500% in the last decade (United States Government Accountability Office, 2005). Over the past 20 years, there has been an increase of 123% in the number of paraprofessionals employed in the educational system to help meet that need (Legislative Review & Investigations Committee 2006). Unfortunately, the number of students with disabilities served under IDEA is growing at a greater rate than the growth of trained staff (United States Department of Education, 2000).

Many of the services provided to students with ASD in public schools are delivered by paraprofessionals. Despite this fact, a scarcity of research exists evaluating the effectiveness of paraprofessionals in improving outcomes for children with disabilities, including students with ASD (Marks, Schrader, & Levine, 1999; Young, Simpson, Myles, & Kamps, 1997). Many paraprofessionals are not adequately trained in evidence-based interventions to support children with disabilities. Rural areas experience increased challenges in providing training opportunities for paraprofessionals (Pickett & Gerlach, 2003). When training is available, it’s usually unstructured and not competency based (Pickett & Gerlach, 2003).

The methods of applied behavior analysis (ABA) have been demonstrated to have positive effects in teaching individuals with disabilities over the last 40 years (Eldevik et al., 2009; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005). In 2010, the National Autism Center conducted the National Standards Project and produced a set of standards for effective, research-validated education and behavioral intervention for children with ASD. The overwhelming majority of established interventions identified was developed in the behavioral literature and demonstrated the application of ABA procedures.

An important aspect of ABA interventions is the implementation of mand training procedures. Mand training is a technique used to...
Teaching mands (requests) is a pivotal goal in most treatment plans for students with autism (Sundberg & Michael, 2001). Teaching students to mand for items/activities has many benefits. For students with autism and related disabilities, mand training has been effective in decreasing problem behaviors such as self-injury and aggression (Carr & Durand, 1985; Winborn, Wacker, Richman, Asmus, & Geier, 2002), increasing vocabulary and spontaneous speech (Arntzen & Almas, 2002; Knapczyk, 1989), and increasing social interactions with parents, teachers, and peers (Sundberg, Loeb, Hale, & Eigenheer, 2002). A limited number of staff trained in implementing ABA and/or mand training may result in limited opportunities for learning valuable communication and social skills (Lerman, Vorndran, Addison, & Kuhn, 2004).

Research has demonstrated ways to successfully train staff in mand training procedures. Laski, Charlop, and Schreibman (1988) demonstrated that discussion, modeling, and in vivo coaching was effective in promoting mand training among staff and parents, however, lengthy instructions were required. In 2010, Nigro-Bruzzi and Sturmy used behavioral skills training (BST) to train staff to implement mand training with students with autism. The training consisted of 30 to 60 min sessions of instructions, video modeling, role-play rehearsal, and performance feedback. Training resulted in increases in staff performance in mand training and in unprompted mands by children. Although effective, each trainee required one-to-one time with an experienced behavior analyst, which may not be possible in many situations.

Online training in ABA principles, including video demonstrations of procedures being implemented, might be one solution to overcoming the barriers associated with paraprofessional training and professional development. Online training and education has been found to be effective in many disciplines, including business, health care, computer science, and medicine (Ruiz, Mintzer, & Leipzig, 2006; U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, 2009). Online training offers learners control over the learning sequence and pace of instruction, allowing them to tailor their experiences to meet their personal learning objectives.

One study investigated the use of an online training tool in the field of ABA and autism. Granpeesheh et al. (2009) examined the effectiveness of an online training tool to teach the academic knowledge of ABA treatment for children with autism with a group of newly hired service providers. This online training presented the information through text, voice-over, and occasional video clips. Performance of participants who received e-learning training was compared to the performance of a group who received traditional classroom training. Results showed knowledge of ABA principles and procedures increased substantially for both groups, suggesting that e-learning can be similarly successful at teaching foundational concepts as traditional classroom training. One question that this study did not address was whether the online training affected the quality of the clinicians’ implementation of the principles when actually teaching students. The current research study evaluated the impact of online videos on the direct application of ABA principles in the classroom.

The purpose of this single-subject study was to evaluate the impact of online training videos (OTV) on paraprofessionals’ use of mand training procedures with students with ASD and related disabilities within a special education setting. We also examined the impact of the online training on the students’ frequency of mands (requests).

**Method**

**Setting and Participants**

The setting for this study was a special education classroom on a public elementary school campus in a rural part of Hawaii. A special education teacher supervised the classroom, including five educational aids/paraprofessionals. The classroom had nine students (ages 6 to 10 years) coming and going throughout the day. There were two large tables for group instruction and six partitioned desks for one-to-one instruction. There was also a computer area, play area with toys and books, and a sensory area with therapy balls and sand/water table.
**Staff participants.** The three participants, Autumn, Rebecca, and Molly were female, of Hawaiian ancestry, and ages 26, 34, and 46 years, respectively. Rebecca and Molly had a high school diploma and Autumn had bachelor’s degree in business. None of the participants had had any previous training in ABA or mand procedures. Each participant worked one-to-one with a student who attended at least part-day in the special education classroom.

**Student participants.** Three elementary special education students participated in the study. All student participants had goals on their individualized education plan (IEP) that specifically focused on increasing requests/mands. Ezra was a 6-year-old boy with autism and of Hawaiian ancestry. Ezra participated part-day in a special education first grade classroom with supports. Although Ezra used sentences to communicate, he engaged in limited mands with teachers and peers. Ezra also had problem behaviors that included running away, task refusal, and hitting others. Autumn worked with Ezra.

Adam was an 8-year-old boy with developmental delays who was of Hawaiian ancestry. Adam also spent part of his day in a special education classroom. He demonstrated moderately good social skills with adults and peers. He had language delays and unintelligible speech. Molly worked with Adam.

Maile, a 10-year-old girl with developmental delays who was of Hawaiian ancestry, participated part-day in a special education classroom. Although Maile used speech to communicate, her language was delayed, she used short phrases, and her speech was difficult for others to understand. Rebecca worked with Maile.

**Paraprofessional Behavior Definitions**

Implementation of mand training procedures by the paraprofessionals was operationally defined as the participants’ application of the following component skills with his or her student:

1. “Sanitize” the environment: The paraprofessional blocks access to or removes motivating items/activities, keeping them out of reach while leaving these items or activities in view for the student to see.
2. Prompt/require mand: The paraprofessional requires a mand or provides a prompt for a mand before motivation decreases (i.e., before the student moves away/looks away from the item).
3. Reinforce: The paraprofessional gives the student the desired item/activity within 3 sec of a student’s mand.

**Student Behavior Definitions**

The student’s behavior being observed was spontaneous mands. A spontaneous mand was defined as any verbal utterance/word that resulted in obtaining an item/activity.

**Observation Procedures and Interobserver Agreement**

All sessions were observed in the classroom during one-to-one instruction with the paraprofessional-student participant dyad for 15 min per session. Data were collected alternately for paraprofessional and student using partial interval recording. The 15-min observation was broken into thirty, 30-sec intervals. If a component skill (sanitize the environment, require mand/prompt, or reinforce) for the paraprofessional occurred within the 30-sec interval, the interval for that component skill was scored “yes.” If the component skills did not occur within the interval, the interval was scored “no.” The percentage of occurrences over total intervals was graphed for all components for the paraprofessional.

Student data were collected using partial interval recording as well. If a spontaneous mand occurred with the 30-sec interval, the interval was scored “yes.” If no spontaneous mand(s) occurred with in the 30-sec interval, the interval was scored “no.” The percentage of occurrences over total intervals was graphed for student percentage of spontaneous mands.

Before the study began, a second observer was trained in data collection methods by reviewing the definitions of the dependent measures and practicing identifying the behavior in prerecorded videos of mand training with nonparticipants. The second observer was a paid research assistant with a Master’s degree.
in Education. The second observer and the researcher practiced data collection with videos until interobserver reliability agreement of 80% or better across three observation sessions was achieved. The second observer independently collected data on the dependent measures 41% of the sessions. For each skill component and spontaneous mands, the observer’s records were compared to the first observer’s records to determine agreement on the occurrence or nonoccurrence of responses. The total number of agreements plus disagreements was divided by the number of agreements and the quotient was multiplied by 100% to obtain the percentage of interobserver agreement for each session (Kennedy, 2005, p. 114). The second observer independently collected data on the participant and student behavior during 53%, 38%, and 31% of the sessions for Rebecca, Autumn, and Molly, and their students respectively. Interobserver agreement averaged 84% for the paraprofessionals’ data and 84% for the students’ data across all sessions (see Table 1).

**Experimental Design**

A multiple baseline design across participants was utilized because the intervention was knowledge-based and could not be reversed. To determine a functional relation between the dependent variable and the independent variable, data were collected on the accuracy of the implementation of mand training and the frequency of mands used by the participating students during baseline and post-intervention conditions.

**Experimental Conditions**

**Baseline.** During baseline, the paraprofessionals were observed working with their students during one-to-one instruction for 15 min each. The participants were told to do what they would normally be doing during that one-to-one time with their student. Typical one-to-one activities during observation times included art activities, math lessons, toy play, and worksheets. Dependent measures of mand training (sanitize the environment, prompt/require mand, and reinforce) and student spontaneous mands were recorded as described above. Baseline sessions continued until there were stable and level data.

**Intervention.** Once baseline data were stable for the first paraprofessional participant, access to the OTV was given. The OTV intervention consisted of: a) a pretest of 20 questions to determine a baseline of knowledge; b) 18, 2 to 6 min high-definition, documentary-style videos with classroom demonstrations, studio produced voice-over, and supporting graphics and text (Autism Training Solutions, 2010); c) a competency check following each 2 to 6 min video; d) a post-test (identical to the pre-test); e) a certificate of completion for participants achieving 88% accuracy on the post-test; f) a return to a specific point in the training program where the participant didn’t demonstrate mastery followed by a re-
peat of the post-test; and g) a self-evaluation checklist to self-monitor the use of mand-training procedures during classroom application of mand training (Carbone, Zecchin, & O’Brien, 2009). The videos showed teachers using the methods within classroom settings. They also showed teachers implementing the intervention in several different ways. Teachers were given a timeframe (3–4 days) to complete OTV. Once a participant completed OTV and met criterion (88% accuracy) on an associated post-test, she was directed to download and print a self-management checklist of the mand training procedures. She was told to use this in subsequent classroom teaching sessions to self-evaluate in the application of mand training. These procedures were the same for all participants.

Molly went through the modules twice and was not able to meet criterion on either post-test with 88% accuracy. Although she received a score of 50% on the post test score in *Introduction to Verbal Behavior* and 74% on the post-test of *Mand Training*, the researchers moved her into the post-intervention condition because she had taken the OTV course twice. Autumn met criterion on the post-tests on *Introduction to Verbal Behavior* and *Mand Training* with 95% and 89% accuracy, respectively; and Rebecca passed the post-tests with 89% and 89% accuracy, respectively. Both Autumn and Rebecca took the post-test once. The sessions thereafter were considered post-intervention sessions.

**Post-Intervention.** Post-intervention data were collected in the same way that data were collected during baseline. Follow-up sessions were recorded 5 and 8 weeks after the post-intervention condition to see if effects maintained.

**Results**

Figure 1 presents the percentage of intervals with correct implementation of mand training components pre- and post-training. Rebecca’s baseline was somewhat stable with scores of 0%, 23%, and 0% with a mean of 8%. Maile’s spontaneous mands in baseline were 0%, 45%, and 0% with mean of 15%. Rebecca completed the OTV in 2 days and reported that she spent about five hours completing the online training. Immediately after training Rebecca’s data jumped from 0% to 42%. Rebecca’s data followed an upward trend across all post-training sessions. This was also reflected in her self-evaluation scores that increased from 8% to 100%. There was no immediate effect in Maile’s data for spontaneous mands but her data followed an increasing trend with variability ranging from 6% to 73%.

Autumn’s baseline scores showed variability with an initial high score of 80% and an immediate decrease to 10% and 0% (see Figure 1). Ezra’s spontaneous mands also had an initial high score of 80%, and then dropped to 65% and 0%. Both paraprofessional and student data showed a dramatic downward trend in baseline. Autumn completed the online training across 3 days, 1 day at school and the other 2 at her home over a weekend. She reported that the training took her about three hours. Autumn’s score jumped from 0% in baseline to 86% immediately after intervention. Her self-evaluation scores increased from 33% to 69% across post-intervention sessions. After 4 sessions of stable data, there was some variability and decrease in her scores, which subsequently increased and maintained in follow-up sessions. Ezra’s data closely mimicked Autumn’s data, with an immediate change from 0% to 93% after intervention. Ezra’s data also showed similar variability and inconsistency mirroring Autumn’s data, with a final increase to the 90–100% range. Baseline data overlapped with post training data for both paraprofessional and student.

Molly’s baseline remained fairly stable with scores between 0%–25% across nine sessions (see Figure 1). Adam’s spontaneous mands remained low in baseline ranging from 0–45% with a mean of 18%. Molly participated in the OTV across 6 days during and directly after the school day. Molly reported that the training took her about eight hours because she had to go back and review modules when she didn’t meet criterion. She never met the criterion of 88% after viewing the training twice, however, she was advanced to the post-intervention condition of the study. In the post-intervention condition, Molly’s data immediately jumped from 18% to 53% (see Figure 1). Subsequent sessions displayed a higher level of performance with a mean of 50% and a subtle increasing trend. Adam’s
manding also immediately jumped from 0% to a 50% and followed a similar level and trend as Molly’s data. Adam’s post-intervention mean was 54%. Both Molly and Adam’s data remained stable into the follow-up session.

**Discussion**

Overall, OTV combined with the self-management checklist seemed to have functional control over the paraprofessionals’ implementation of mand training procedures. OTV
seemed to increase the use of mand training components during observed one-to-one sessions. As a result, the degree to which the paraprofessionals were using mand training procedures seemed to be directly related to the percentage of intervals the students were spontaneously manding. In other words, the students’ manding behaviors increased when the paraprofessionals were implementing the components of mand training (sanitizing the environment, prompting/requiring mand, and reinforcing).

Before intervention, Rebecca interacted with Maile by asking her many questions about pictures and objects during one-on-one teaching sessions (What is this? Can you draw with crayons?). Rebecca also gave her a lot of directions (“Show me the big one”). After intervention, Rebecca continued to ask her questions and give directions, but she also started using the components of mand training (sanitizing the environment, prompting/requiring mands before giving items to students, and reinforcing mands immediately). Rebecca reported that after intervention, it took time and practice to implement mand training procedures because she wasn’t sure what Maile would be motivated enough to mand for.

Autumn’s baseline scores showed variability with an initial high score of 80% and an immediate decrease to 10% and 0%. This initial high score might have been the result of reactivity. For example, before the initial observation, the lead teacher, who had some training in teaching mands, mistakenly told Autumn that she was being observed and should provide opportunities for Ezra to make requests. This may be the cause of the initial high percentage of mands and mand training component skills. She was then told to do what she normally does during that one-to-one instruction time. Subsequent baseline sessions showed a decrease in mands.

After Autumn completed OTV, her implementation scores immediately increased and maintained for 4 sessions and then decreased significantly. On the day both Autumn and Ezra’s scores decreased, Autumn and the classroom teacher reported that due to an issue in the home, Ezra was not responding to instruction, and participating less in activities that he normally enjoyed. During sessions 9 and 10, Ezra engaged in several tantrums. It’s important to note that Autumn and the other paraprofessionals hadn’t had any training in behavior management. Thus when Ezra’s problem behaviors increased, Autumn may not have been able to implement mand training effectively. Unfortunately, stable data were not achieved in the post-intervention phase.

Molly viewed the trainings two times and wasn’t able to meet the criterion of 88% accuracy. She consistently missed the same components of mand training, which were to prompt the mand and immediately reinforce. The change in level of data was mostly due to her increased ability to sanitize the environment. This one step of mand training was able to make a significant difference in implementation and Adam’s number of spontaneous mands. Adam’s mands closely mimicked Molly’s data, suggesting a relationship between the mand training and spontaneous mands.

**Limitations**

The first limitation is that individuals who don’t have experience using online technologies may be resistant to adopting this method of training. One of our initial participants, who was in her sixties and had little experience with computers, dropped out of the study once the online training was introduced to her. She had difficulty navigating and logging into the system and reported that the training was “stressful” for her. Another limitation that was uncovered was the school’s inability to provide time to complete the training. Participants had to complete the training outside of worktime. The school system also did not provide any incentives for the paraprofessionals to complete trainings or increase their skills. The classroom teacher expressed interest in continuing to use online staff training, but even when the training was offered free of charge, he wasn’t sure how to get the staff to complete training without compensation. If online trainings are adopted in the schools, schools may need to reallocate some of the cost-savings into providing incentives for the paraprofessionals to complete trainings on their own time.

A theoretical limitation is that there is a lack of literature that provides examples of an operational definition for a mand. One of the
defining characteristics of a mand is that there must be a motivation or motivating operation present before the verbal behavior occurs (Sundberg, Loeb, Hale & Eigenheer, 2002). Since motivation is not easily observed, it was not part of this study’s operational definition of a mand. After reexamination, more careful consideration of including an operational definition of motivation may be needed in future studies of mands. Students may evoke mands but not access to the item or activity they requested. In turn, this may have limited the frequency of true mands being recorded.

Recommendations for Future Research

One of the limitations of greatest significance within this study was the degree to which the findings can be generalized. External validity will need to be addressed in future studies. Because the study was a single-subject, multiple baseline design across participants design, this study suggests that OTV was effective for the paraprofessionals who participated in the study. Additional replication studies should be conducted to determine if there would be similar results with other populations. Other topics related to the outcomes of professional development and the outcomes of student learning as a direct result should be investigated.

The intervention in this study was a treatment package and did not include a component analysis to determine the effectiveness of OTV without the self-evaluation checklist. Substantial research indicates that self-monitoring/self-evaluation strategies are powerful interventions in their own right (c.f., Allen & Blackston, 2003; Plavnick, Ferreri, & Maupin, 2010; Richman, Riordan, Reiss, Pyles, & Bailey, 1988). It would be useful to know if the results of the study would have been similar without the self-evaluation checklists.

More research is needed across other populations and other teaching methods to assess whether online training is an effective training tool for paraprofessionals. Will paraprofessionals perform better with a blended approach of OTVs and in-vivo coaching? Would paraprofessionals perform better if they had training initially in behavior management before learning teaching procedures? What ratio of online learning and in-vivo coaching is most effective? Would other online technology features, such as social media and forums, increase the effectiveness and positive attitudes of online training?

Conclusions

Although the majority of research indicates that classroom lecture and workshop-style inservice training have little impact on paraprofessional performance (Lamb, 1993), schools continue to rely heavily on this method of training. Training methods that have been found to be effective, such as on-the-job coaching, video modeling, and verbal feedback (Van Oorsouw, Petri, Embregts, Bosman & Jahoda, 2009) are difficult for schools to implement due to lack of resources and available trainers (Lerman, Vorndran, Addison, & Kuhn, 2004). Online training can be offered to teachers and paraprofessionals in a cost-effective and efficient manner outside of the school day. It is self-paced and customized to meet individuals’ needs. Consequently, it may be a viable alternative to traditional workshops and inservice training. It also provides paraprofessionals and teachers the foundational knowledge to maximize the time they are able to spend with behavioral specialists who collaborate with them and provide on-the-job coaching. This study is the first study that investigated the application of knowledge gained from online professional development in the field of special education and may set the stage for future research.

In spite of the limitations, online training was shown to be an effective tool in training these paraprofessionals to implement mand training procedures. If the schools that implement online training understand the limitations and provide incentives for the teachers to complete the trainings, online training may offer a more efficient means by which paraprofessionals and teachers can be trained in evidenced-based interventions. While future research is clearly needed in the area, overall, it appears that OTVs, such as the one investigated in this study, have great potential.

References


Autism Training Solutions (Version 1.0) (online learning management system). Honolulu HI


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Born in the early 1900s in rural Idaho, James Castle was believed to be deaf, mute, illiterate and intellectually disabled. Never speaking, he nevertheless produced tens of thousands of artworks using such found materials as ink made from soot and saliva, pens fashioned from twigs or sticks, and canvases scavenged from scrap paper. Today his behavioral and communication characteristics would likely be interpreted as consistent with autism.

This Idaho Public Television-aired video documentary uses Castle’s art (drawings, constructions, books) and exclusive interviews with Castle’s childhood friends, family and art experts to tell his unique story, helping the viewer to see the world as it might be experienced by a gifted artist with autism.

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http://www.cec.sped.org/ScriptContent/Orders/ProductDetail.cfm?section=CEC_Store&pc=D5902

Package Price (book James Castle: His Life and Art and DVD Dream House)  
Member Price: $35.95  
Non Member Price: $39.95  
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Research-Based Practices in Developmental Disabilities

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When CEC’s Division on Developmental Disabilities published its landmark first edition of Best and Promising Practices in Developmental Disabilities in 1998, it quickly became a staple in the libraries of professionals working in the fields of cognitive disabilities/mental retardation, autism spectrum disorders, and associated developmental disabilities. Covering existing best practices in such arenas as assessment, curriculum development, and instructional strategies, that work quickly established itself as the premier publication of its kind.

Now this landmark publication is available in a greatly expanded second edition. Featuring contributions from some of the most notable names in developmental disabilities, the new Research-Based Practices in Developmental Disabilities—Second Edition provides current professional thought on such fundamental issues as the meaning of developmental disabilities, learning characteristics, assessment and instructional planning, and inclusive programs.

Present-day practitioners providing services to individuals with developmental disabilities are now required to implement best practices that are supported by research. This work answers the need of these practitioners for accessible and immediately practical information that reflects best practices as based in research.

The book is also designed to meet the needs of university personnel in special education teacher preparation programs. Each of the 29 chapters includes:
- Summary of chapter contents
- Learning outcomes
- Glossary of professional terminology
- Specific CEC Standards addressed in that chapter
- Web site resources

An accompanying Instructor’s Manual offers for each chapter a variety of useful supplements, including:
- Outline
- Extension Activities
- Exam questions and answers
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.
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.

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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.
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