Education and Training in Developmental Disabilities

Focusing on individuals with cognitive disabilities/mental retardation, autism, and related disabilities

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Education and Training in Developmental Disabilities

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Teaching students with moderate intellectual disabilities to read: An experimental examination of a comprehensive reading intervention. **Jill H. Allor**, Patricia Mathes, Kyle Roberts, Francesca Jones, and Tammi Champlin, Department of Teaching and Learning, Annette Caldwell Simmons School of Education and Human Development, Southern Methodist University, P.O. Box 750381, Dallas, TX 75275-0381.

Friendships with peers with severe disabilities: American and Iranian secondary students’ ideas about being a friend. Mohsen Shokoohi-Yekta and **Jo Hendrickson**, The Department of Teaching and Learning, N259 Lindquist Center, University of Iowa, Iowa City, IA 52242.

Effects of constant time delay procedure on the Halliwick’s method of swimming rotation skills for children with Autism. İlker Yılmaz, **Ferman Konukman**, Benyamin Birkan, Arzu Özen, Mehmet Yanardağ, and İlhan Çamursoy, The College at Brockport, State University of New York, Dept. of Physical Education & Sports, Brockport, NY 14420-2989.


Response cards: An effective intervention for students with disabilities. **Channon Horn**, Department of Special Education, 229 Taylor Education Building, University of Kentucky, Lexington, KY 40506-0001.

Characteristics and hypothesized functions of challenging behavior in a community-based sample. **Anna Ingeborg Petursdottir**, John W. Esch, Rachael A. Sautter, and Kelise K. Stewart, Department of Psychology, TCU Box 298920, Fort Worth, TX 76129.

Use of self-modeling static-picture prompts via a handheld computer to facilitate self-monitoring in the general education classroom. **David F. Cihak**, Rachel Wright, and Kevin M. Ayres, University of Tennessee, A412 Claxton Complex, Knoxville, TN 37996-3442.

Long-term outcomes of services in inclusive and self-contained settings for siblings with comparable significant disabilities. **Diane Lea Ryndak**, Terri Ward, Sandra Alper, Jill F. Storch, and Jennifer Wilson Montgomery, University of Florida, Department of Special Education, G315 Norman Hall, PO Box 117050, Gainesville, FL 32611-7050.


Examining the effects of a social communication intervention on the play behaviors of children with autism. **Jennifer Loncola Walberg** and Lesley A. Craig-Unkefer, DePaul University, School of Education, 2320 North Kenmore, Chicago, IL 60614-3250.

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Functional Curriculum Models for Secondary Students with Mild Mental Impairment

Emily C. Bouck
Purdue University

Abstract: This paper analyzed 10 commercially available functional curriculum models designed for secondary students with mild-to-moderate mental impairment. The models were examined with respect to the inclusion of functional curriculum components, the domains and subdomains of adulthood, the materials identified by the model to be used to deliver the curriculum, and the incorporation of best practices for teaching. Results indicate that none of the models reviewed adequately addressed the needs of this population for learning in terms of providing a functional curriculum. Overall, the analysis suggests that more appropriate curriculum models need to be developed, such as one that is designed to be balanced, comprehensive, and coherent for secondary students with mild mental impairment. In addition, more research is needed on functional curricula, including the components of this approach.

Following recent federal and state policies (i.e., No Child Left Behind [NCLB], 2002; Individuals with Disabilities Education Act [IDEA], 1997, 2004), the focus of special education has shifted from process to outcomes. It is now mandated that teachers of students with disabilities be held accountable for their students’ academic progress and outcomes. Thus, in this era of accountability and achievement, questions arise as to what should be the targeted outcomes for students with mild mental impairment and what educational programming best meets their needs at the secondary level in terms of successfully achieving post-school outcomes (Bouck, 2004, 2007). This article advocates for the use of a functional curriculum for secondary students with mild mental impairment, yet discusses limitations that may be imposed through implementation of the functional curriculum models currently available. It discusses issues teachers need to consider if they use or are considering a currently-available commercialized functional curriculum model.

Functional Curriculum

A functional curriculum is a curriculum designed to teach functional life skills, or in other words, the skills necessary to live, work, and have fun in an inclusive community (Brown et al., 1979; Falvey, 1989; Snell & Browder, 1987). Components of a functional, or life management, curriculum are presumed to include the functional skills and applications of core subject areas (academics), vocational education, community access, daily living, financial, independent living, transportation, social/relationships, and self-determination (Patton, Cronin, & Jairrels, 1997). A functional curriculum is utilized when students with disabilities are deemed to need assistance in the above-mentioned critical life skills areas, and when the educational experiences these students are receiving in schools through the general education curriculum fails to reflect the skills necessary for their post-school success (Bouck, 2004; Retish, Hitchings, Horvath, & Schmalle, 1991). While using a functional curriculum to educate secondary students with mild mental impairment may be at odds with current federal policy (i.e., NCLB, 2002; IDEA, 2004) (Bouck, 2009), the concerns about the post-school success, or lack thereof, by this population suggests that a curriculum focused on social skills, finances, vocational skills, and...
other life skills may be what these students need (Patton, Cronin, & Bassett, 1997). This is especially so considering the lack of positive post-school outcomes for students with mild mental impairment. The population is traditionally associated with low employment rates, low independent living rates, and difficulty adjusting to life after school (Blackorby & Wagner, 1996; Edgar & Polloway, 2004; Neubert, Moon, & Grigal, 2004; Wagner, Newman, Cameto, & Levine, 2005). Although recent data have suggested improvement in some post-school outcomes for secondary students with mild mental impairment (i.e., decreased dropout rates, increased employment rates, increased rates of independent living), an alternative, such as a functional curriculum, to providing the general education curriculum, which is focused on preparing students for high-stakes tests and rigorous higher education, needs to be examined for this population which has a statistically low post-secondary education rate (13.4% in 2003) but potential for meaningful post-school contributions outside of higher education (Wagner et al.).

Although calls for the use of functional curriculum to educate secondary students with mild mental impairment have been made (Bouck, 2004; Cronin, 1996; Dever & Knapczyk, 1997), the field of special education has not given enough deliberation to the curriculum models commercially available to implement such an approach. This study explored and reviewed commercially available functional curriculum models targeted towards educating secondary students with mild mental impairment (i.e., marketed towards students with “mild” to “moderate” disabilities). While students with mild mental impairment were the target population, the curriculum models examined included ones that were geared towards students with moderate disabilities, given the position that mild mental impairment is not a “mild” disability (see Polloway, 2004). Specifically, this study sought to explore functional curriculum model options that exist at the secondary level and consider if these models are appropriate in terms of serving the needs of secondary students with mild mental impairment and supporting teachers who elect to implement a particular model.

Method

Materials

Ten commercially available functional curriculum models were reviewed: The Syracuse Community-Reference Guide (Ford et al., 1989); Functional Independence Skills Handbook (Killion, 2003); Impact: A Functional Curriculum Handbook (Neel & Billingsley, 1989); Community-Based Curriculum (Falvey, 1989); Functional Curriculum for Teaching Students with Disabilities (Bender, Valletutti, Baglin, & Hoffnung, 1996); Life Skills Instruction for All Students with Special Needs (Cronin & Patton, 1993); Functional Curriculum for Elementary, Middle, and Secondary Students with Special Needs (Wehman & Kregel, 2004); Life Skills Activities for Secondary Students with Special Needs (Mannix, 1995); Adaptive Living Skills Curriculum (Anderson, Bruininks, Morreale, & Gilman, 1991); and Everyday Life Skills (American Guidance Service, 2001). Brolin’s (2004) Life Centered Career Education (LCCE) is mentioned in this review, but is not evaluated as it represents a fundamentally different functional curriculum model in terms of cost, professional development opportunities, number of revisions, and endorsement by the Council for Exceptional Children.

Four charts were created or adapted by the researcher to analyze the commercially available functional curriculum models (all available from the author by request). The first chart (Chart A) was created by the researcher to analyze basic information, such as the age and disability focus, research conducted on the curriculum, resources available with the curriculum, number of revisions, and associated professional development opportunities available for teachers. It also focused on evidence of functional curriculum components, as defined by Patton, Cronin, and Jairrels (1997), within each model, including: functional academics, vocational education, daily living, social/relationships, independent living, community access or skills, transportation, financial, self-determination, leisure and recreation, and communication skills. The second chart (Chart B) was adapted from Martine and Patriarca’s (2002) review of “best teaching practices.” It identified the instructional strategies offered in each model, such as the use of sequencing, drill and practice
review, segmentation, directed questioning and responses, level of difficulty of tasks, technology, grouping of students (individually, pairs, small group, whole group), any supplement to teacher and peer involvement, and strategy cues.

The third chart (Chart C) was adapted from Cronin and Patton’s (1993) domains and subdomains of adulthood. The curriculum models were analyzed for their inclusion of Cronin and Patton’s six domains of adulthood and 23 subdomains. The six domains of adulthood included: employment/education, home and family, leisure pursuits, personal responsibilities and relationships, community involvement, and physical/mental health. The subdomains fell within the six domains and included aspects such as goal setting, family life, general job skills, and travel. The fourth chart (Chart D) was based off of Hammill and Bartel’s (1990) materials analysis, which had 10 major sections: instructional areas and skills, scope and sequence; component parts of material; level of the material; quality; format; support materials; time requirements; field test and research data; bibliographic and price; and method, approach, or theoretical base.

Procedure

The functional curriculum models reviewed were first selected from a list of commercially available functional curriculum models identified by the Center for Innovations in Education (n.d.). Major publishing companies were also explored for functional curriculum model materials. The complete list was narrowed by excluding any curriculum models that were deemed as not being comprehensive (i.e., only dealt with a specific functional area, such as self-care or self-determination), not geared towards secondary students, or were clearly focused on students with severe mental impairment or other severe disabilities.

Data Analysis

After selecting and purchasing the functional curriculum models that met the criteria (i.e., comprehensive, focused on secondary students with mild-to-moderate mental impairment), the models were then analyzed with respect to the charts previously discussed. Thus, the curriculum materials were reviewed, the charts completed, and then the functional curriculum models discussed in terms of most comprehensive (i.e., covered most components) or “best value.” When analyzing the models with respect to components covered, each curriculum model was given one point if it fully addressed a component (e.g., vocational, social skills) and a half-point if they partially addressed a component, such as within the component of transportation if the model discussed walking safely within the community, but not public transportation (Charts A and C). The other two charts (Charts B and D) were marked with respect to yes or no if they addressed components of best teaching or specific information, such as having a research base or offering support materials.

Results

The 10 functional curriculum models examined were all marketed towards secondary students with disabilities and, at a superficial analysis, could be considered appropriate for use with students with mild mental impairment. All models addressed students with “mild” or “moderate” disabilities, although they used various terminologies, such as developmental disabilities, moderate disabilities, and special needs students. While the models supposedly focused on the same curriculum components (i.e., functional) and the same student population, they were quite divergent. For example, in price alone, the curriculum models had a wide range (see Table 1). The lowest cost was $29.95 for Life Skills Instruction for All Students with Disabilities (Cronin & Patton, 1993) while the most expensive was Every- day Life Skills at $519.93 (American Guidance Service, 2001). Brolin’s (2004) Life Centered Career Education (LCCE), which was not reviewed, was priced at $995. Five of the 10 curriculum models were under $100, two more under $200, and one was out of print and no longer available for purchase from the publisher (i.e., Impact: A Functional Curriculum Handbook, Neel & Billingsley, 1989).

All the curriculum models addressed most aspects of a functional curriculum, as defined by Patton, Cronin, and Jairrels (1997): Func-
Functional academics, vocational education, daily living, social/relationships, independent living, community access or skills, transportation, financial, self-determination, leisure and recreation, and communication skills (see Table 2).

Functional Curriculum for Elementary, Middle, and Secondary students with Special Needs (Wehman & Kregel, 2004) covered the greatest number of functional curriculum components with 9 of the 11 categories addressed, while Impact: A Functional Curriculum Handbook (Neel & Billingsley, 1989) had the fewest with two skills covered completely and one partially. The social/relationship skills component was at least partially addressed by all 10 functional curriculum models. The next most addressed components included vocational education and independent living, in which 9 of the 10 reviewed curriculum models partially or totally addressed each component. Self-determination was addressed in the fewest number of curriculum models (only five models partially or totally included it).

Most of the curricular models examined consisted of a single book, although there were variations in the structure and purposes of these books. The few that offered additional resources beyond the “teacher’s” guide

<table>
<thead>
<tr>
<th># of components</th>
<th>Functional Curriculum Models’ Components Covered (Most to Least)</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Functional Curriculum for Elementary, Middle, and Secondary Age Students with Special Needs</td>
<td>1</td>
</tr>
<tr>
<td>9.5</td>
<td>Life Skills Instruction for All Students with Special Needs</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Community-Based Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Functional Independence Skills Handbook</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Life Skills Activities for Secondary Students with Special Needs</td>
<td>5</td>
</tr>
<tr>
<td>8.5</td>
<td>The Syracuse Community-Referenced Guide</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>A Functional Curriculum for Teaching Students with Disabilities</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Everyday Life Skills</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Adaptive Living Skills Curriculum</td>
<td>9</td>
</tr>
<tr>
<td>2.5</td>
<td>Impact: A Functional Curriculum Handbook</td>
<td>10</td>
</tr>
</tbody>
</table>

or edition included assessment materials (i.e., *Functional Independence Skills Handbook*, Killion, 2003), CDs, or other workbooks (i.e., *Everyday Life Skills*, American Guidance Service, 2001). Few of the 10 curriculum models analyzed addressed any research conducted on the model or its implementation in classrooms. Some curriculum models did provide research to support the inclusion of specific curriculum components (i.e., *The Syracuse Community-Referenced Guide*, Ford et al., 1989 and *Community-Based Curriculum*, Falvey, 1989), yet these tended to read more like textbooks. They had less emphasis on enabling teachers to implement the curriculum in the classroom and more of providing research to support the components or concepts included in their model. Furthermore, no curriculum model reviewed addressed any professional development opportunities for teachers in terms of teaching the particular model. Note: LCCE discusses professional development.

Few of the analyzed functional curriculum models addressed the ideas and teaching strategies found in the research on “best practices” (Mariage & Patriarca, 2002). For example, few gave explicit information regarding the philosophy towards implementing the curriculum. The majority of the models were structured around principles of direct instruction, as opposed to constructivist approaches (Swanson, 2001). Furthermore, few of the models involved technology, and most only implicitly addressed issues related to sequencing the materials, repetition of skills and concepts, segmentation, and controlling for difficulty of demands of tasks.

None of the curriculum models reviewed covered all of Cronin and Patton’s (1993) six domains of adulthood, aside from Cronin and Patton’s *Life Skills Instruction for All Students with Special Needs* which covered 23 of the 23 total subdomains. This particular curriculum model was structured around the domains and subdomains of adulthood and provided resources for materials for each of the subdomains. Although the remaining models covered many of the six domains, the subdomains were addressed to varying degrees (see Table 3). The adulthood domains of home and family, leisure pursuits, and personal/relationship were covered across most of the remaining nine models. The curriculum model that addressed the fewest subdomains was Neel and Billingsley’s (1989) *Impact: A Functional Curriculum Handbook* (.5 of 23).

In analyzing the functional curriculum models with respect to the material analysis (Hammill & Bartel, 1990), the results showed that none of the models had an “appropriate” form for teachers. While the models consisted of different forms, none were assessed to be completely appropriate for teaching functional curriculum to secondary students with mild mental impairment. Some models placed too great a demand on teachers acquiring or creating their own materials (i.e., *Functional...

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### Table 3

**Functional Curriculum Models’ Adult Life Subdomains Covered (Most to Least)**

<table>
<thead>
<tr>
<th>Order</th>
<th>Title</th>
<th># of subdomains</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Life Skills Instruction for All Students with Special Needs</em></td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td><em>Functional Curriculum for Elementary, Middle, and Secondary Age Students with Special Needs</em></td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td><em>The Syracuse Community-Referenced Guide</em></td>
<td>15.5</td>
</tr>
<tr>
<td>4</td>
<td><em>Everyday Life Skills</em></td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td><em>Community-Based Instruction</em></td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td><em>Adaptive Living Skills Curriculum</em></td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td><em>Life Skills Activities for Students with Special Needs</em></td>
<td>11.5</td>
</tr>
<tr>
<td>8</td>
<td><em>A Functional Curriculum for Teaching Students with Disabilities</em></td>
<td>9.5</td>
</tr>
<tr>
<td>9</td>
<td><em>Functional Independence Skills Handbook</em></td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td><em>Impact: A Functional Curriculum Handbook</em></td>
<td>.5</td>
</tr>
</tbody>
</table>
Life Skills Instruction for All Students with Special Needs; Cronin & Patton, 1993), others did not have enough application in the curriculum, and others were directed too much at teachers (i.e., references and citations) as opposed to activities or lessons for students (e.g., The Syracuse Community-Reference Guide; Ford et al., 1989).

Other issues emerging from the material analysis were readability levels, student support materials, and teacher support. To begin with, none of the curriculum models actually addressed the readability level of materials (Hammill & Bartel, 1990). While the curriculum models themselves were mostly directed to teachers, so readability level was not an issue, the few material pieces within the curriculum that were geared towards students were assessed to be at a reading level too high for the average student with mild mental impairment. In addition, not all curriculum models had support materials or additional components, leaving teachers having to create or find various components such as assessments or worksheets. The curriculum models also did not address teacher training or support for teachers during implementation as the “teacher’s guide” or “teacher’s edition” was the curriculum model itself. In general, the models did not consist of separate student and teacher editions, but rather there was only a teacher’s book (or guide or edition), with one exception, Everyday Life Skills (American Guidance Service, 2001).

Discussion

While each functional curriculum model had its strengths and weaknesses, none was all encompassing and could be portrayed as a solid, complete functional curriculum model for secondary students with mild mental impairment, when excluding Brolin’s Life Centered Career Education (2004) from evaluation and consideration. No one model addressed all curricular areas as defined by Patton, Cronin, and Jairrels (1997). Furthermore, the varying formats were challenging. Some read more like college textbooks than curriculum models, making implementation difficult in a classroom (i.e., Community Based Curriculum, Falvey, 1989; The Syracuse Community-Referenced Guide, Ford et al., 1989). Others models were essentially a book of worksheets to give to students (i.e., Life Skills Activities for Students with Special Needs, Mannix, 1995), while some were reference books that told teachers about materials, books, and videos that could be used to “create” their own functional curriculum by compiling materials from the identified multiple sources (i.e., Life Skills Instruction for all Students with Special Needs, Cronin & Patton, 1993).

The analysis also revealed vast differences in functional curriculum component coverage, ease of implementation, accessibility of materials with students, and cost. For an educator looking to implement a functional curriculum model, any of these issues could be a hindrance in implementing a currently commercially available curriculum model. Practitioners must weigh competing demands, such as comprehensiveness versus expense, time to devote to teaching a functional curriculum with time needed for depth of the different components, and a scripted curriculum versus one that involves supplements and teacher-constructed materials. In essence, each curriculum model comes with trade-offs, whether those are cost or coverage, and teachers, in conjunction with other educators, must make decisions regarding the needs of their students and the resources of their program and/or district.

Thus, what appears missing from the collection of functional curriculum models reviewed for secondary students with mild mental impairment is a comprehensive curriculum model that addresses all curriculum components (Patton, Cronin, & Jairrels, 1997), involves community instruction as well as technology, is affordable, appeals to and supports students and teachers (i.e., engages students yet has easy implementation), and considers best practices. The ideas and beliefs of the functional curriculum, much abandoned for this population of students with mild mental impairment over recent years, deserves to be revisited and new models and materials created that represent a more comprehensive approach, addressing the needs of teachers and students (Bouck, 2004). These new functional curriculum models need to turn towards technology, utilizing practices, methods, and lessons that involve CD-ROMs and web-based instructional environments to cap-
ture the attention and excitement of both students and teachers.

The field needs to move towards providing a balanced, comprehensive, coherent functional curriculum for this population of students at the secondary level (Bouck, 2008). A balanced, yet flexible, functional curriculum model would include utilization of different theories of learning and different pedagogical approaches (i.e., skills, cognitive apprenticeship, modeling, social mediation direct instruction, etc.). It would balance the various components of a functional curriculum (e.g., functional academics, community access, daily living skills, financial, transportation, leisure and recreation, communication, self-determination, social skills, vocational education, independent living skills; Patton, Cronin, & Jairrels, 1997). Furthermore, it would balance direct skills instruction with a cognitive apprenticeship, students as consumers with students as producers, and individualization with community.

A balanced approach to functional curriculum would resemble a balanced literacy approach; however, instead of moving on a continuum from kindergarten through 12th grade and shifting emphasis from “learning to read” to “reading to learn” (Duke, Bennett-Armistead, & Roberts, 2003; McCartney, 2004; National Center to Improve the Tools of Education, 1996), the shift in emphasis would occur with “learning to function” (i.e., performance) to “functioning to learn” (i.e., cognitive apprenticeship) (see Figure 1) (Bouck, 2008). The ascertainment of functional life skills needed for successful post-school outcomes would become a learning process across students’ school careers with the goal of arming students with skills and experiences necessary to be successful in life, much like what schools currently do for students going onto traditional post-secondary education.

Limitations and Future Directions

This study has some limitations. For one, it represents one researcher’s analysis of commercially available functional curriculum models geared towards secondary students with mild mental impairment. Thus, curriculum models may be missing that are not widely circulated or the researcher’s perceptions may be biased. In addition, this study does not attempt to elicit the opinions and perspectives of teachers, students, and parents as to the different functional curriculum models, but relies solely on the analysis of the written curriculum materials provided. This project also did not explore older, less known curriculum models such as Problem Solving Activities for Teaching Daily Living Skills (Luccas, Lenox, & Amey, 1982) or curricula geared to delivery by parents or in the home, such as Steps to Independence (Baker & Brightman, 2004).

Future research should consider the perspectives of teachers, students, and parents in regards to functional curriculum models. Researchers should find ways to capture and express the opinions of these key stakeholders in regards to the most essential components of a functional curriculum model and delivery modes. Future research should also seek to create new functional curriculum models, drawing upon technology, which has the potential of creating curricula that captures students’ attention and presenting them with meaningful learning experiences in the community, school, home, and places of employment. Research on functional curricula for secondary students with mild mental impairment should extend beyond just a review and analysis of functional curriculum models and recommendations for the creation of new and alternative approaches. It should include the examination of curricular impact on students’ outcomes, such as employment, independent living, access to the community, and social relationships.

References


Wehman, P., & Kregel, J. (2004). *Functional curriculum for elementary, middle, and secondary age students with special needs.* (2nd ed.). Austin, TX: Pro-Ed.

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Autism Spectrum Disorders and Sibling Relationships: Research and Strategies

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Abstract: Significant attention has been paid in the literature to sibling relationships and the effects of birth order, family size, and gender on such relationships. Although these are important areas to study, there is relatively little research on the effects of autism spectrum disorders (ASD) on sibling relationships. The existent research identifies both positive and negative factors in such sibling relationships. This paper analyzes the studies that are available on ASD and sibling relationships, discusses findings, identifies implications, and makes recommendations for improving sibling relationships when one sibling has ASD.

Within the family unit siblings share a unique relationship with one another (Knott, Lewis, & Williams, 1995), typically lasting the longest among all human relationships (Orsmond & Seltzer, 2007). Sibling relationships in the general population develop along a continuum throughout childhood, adolescence and adulthood (Dunn, Slomkowski, & Beardsall, 1994) and typical sibling relationships provide siblings with experiences that “foster the development of emotional understanding, self-regulation, and a sense of belonging and comfort” (Orsmond & Seltzer, p. 313).

A number of specific aspects of sibling relationships have been highlighted in the research. For example, Smith and Hart (2002) stated that sibling relationships play a significant role in the development of children’s understandings of others’ emotions and thoughts. Kaminsky and Dewey (2001) reported that positive sibling relationships can be an important source of social development and self-worth and are associated with lower levels of conduct disorders and loneliness in children. Further Foden (2007) stated interplay between siblings profoundly affects individuals’ personalities and social and intellectual development. Howe, Petrakos, and Rinaldi (1998) similarly found that siblings who engage in frequent pretend play demonstrate a greater understanding of others’ emotions, are more likely to construct shared meanings in play, and are more likely to develop conflict management strategies. In addition, El-Ghoroury and Romanczky (1999) reported that siblings are important social agents for children with autism spectrum disorders (ASD), who often have severe deficits in social competence. As Reagon (2006) further noted, siblings are the most frequently available play partners.

Thus, the question of how do autism spectrum disorders (ASD) affect sibling relationships is important to answer because positive sibling relationships can foster a better quality of life both in the present and in the future, such as once parents may be unable to care for their child with ASD. This paper addresses factors that affect sibling relationships, analyzes the impact of having a sibling with ASD as compared to one with other disabilities, discusses the findings and potential makes recommendations for improving sibling relationships when one sibling has ASD.

Research on Sibling Relationships

Factors

In addition to the presence of a sibling with a disability, there are many factors that have been identified that affect sibling relationships. Kim, McHale, and Wayne (2006) reported on gender effects on sibling relationships; stating that girls tend to report more...
affection in their sibling relationships than boys while Trevino (1979) reported older brothers tend to be the least involved with their siblings. Further, Brody (1998) found positive parent-child relationships were connected to positive affect and pro-social behavior of siblings. Moreover, Fielder and Simpson (2006) reported that culture, traditions, interests, and environmental contexts all have an effect on sibling relationships. The aim of this paper is to analyze the research about the impact of the presence of a disability, and in particular ASD, on sibling relationships.

ASD: Behavioral Barriers to the Sibling Relationship

Foden (2007) stated that typically developing siblings of siblings with ASD face the daunting task of forming a healthy sibling bond. Harris (2007) reported the nature of ASD makes it difficult for siblings who are non-disabled to form satisfying relationships with their brother or sister with ASD. That is, the majority of individuals with ASD have cognitive limitations as well as social and behavioral characteristics that may present challenges to sibling relationships (American Psychiatric Association, 2000). Such limitations and characteristics include deficits in understanding the perspectives and emotions of others, lack of reciprocity in conversations, inability to seek out others for comfort, affection, inability to initiate play (Rutter & Schopler, 1987), and troubling behaviors such as aggression (Donenberg & Baker, 1993). Further, Rivers and Stoneman (2003) found in a study of 50 families with children with ASD that siblings who are non-disabled reported on a self-inventory that they were often disturbed by their siblings’ behaviors. Kaminsky and Dewey (2001) hypothesized that the social deficits shown by individuals with ASD causes their sibling relationships to be different from the relationships of other disorders such as Down syndrome (DS), mental retardation (MR), and developmental delay (DD), as well as siblings of typically developing individuals. In the succeeding sections attention is also given to prosocial behavior among siblings, pride or embarrassment of siblings, conflict between siblings, concerns for siblings, and coping skills, (See, Table 1 for more information on studies discussed below)

Positive relationships. There have been studies that have found positive reports of sibling relationships between typically developing siblings and siblings with ASD. Rivers and Stoneman (2003) studied 50 families of siblings of individuals with ASD ages 7–12 and reported mainly positive feeling about their sibling relationships. Mascha and Boucher (2006) concluded in their qualitative study that most siblings of individuals with ASD ages 7-20 recalled positive experiences with their siblings, stating they played outside, watched television and had fun with their siblings. Further, Foden (2007) reported that typically developing siblings of individuals with ASD spoke of pride in teaching their sibling with ASD. In addition, Knott et al. (1995) reported that siblings of individuals with ASD typically “stage-manage” play with their sibling. Knott et al. also found that in some cases siblings with ASD did initiate play with their typically developing sibling(s). Moreover, Fisman et al. (1996) and Kaminsky and Dewey (2001) concluded in their study of 138 subjects that siblings of children with ASD reported less conflict and greater warmth in the sibling relationship than siblings of typically developing individuals. Orsmond and Seltzer (2007) reported siblings of individuals with ASD were closer when the sibling had lower educational levels, lived closer to their brother or sister with ASD, used coping strategies, and when their sibling had higher levels of independence.

Moreover, McHale et al. (1987) reported that siblings of individuals with ASD reported more positive sibling relationships when they accepted their role as a family member, perceived minimal parental favoritism, developed coping skills, understood their siblings’ disability, and were not worried about the future of their sibling with ASD. Similarly, Orsmond and Seltzer (2007) found that the use of ef-
TABLE 1
How do Autism Spectrum Disorders (ASD) Affect Sibling Relationships?

<table>
<thead>
<tr>
<th>Citations</th>
<th>N =</th>
<th>Comparison group</th>
<th>Measurement</th>
<th>Outcomes: Siblings of Individuals w/ASD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagenholm &amp; Gillberg (1991)</td>
<td>60 subjects b/w 5-20 years old</td>
<td>Sibling of siblings w/MR &amp; non-disabled</td>
<td>Parents &amp; sibling interviewed &amp; completed the Eysenck Personality Inventory</td>
<td>Reported significantly less positive experiences</td>
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<tr>
<td></td>
<td>20 siblings of siblings w/ASD</td>
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<tr>
<td></td>
<td>20 siblings of siblings w/MR</td>
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<tr>
<td></td>
<td>20 siblings of siblings w/out a disability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisman et al. (1996)</td>
<td>138 subjects</td>
<td>Sibling of siblings w/out disability</td>
<td>Parent/caregiver &amp; teacher interviewed</td>
<td>Reported less conflict &amp; greater warmth</td>
</tr>
<tr>
<td></td>
<td>46 siblings of siblings w/ASD</td>
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<tr>
<td></td>
<td>46 siblings of siblings w/DS</td>
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<tr>
<td></td>
<td>46 siblings of siblings w/out a disability</td>
<td></td>
<td></td>
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<tr>
<td>Foden (2007)</td>
<td>Metaanalysis of sibling outcomes</td>
<td>Siblings of siblings w/DS &amp; no disability</td>
<td>Sibling interviewed &amp; observational</td>
<td>Spoke of pride teaching their siblings w/ASD</td>
</tr>
<tr>
<td>Hodapp &amp; Urbano (2007)</td>
<td>46 subjects</td>
<td>Sibling of siblings w/DS</td>
<td>Sibling questionnaire</td>
<td>Showed less close &amp; warm relationships, slightly worse health, higher levels of depressive symptoms &amp; less contacts</td>
</tr>
<tr>
<td></td>
<td>284 siblings of sibling w/DS</td>
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<tr>
<td></td>
<td>176 sibling of sibling w/ASD</td>
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</tr>
<tr>
<td>Kaminsky &amp; Dewey (2001)</td>
<td>90 siblings of siblings w/ASD b/w 8 &amp; 18</td>
<td>Sibling of siblings w/DS &amp; TD</td>
<td>Sibling Relationship Questioner (SRQ)</td>
<td>Characterized relationships by less intimacy, prosocial behavior, &amp; nurturance, &amp; reported less conflict</td>
</tr>
<tr>
<td>Knott et al. (1995)</td>
<td>30 sibling pairs</td>
<td>Sibling of sibling w/DS &amp; LD</td>
<td>Observed at home</td>
<td>Engaged in fewer bouts, imitated less, &amp; staged managed play</td>
</tr>
<tr>
<td>Mascha &amp; Boucher (2006)</td>
<td>14 subjects ages 7-20 from families where there was a child diagnosed ASD</td>
<td>Sibling of siblings w/DS</td>
<td>Sibling Interviewed &amp; observed at home</td>
<td>Reported greater feelings of embarrassment, &amp; coping strategies resulted in more positive feelings, recalled positive feelings about playing outside, &amp; watching tv</td>
</tr>
<tr>
<td>Citations</td>
<td>N =</td>
<td>Comparison group</td>
<td>Measurement</td>
<td>Outcomes: Siblings of Individuals w/ ASD</td>
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<tr>
<td>McHale, Sloan &amp; Simensson (1987)</td>
<td>90 subjects ages 6-15</td>
<td>Sibling of siblings w/ MR &amp; non-disabled</td>
<td>Sibling questioners</td>
<td>No differences in relationships b/w groups</td>
</tr>
<tr>
<td></td>
<td>30 siblings of sibling w/ ASD</td>
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<td></td>
<td>30 siblings of siblings w/MR</td>
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<td></td>
<td>30 siblings of sibling w/out a disability</td>
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<tr>
<td>Osmond &amp; Seltzer (2007)</td>
<td>154 subjects ages 21–56</td>
<td>Sibling of siblings w/ DS</td>
<td>Sibling questioner</td>
<td>Reported less positive affect, relationship w/parents impacted, development of coping strategies resulted in more positive feelings, as did lower level of education &amp; higher levels of independence of their sibling</td>
</tr>
<tr>
<td></td>
<td>77 sibling of siblings w/DS</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>77 sibling of sibling w/ASD</td>
<td></td>
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</tr>
<tr>
<td>Rivers &amp; Stoneman (2003)</td>
<td>50 families where there was a child diagnosed ASD</td>
<td>No comparison group: normally developing siblings &amp; parents views</td>
<td>Sibling Inventory Behavior (SIB) &amp; Sibling Relationship Questioner (SRQ)</td>
<td>Reported more positive relationships than parents did</td>
</tr>
<tr>
<td>Roeyers &amp; Mycke (1995)</td>
<td>60 subjects ages 8-14</td>
<td>Sibling of siblings w/DS &amp; non-disabled</td>
<td>Siblings interviewed</td>
<td>No differences in relationships b/w groups</td>
</tr>
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<td></td>
<td>20 siblings of sibling w/ASD</td>
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<td>20 siblings of sibling w/MR</td>
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<td></td>
<td>20 siblings of siblings w/out a disability</td>
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<tr>
<td>Ross &amp; Cuskelly (2006)</td>
<td>25 subjects ages 8-15 of siblings w/ ASD or no disability</td>
<td>Siblings w/no disability</td>
<td>Siblings interviewed</td>
<td>Reported more aggressive behaviors in the relationship</td>
</tr>
</tbody>
</table>
fective coping strategies results in more positive sibling relationships between typically developing siblings and siblings with ASD.

Thus, positive relationships (Rivers & Stoneman, 2003; Mascha & Boucher, 2006; Foden, 2007; Knott et al., 1995) and less conflict (Fisman et al., 1996; Kaminsky & Dewey, 2001) have been reported by siblings of a brother or sister with ASD. Further, effective coping strategies (McHale et al., 1986; Orsmond & Seltzer, 2007), minimal perceived parental favoritism, understanding of sibling’s disability, and little concern about futures of sibling with ASD were all found to contribute to positive sibling relationships (McHale et al.).

Negative relationships. Bagenholm and Gillberg (1991) conducted a study of 60 siblings of children with ASD, DD, and children who are non-disabled and their parents and found siblings and parents of children with ASD reported less favorable attitudes towards their brother or sister with ASD and significantly less positive experiences of their sibling’s role in the family. Further, siblings and parents also reported problems with the destructive behavior of their sibling with ASD (Bagenholm & Gillberg). Similarly, Ross and Cuskelly (2006) reported that siblings of children with ASD ages 8–15 reported more aggression in their sibling interactions.

Further, Kaminsky and Dewey (2001) also reported differences between 90 siblings of individuals with ASD and other disabilities and typically developing individuals ages 8–18. That is, they found siblings of a brother or sister with ASD reported on Sibling Relationship Questionnaire (SRQ) less intimacy, prosocial behavior, initiated play and nurturance with their sibling than siblings of individuals with DS and of typically developing individuals. Knott et al. (1995) compared 30 sibling pairs of individuals with ASD and siblings of individuals with DS and found that siblings of individuals with ASD spent less time with their sibling, reported having less close relationships and contact, and were more concerned about their siblings’ future. Hodapp and Urbano (2007) conducted a study of 284 subjects of siblings with DS and 174 subjects of siblings with ASD and found siblings of individuals with DS reported closer, warmer sibling relationships than siblings of individuals with ASD. Further, in a study of 154 subjects, Osmond and Seltzer (2007) concluded that siblings of individuals with ASD reported less contact and positive affect with their siblings than siblings of individuals with DS. They also found that siblings of individuals with ASD were more likely to report that their relationships with their parents had been impacted more than those with siblings with DS. Mascha and Boucher (2006) found in their study of 14 subjects ages 7–20 that siblings of individuals with ASD reported greater feelings of embarrassment than siblings of individuals with DD or no disability.

To conclude, siblings of a brother or sister with ASD have reported negative sibling relationships such as less contact, less intimacy, less prosocial behavior and less initiated play (Bagenholm & Gillberg, 1991; Hodapp & Urbano, 2007; Knott, et al., 1995; Orsmond & Seltzer, 2007), worry about the future of their sibling with ASD (Knott et al.) concern about destructive behavior of sibling with ASD (Bagenholm & Gillberg, 1991; Ross & Cuskelly, 2006; Rivers & Stoneman, 2003), and embarrassment (Mascha & Boucher, 2006).

No differences. In contrast to the above studies reported on which showed evidence of less positive relationships, Roeyers and Mycke (1995), in their study of 60 subjects ages 8–14, reported no differences between sibling relationships of children with ASD when compared to siblings of children with DS and no disability. Similarly, in a study of 90 subjects ages 6–15, McHale et al. (1987) found siblings of children with ASD, of children with MR, and of typically developing children reported no differences in sibling relationships.

Strategies for Improving Sibling Relationships

The research findings summarized above may indicate in part a negative impact of ASD on sibling relationships. While there is nothing that can be done about the age, ordinal position, or degrees of ASD, there are strategies that can be implemented to facilitate more positive relationships between typically developing siblings and their brother or sister with ASD. Strategies addressing four areas of concern are discussed below.


**Teach play skills.** Siblings are the most frequently available play partners (Reagon, 2006). One strategy for increasing positive interactions, prosocial behaviors, and play skills between siblings is to teach siblings a game that they can play together. Harris and Glasberg (1994) suggested starting with a simple skill such as rolling a ball to each other or playing catch and gradually increasing the complexity of the skill as the siblings become more skillful and older, such as going for a jog or shooting baskets together. Further, older typically developing siblings might enjoy learning specific teaching skills so they can be the “teacher” of play (Howlin, 1988) and research has shown that siblings of a brother or sister with ASD can effectively implement behavior interventions (Celiberti & Harris, 1993; Schreibman, O’Neill & Koegel, 1993).

**Develop coping skills.** As stated earlier, McHale et al. (1987) and Orsmond and Seltzer (2007) reported that siblings of a brother or sister with ASD who had developed effective coping strategies reported more positive relationships. Thus, typically developing siblings need effective coping skills in order to effectively deal with the challenges that come with having a sibling with a disability and to develop a more positive relationship with their sibling with ASD.

Coping strategies can be developed by first encouraging typically developing siblings to share how they are feeling and any concerns they have for their sibling with ASD. That is, by encouraging siblings to openly discuss their feeling unnecessary distress can be avoided and siblings can be reassured their feelings are natural.

Second, Glasberg (2000) stated these siblings often lack information or are misinformed about their brother’s or sister’s disability and that approximately one of every five siblings claim they never heard the sibling’s diagnostic term (autism), thus providing them with accurate age appropriate information about ASD can enable them to cope both intrapersonally and interpersonally by dealing more effectively with their own curiosity and peers’ curiosity (Howlin, 1988; & McHale et al., 1986).

Glasberg (2000) suggested when considering how to explain the disability to siblings it is important to first assess the sibling’s cognitive level and to then re-present information throughout the sibling’s development. Further, Harris and Glasberg (1994) stated that very young siblings will not benefit from a detailed discussion of ASD, but they need to be reassured about their concerns. Smith, Polloway, Patton, and Dowdy (2008) stated that as siblings get older they should be provided with information concerning the disability, which can be found in books, magazines, and journal articles. At the same time, however as noted by Fiedler, Simpson and Clark (2005), adults should help siblings with comprehension for most information is often presented in a manner meant for adults. Further, Smith et al. stated that siblings should be included in the education of their brother or sister with a disability because siblings who are not included in the education of their brother or sister with a disability may often feel isolated or guilt about causing the disability (Meyer, 2001).

Third, Rivers and Stoneman (2003) hypothesized that accessing social support could shield the harmful effects of stressors on the sibling relationship. Therefore, encouraging typically developing siblings to join support groups can allow them to meet others who are going through similar experiences, share their own experiences and realize they are not alone.

**Private special time.** Meyer (2001) reported that siblings of a brother or sister with a disability reported feelings or resentment when their sibling became the focus of the family’s attention and when he or she was spoiled, overprotected, and allowed to engage in behaviors that were unacceptable if done by another family member. Thus, in order to reduce resentment, perceived parental favoritism, depression, and increase sensitivity and intimacy of typically developing siblings towards their brother or sister with ASD, parents should purposefully set aside private special time to spend with their typically developing child when the child can be the center of attention and feel like a valued member of the family (Harris & Glasberg, 1994). Finding this time may not always be easy, but parents can, for example, spilt the time between each other, spend time with the child while doing errands, enlist in support from other family members such as grandparents, and use re-
siste care for the individual with ASD (Howlin, 1988).

Avoid unnecessary emotional and physical pressure. Smith et al. (2008) stated that the siblings of a brother or sister with a disability often become second parents in the areas of care and discipline. As mentioned earlier, Knott et al. (1995) reported that concerns about the future of the sibling with ASD can lead to negative sibling relationships. Thus, parents should be conscious of not putting too much responsibility on typically developing siblings for support for this puts unneeded stress upon them. More specifically, parents should plan for the possibly of future residential placements of sibling with ASD long before they become too old and typically developing siblings should be involved in the process, but not feel obligated for future care (Howlin, 1988).

Future Research Areas

The inconsistencies that are reported in the research regarding the effects of ASD on sibling relationships (e.g., positive vs. negative relationships) seem inevitable because of intervening variables such as the family environment (e.g., economic, educational status, number, age, and gender of children in the family, presence or absence of stress in the paternal relationship, development of coping strategies, availability of social support) and the severity of the disorder of the child with ASD. However, the research literature does seem to show more negative impacts than positive impacts of having a sibling with ASD when compared to having a sibling with DS, DD, MR, or no disability (Bagenholm & Gillberg, 1991; Hodapp & Urbano, 2007; Knott et al., 1995; Ormond & Seltzer, 2006; Ross & Cuskelley, 2006; Mascha & Boucher, 2006; Rivers & Stoneman, 2003).

Further, it appears that the majority of the studies on siblings of individuals with ASD group together siblings spanning from the childhood to adolescence years, which may obscure the differences between these life stages. In addition, the measurements most commonly used (e.g., self-reports) in most of the studies were dependent on the skills and development of the siblings and parents and thus may not be reliable.

Given the status of the research findings in this area, it seems reasonable to conclude it is not enough to just study the effects of ASD on sibling relationships. Rather, future studies need to take a life course approach and consider the context of life stages and also to analyze in depth the effects of factors such as those discussed below.

A first consideration is the gender of the siblings with and without ASD. Stoneman, Davis, Crapps, and Malone (1991) reported that older sisters with brother or sister with a disability had more care giving responsibilities than other siblings. Thus, it seems reasonable to ask is the sibling relationship in which one sibling has a ASD more likely to be poor if the typically developing sibling is an older sister than if an older brother. Further, it may be interesting to look into how the relationship is affected if the siblings are of the same or opposite sex.

A second area for focus is age of the siblings with and without ASD. That is, future research should ask how the relationship is impacted if the typically developing sibling is older or younger than their sibling with ASD. Brody, Stoneman, Davis, and Crapps (1991) reported that older siblings with mental retardation can become closer with their younger typically developing sibling than if they did not have the disability, but little research is available on if this finding would also be true of siblings with ASD.

Third, while it is well known that having a child with ASD can put strain on the marital relationship, the question remains as whether this strain carries over to sibling relationships. That is, do siblings sense stress among parental relationships and if so are sibling relationship affected by negative or positive interaction among parents.

Fourth, Trevino (1979) reported that the larger the family the more the responsibilities for the child with a disability are dispersed among the family members. Thus, future research should address the affects of a larger family on relationships among typically developing siblings and their brother of sister with ASD.

A fifth concern is as mentioned earlier coping strategies have been found to have a positive effect on sibling relationships (McHale et al., 1986; Ormond & Seltzer, 2007), but strate-
gies that are the most and least effective for facilitating positive relationships among typically developing siblings and their brother or sister with ASD have not been widely documented; thus future research should address this issue.

Another area of focus should be the socioeconomic status of the family. Seligman (1983) reported that families with financial security may experience greater difficulty meeting the needs of their child with a disability because fewer resources are available to pay for services. Further research is needed to address whether relationships are more positive in affluent families.

Finally, other factors that may be important are the effects of the severity of the disability, the family dynamic, and the cognitive abilities and educational levels of family involvement. Moreover, most of the studies reported compared siblings with ASD to siblings with DS and used one type of assessment such as self-reports and this alone is not sufficient enough to draw any clear conclusions about sibling relationships. Thus comparisons to other populations and other assessment method needs to be used along with self-reports (e.g., observations).

Discussion

The Centers for Disease Control and Prevention (CDC) (2007) released the latest prevalence figures for ASD of 1 in 150, which is up from the 1 in 166 figure reported by the CDC in 2004. Consequently, it appears that having a brother or sister with ASD is becoming more common. For children with ASD, a primary concern is the development of social competence and thus it seems more important than ever that sibling relationships be positive given that siblings are the most frequently available play partners (Reagon, 2006). As detailed earlier, positive support, effective coping strategies, open discussion, planning and sensitivity can facilitate more positive relationships between typically developing siblings and siblings with ASD.

References


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Impacts of Family Support in Early Childhood
Intervention Research

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Abstract: The purpose of this paper is to review intervention research to determine the types of family support that are reported and evaluated in early childhood. This review includes 26 articles evaluating (a) parent training programs; (b) general family-centered practice models which offer comprehensive supports; (c) peer support; (d) two-generation programs; and (e) respite care. In the article, we focus our discussion on: (a) the definitions or description of family support, (b) the family variables or impacts evaluated and their findings, and (c) the link between support and impacts to both the ECO outcomes and the family quality of life domains. This review indicates a need for specific and consistent terminology in defining family support in the early intervention field. Further, a family support framework to guide future research to investigate both long-term and short-term outcomes for families is warranted.

Over the past decade, early interventionists have recognized that working with families in a broader scope by providing supports to families and children impacts not only the child’s development, but the family’s ability to help the child grow and develop (Bailey et al., 1998; Bailey & Bruder, 2005; Sandall, Hemmeter, Smith, & McLean, 2005). Further, the statutory underlying premise of early intervention services for children with disabilities is “to enhance the capacity of families to meet the special needs of their infants and toddlers with disabilities” (Individuals with Disabilities Education Act Amendments of 2004, Title I, Part C, Sec. 631(a)(4)), thus strengthening the role of the family as the primary caregiver.

Family-centered practice is defined using two primary facets. The first facet is the partnerships that are developed between professionals and parents that culminate in empowering the family to make decisions for their child (Allen & Petr, 1996; Bailey et al., 1998; Mahoney et al., 1999; Turnbull, Turbiville, & Turnbull, 2000). The second facet specifies that the family itself is a recipient of supports for two reasons: because it helps children grow and learn and because families are impacted by their child’s disability and are in need of supports in their own right (Allen & Petr, 1996; Mahoney et al., 1999; Poston et al., 2003). (We are using the term, family support, to refer to assistance provided through formal systems (e.g., early intervention programs) and informal networks (e.g., peer support). This article focuses on the nature of family support as contrasted to the nature of partnerships between professionals and parents). This second facet of family-centered services is the focus of this paper.

The family as a recipient of support has received less emphasis than the relationship facet of family-centered practice. In an analysis of early intervention literature, family choice and family strengths perspectives have dominated the literature in comparison with the delivery of support to the family (Epley, 2006). In 25 articles, definitions included the family as a unit of attention only 60% of the time; while 88% of the articles identified how to provide support to families, only 42% identified what types of support should be provided to families in early intervention. Although position papers and commentary have remained strong in advocating the importance of establishing partnerships with families and maintaining empowering relation-

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ships—the how of early intervention—there has been relatively less emphasis on the whole family as a unit of attention (Epley), and more specifically, on the delivery of support to families to “enhance their capacity”, as the law puts it.

An understanding of the types of support, both formal and informal, families receive is particularly important due to recent efforts to develop outcome measures related to children and families in early intervention and early childhood special education. In 2005, the Early Childhood Outcome (ECO) Center recommended five family outcomes that apply to early intervention and early childhood education. The ECO Center defines family outcome as “a benefit experienced as a result of services received” (Bailey & Bruder, 2005). The five outcomes are (a) families understand their children’s strengths, abilities and special needs, (b) families know their rights and advocate effectively for their children, (c) families help their children learn and grow, (d) families have support systems, and (e) families are able to gain access to desired services, programs, and activities in their community (Bailey et al., 2006).

Another more long-term outcome of these specific ECO outcomes is family quality of life (Summers et al., 2005). Family quality of life is a condition in which family needs are being met, family members enjoy their life together and have an opportunity to participate in the activities that are important to them (Park et al., 2003). Based on psychometric studies, family quality of life is comprised of five domains: family interaction, parenting, emotional well-being, physical/material well-being, and disability-related support (Hoffman, Marquis, Poston, Summers, & Turnbull, 2006). The Beach Center on Disability defines family outcomes as either positive or negative impacts that families may experience as a result of supports and services for themselves and/or their children with disabilities (Mannan, Summer, Turnbull, & Poston, 2006) which can be measured using the family quality of life domains. However, in addition to assessing family outcomes, it is critical to determine what specific support families are receiving in order to link those services to the proposed outcomes.

An understanding of the specific services that are linked to family outcomes might be found in the Individuals with Disabilities Education Act (IDEA). Part C of IDEA governs the manner in which infants and toddlers with disabilities and their families receive educational services from public agencies. Early intervention services are defined as “developmental services that are designed to meet the developmental needs of an infant or toddler with a disability, as identified by the individualized family service plan team” (Individuals with Disabilities Education Act Amendments of 2004, Title 20, Part C, Sec. 1432(4)(C)). The family support included on the IFSP should promote physical, cognitive, communication, social/emotional, and adaptive development of the child. Within the statute, the following developmental services are listed: family training, counseling and home visits; special instruction; speech-language pathology and audiology services and sign language and cued sign language services; occupational therapy; physical therapy; psychological services; service coordination services; medical services only for diagnostic or evaluation purposes; early identification, screening, and assessment services; health services necessary to enable the infant or toddler to benefit from the other early intervention services; social work services; vision services; assistive technology devices and assistive technology services; and transportation and related costs that are necessary to enable an infant or toddler and the infant’s or toddler’s family to receive one of these services (Individuals with Disabilities Education Act Amendments of 2004, Title I, Part C, Sec. 1432(4)(E)).

However, it is not clear just what this list of services means in terms of what specific support is delivered to families, as opposed to child-oriented services. Further concern is raised by a review of data concerning types of family support on IFSPs. In reviewing data reported by states regarding the number and percentage of early intervention services reported on IFSPs for children ages 0–2 under Part C of IDEA, family support has been on a downward trend over the past decade (Danaher & Armijo, 2005). For example, family training, counseling and home visits; health services; medical services; respite care; social work services; and transportation are early intervention services that have decreased in
numbers as reported by IFSP data (Danaher & Armijo). The exceptions to this appear to be services that are child-focused, including occupational therapy, physical therapy, special instruction and speech and language pathology, which are remaining consistent or increasing in number (Danaher & Armijo). However, problems with this data set indicate that states and local programs may be defining these services differently, and family support may be occurring in the context of other defined services (J. Hurth, personal communication, January 23, 2006). It is not clear whether these findings indicate an actual decline in emphasis or amounts of support provided to families. It is possible that early interventionists are serving families in a variety of ways that are not captured in the data. Also, it may be that definitions of family support are not consistent with the actual types of support families are receiving.

Another possible source of insight into the types of support families receive in the context of early intervention might be found in literature describing and evaluating early childhood service models. Intervention research may include descriptions of types of family support and related outcomes of this support. The purpose of this paper is to focus on intervention research and evaluation to determine the types of family support that are reported and evaluated in descriptions of early childhood intervention research. The specific questions guiding this literature review were:

1. What types of family-related support are included in evaluations of early intervention programs?
2. How are families impacted by the provision of family support?
3. What specific family outcomes appear to be related to these family impacts?

Method

We conducted a literature search for intervention studies in the field of early intervention and early childhood, including programs designed both specifically for families and children with disabilities and for families and children considered “at risk” for disabilities (e.g., programs serving low-income families or adolescent parents). “At risk” children and families were included in the population for this paper because there were a limited number of intervention research articles devoted only to families and children with disabilities in early intervention. Therefore, the investigator expanded the search to include the “at risk” population to provide insight into more types of family-oriented services in the early intervention field.

The literature search used the following descriptors to capture the population of interest: early intervention, early childhood, preschool, infant and toddlers, families and disabilities. The search included the following key words: family outcomes, family services and supports, family centered services, family interaction, parent training, parent to parent, parental stress, parental depression, parent education, respite care, routines-based intervention, home visiting, family counseling, relationship intervention, advocacy, social supports, and support groups. The search also included specific names of authors known as investigators of family issues in the field, e.g., Bailey, Bruder, Dunst, McWilliam, Kaiser, Fewell, Mahoney, Ramey, and Singer. These key words, author names, and descriptors were used to search five primary databases: Psych-INFO, PubMed, ERIC, Educational Abstracts, and Wilson Web. Further, we searched websites of specific national organizations in the field of early intervention to identify intervention studies. Those websites included Parents as Teachers (PAT), Early Childhood Outcomes Consortium (ECO), Division of Early Childhood (DEC), Office of Special Education (OSEP), Administration of Children and Families (ACF), National Early Childhood Technical Assistance Center (NECTAC), and the National Association of Councils of Developmental Disabilities (NACDD).

Studies selected for this article were limited to those published within the last decade from the date of the first search in 2005. Studies included in this paper used randomized controlled designs, meta-analyses, longitudinal designs, quasi-experimental designs, pilot studies, pretest/posttest experimental designs, path analysis, and correlation designs. Literature reviews and meta-analyses were included, especially in the case of research evaluations with a very large literature base (such as home visiting programs). Studies that inves-
tigated the effectiveness of commercially available programs and materials were excluded. Articles were collected from literature across all disability-related disciplines, but did not include those studies narrowly focused on specific services listed in IDEA that are child focused, such as speech, OT, PT, special instruction and assessment or diagnostic testing. The intervention studies were restricted to families and children from the ages of birth to 8, with the exception of the intervention studies regarding respite care and peer support which reflect families and children with developmental disabilities of all ages. The reason for this exception was that we were not able to locate studies on respite care or peer support that were focused on the early childhood age range. Some of the programs reviewed were evaluations that were specifically focused on family support, e.g., respite care and peer supports (Parent to Parent); the majority, however, were general early childhood interventions that included some family support component in the context of providing interventions for children. Since the focus of this paper was to identify and define the types of support to families that are typically included in such early childhood interventions, these studies were of particular interest.

The articles collected based on the above criteria were included in the final review based upon three stipulations. First, the article needed to have specified a clear intervention or interventions related to the area of early childhood that was “tested” through an empirical research design. Second, at least one aspect of the intervention needed to target parents or family members. Third, the results of the intervention research needed a component of measurement regarding how the parents or family members responded to the intervention in question. Based on all, we included a total of 26 articles in this review.

Results

Table 1 presents a synthesis of these 26 articles. The intervention studies reflect intervention models including studies of support for families that were part of evaluations of: (a) parent training programs; (b) general family-centered practice models which offer comprehensive support, which may include counseling, parenting skills, respite care, and/or support groups; (c) peer supports; (d) two-generation programs; and (e) respite care. The following sections summarize the findings of this review related to each of these types of family support. The columns in Table 1 describe the type of family support provided, a brief summary of results pertaining to families, our judgment of the specific family outcomes represented in the study in terms of both ECO Center and FQOL family outcomes, and the reference. Because of the focus on family support in this article, we omitted descriptions of specific child measurements, results, and outcomes.

In each of the following sections we will discuss the three primary questions for this review: (a) the definitions or descriptions of the types of support families receive, (b) the types of family variables or impacts included in the research or evaluation design and their findings, and (c) a categorization of the link of these types of supports and impacts to both the ECO outcomes and the family quality of life (FQOL) domains as indicated by the results of the evaluation.

Parent Training Programs

Parent training programs encompass intervention research that is specifically focused on providing parent training to improve interactions between parents and their children. The intervention studies in Table 1 were focused on specific areas of parent education and/or a specific population: family-infant interaction and home environment (Bakermans-Kranenburg, van Ijzendoorn, & Bradley, 2005); father empowerment to improve parenting (Fagan & Stevenson, 2002); home-based parent training program and support group (Kucuker, 2006); skill-building groups to improve parental well-being and family interaction (Niccols & Mohamed, 2000); parent management training to reduce behavior problems (Roberts, Mazzucchelli, Taylor, & Reid, 2003); Parents As Teachers programs (Wagner & Spiker, June 2001); and deaf mentor program for parents to improve interactions with their children who are deaf (Watkins, Pittman, & Walden, 1998). Some of these interventions were offered in the context of a home visiting model, while others were provided in group settings.
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<tr>
<th>References/Support Identified</th>
<th>Results</th>
<th>Outcomes</th>
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<tbody>
<tr>
<td><strong>Bakermans-Kranenburg, M. J., van Ijzendoorn, M. H., &amp; Bradley, R. H. (2005)</strong></td>
<td>** Results **</td>
<td>** Outcomes **</td>
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</table>
| Meta-analysis of early childhood intervention studies aimed at parenting or parent-child interaction using the HOME assessment. (U.S. & international) | 1. Interventions with middle-class, non-adolescent parents reported higher effect sizes than interventions with low-SES or adolescent parents. | ECO outcomes ● Families help their child learn and grow  
FQOL Outcomes ● Parenting |
| | 2. Five to 16 home-based intervention sessions in a limited period were most effective. | |
| | 3. Interventions starting when the child was older than 6 months or started prenatally were more effective than interventions starting in the first 6 months of the child’s life. | |
| **Fagan, J., & Stevenson, H. C. (2002)** | ** Results ** | ** Outcomes ** |
| Parent training for fathers. | 1. Resident fathers (those who live at home) in the parent training group reported significantly greater self-esteem at the end of the intervention in comparison to resident fathers in the control group. | ECO outcomes ● Families help their child learn and grow  
FQOL Outcomes ● Parenting  
● Emotional well-being |
| | 2. Resident fathers in the parent training group showed significant improvement in parenting satisfaction in comparison to resident fathers in the control group. | |
| | 3. All fathers in the parent training group made significantly greater gains than fathers in the control group in their attitudes about facilitating the teaching-learning process for their child. | |
| **Kucuker, S. (2006)** | ** Results ** | ** Outcomes ** |
| Early intervention program, to enhance the development of children with disabilities ages 0–4 through a parent training program (Turkey) | 1. The severity of depression scores for both mothers and fathers had decreased after participating in the early intervention program with parent training. | ECO outcomes ● Families help their child learn and grow  
FQOL Outcomes ● Parenting  
● Emotional well-being |
| | 2. There were no differences reported in parental stress scores. | |
| **Niccols, A., & Mohamed, S. (2000)** | ** Results ** | ** Outcomes ** |
| Parenting skill building group focused on attachment theory for parents of infants with developmental delays | 1. Parents in the skill-building group reported statistically significant lower levels of parent-child dysfunctional interaction, parental distress, and depression. | ECO outcomes ● Families understand their child’s strengths, abilities and special needs  
FQOL Outcomes ● Parenting  
● Emotional well-being |
| | 2. Parents in the comparison groups showed a trend towards increased depression. | |
| | 3. Parents in the skill-building group reported high satisfaction, high effectiveness of the content, and increased support from others. | |
| | 4. The majority of parents in the skill-building group (75%) chose consultation as their preferred follow-up service option. | |
## TABLE 1—(Continued)

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<th>References/Support Identified</th>
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<th>Outcomes</th>
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2. Studies using a group intervention format of PMT indicated some positive effects on child behavior, parental stress, parental self-efficacy, and marital satisfaction.  
3. Studies with individual families indicate some support for generalization of effects to other settings and behaviors. | ECO outcomes  
- Families help their child learn and grow  
FQOL Outcomes  
- Parenting  
- Emotional well-being |
| **Wagner, M., & Spiker, D. (June 2001)** | 1. The very low income group had more positive effects than the moderate income group in the area of language and literacy promoting behaviors.  
2. PAT families reported being happier taking care of their families.  
3. After three years, PAT teen mothers had more knowledge, greater literacy promoting behaviors on HOME, less reports of child maltreatment, and increased positive home environment compared to the control group. | ECO outcomes  
- Families help their child learn and grow  
FQOL Outcomes  
- Parenting  
- Emotional well-being |
| **Watkins, S. et al. (1998)**  | 1. Parents of the children in the deaf mentor group reported that they understood what the child was communicating to them a greater percentage of the time than parents in the control group.  
2. Parents in the deaf mentor group reported that their children understood them a greater percentage of the time than the parents of the control group.  
3. Parents in the deaf mentor group reported less frustration and increased number of signs when communicating with their child.  
4. During the intervention, parents in the deaf mentor group were observed in videotaped sessions to use more ASL.  
5. Parents in the deaf mentor group reported perceptions more consistent with the deaf culture and deaf community. | ECO outcomes  
- Families understand their child’s strengths, abilities and special needs  
FQOL Outcomes  
- Parenting  
- Disability-related support |
| **Dunst, C. J. et al. (2001)**  | 1. Participation in a larger variety of activity settings was related to parents reporting that they engaged their children in more learning activities.  
2. The greater adoption and use of the responsive teaching methods by parents, the more the children were observed interacting with adults.  
3. Greater adoption and use of the responsive teaching methods by parents were related to enhanced positive child affect. | ECO outcomes  
- Families help their child learn and grow  
FQOL Outcomes  
- Family interaction  
- Parenting |

**Type of intervention model:** General family centered practice models—usually offering comprehensive support; includes some programs that focus primarily on the child but include evaluations of impacts on families.
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<th>References/Support Identified</th>
<th>Results</th>
<th>Outcomes</th>
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| Erickson-Warfield, M. E. et al. (2000) Parent support groups Intensity of services provided to children | 1. The greatest change between entry and discharge of EI was increased social support networks, both formal and informal.  
2. More intense service (total hours of service) was significantly and positively correlated with increased family cohesion.  
3. More intensive parent support group services and more intensive child group services were significant predictors of increased social support.  
4. The greater number of different services provided resulted in more parent-reported gains in social support helpfulness.  
5. Maternal education impacted service intensity and comprehensiveness of services. | ECO outcomes  
● Families help their child learn and grow  
● Families have support systems  
● Families are able to gain access to desired services, programs, and activities in their community  

FQOL Outcomes  
● Family interaction  
● Emotional well-being  
● Disability-related support                                                                 |
| Hendriks, A. H. C. et al. (2000) Family-directed intervention which may include family support groups, counseling and respite care (The Netherlands) | 1. On average, both mother and father perceived a positive change in well-being 10 months after participating in the program.  
2. Mothers perceived a greater positive change in well-being than fathers. | ECO outcomes  
● Families have support systems  

FQOL Outcomes  
● Emotional well-being                                                                                                                            |
2. Overall, relationship-focused intervention reduced parental stress. | ECO outcomes  
● Families help their child learn and grow  

FQOL Outcomes  
● Parenting  
● Emotional well-being                                                                                                                            |
| Mahoney, G., & Bella, J. M. Family-centered practice model involving an array of family supports | 1. There was no overall change on the Family Environment Scales.  
2. There were marginal changes in maternal stress.  
3. Although there was no overall change in maternal affective styles, enjoyment and expressiveness significantly decreased during intervention.  
4. Approximately 45% of families reported receiving a comprehensive array of family services, which were characterized by extremely high levels of services related to their child’s development and moderate levels of services related to family-level concerns. | ECO outcomes  
● Families help their child learn and grow  
● Families have support systems  
● Families are able to gain access to desired services, programs, and activities in their community  

FQOL Outcomes  
● Family interaction  
● Emotional well-being  
● Disability-related support                                                                                                                       |
| Mahoney, G. & Perales, F. (2005) Relationship-focused early intervention—two studies | 1. Mothers who used responsive teaching made significant increases in responsiveness to their children. | ECO outcomes  
● Families help their child learn and grow  

FQOL Outcomes  
● Family interaction  
● Parenting                                                                                                                                                                                  |
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<th>References/Support Identified</th>
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<th>Outcomes</th>
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<tr>
<td>Trivette, C. M., Dunst, C. J.,</td>
<td>1. Helpgivers from more family-centered programs who had more frequent</td>
<td>• Families know their rights and advocate effectively for their children</td>
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<td>Boyd, K., &amp; Hamby, D. W. (1995)</td>
<td>contact with families reported more positive assessments of helpgiving</td>
<td>• Families are able to gain access to desired services, programs, and activities in their community</td>
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<td>Family-centered services,</td>
<td>practices.</td>
<td><strong>FQOL Outcomes</strong></td>
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<td>using supports to help</td>
<td>2. Participation in family-centered programs in which parents had</td>
<td>• Emotional well-being</td>
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<td>families access</td>
<td>frequent contact with helpgivers using empowering helpgiving practices.</td>
<td>• Disability-related support</td>
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<td>informal supports.</td>
<td>was associated with greater indication of personal control.</td>
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<td><strong>ECO outcomes</strong></td>
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<td>• Families have support systems</td>
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<td>• Families are able to gain access to desired services, programs, and activities in their community</td>
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<td><strong>FQOL Outcomes</strong></td>
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<td>• Emotional well-being</td>
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<td></td>
<td></td>
<td>• Disability-related support</td>
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<tr>
<td>Ainbider, J. G. et al. (1998)</td>
<td><strong>Type of intervention model: Peer support</strong></td>
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<tr>
<td>Qualitative analysis of</td>
<td>1. Parent to Parent support is particularly helpful when reliable</td>
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<td>Parent programs through</td>
<td>allies have the four components: (a) perceived sameness, (b)</td>
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<td>interviews with 24 parents</td>
<td>comparable situations for learning relevant skills and gathering useful</td>
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<td>information, (c) availability of support, and (d) mutuality of support.</td>
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<td>2. Some parents did not find their experience with Parent to Parent to</td>
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<td>be helpful, but expressed belief in the value of parent</td>
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<td>connections.</td>
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<td>3. Barriers to unsuccessful matches included logistics in connecting</td>
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<td>due to business, cost for phone bills, lost numbers, or negligent</td>
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<td>follow-up. Barriers also included differences in preferences and values</td>
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<td>regarding parenting style, communication style, outlook on disability</td>
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<td></td>
<td>and future vision for the children.</td>
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<tr>
<td>Ireys, H. T. et al. (1996)</td>
<td>1. The mothers receiving 1:1 mentoring reported a decrease in mental</td>
<td>• Families have support systems</td>
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<tr>
<td>Social support intervention</td>
<td>health symptoms compared to the control group. Mental health symptoms</td>
<td>• Families are able to gain access to desired services, programs, and activities in their community</td>
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<td>for mothers of children with</td>
<td>included depression, anxiety, anger, and cognitive disturbance.</td>
<td><strong>FQOL Outcomes</strong></td>
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<td>Juvenile Rheumatoid Arthritis</td>
<td>2. The mothers receiving 1:1 mentoring reported greater improvements on</td>
<td>• Emotional well-being</td>
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<td>(ages 2–11). The social</td>
<td>perceived availability of supports than those mothers in the control</td>
<td>• Disability-related support</td>
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<td>support intervention was a</td>
<td>group.</td>
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<td>one-to-one mentoring match of</td>
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<td>mothers of children with JRA.</td>
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<td>Rosenberg, S. A. et al.</td>
<td>1. Both groups believed the services they received were helpful. The</td>
<td>• Families understand their child’s strengths, abilities and special needs</td>
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<td>(2002) Comparison of nurse</td>
<td>families who received visits from the paraprofessionals were</td>
<td>• Families have support systems</td>
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<td>home visiting model to home</td>
<td>significantly more positive about their experience.</td>
<td>• Families are able to gain access to desired services, programs, and activities in their community</td>
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<td>visiting model with trained</td>
<td>2. Families who received services from a paraprofessional indicated they</td>
<td><strong>FQOL Outcomes</strong></td>
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<td>paraprofessionals, who</td>
<td>learned more about how to obtain medical and therapy services than the</td>
<td>• Emotional well-being</td>
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<td>are all mothers of children</td>
<td>nurse home visiting group.</td>
<td>• Physical/material well-being</td>
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<td>with special health care</td>
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<td>• Disability-related support</td>
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<td>needs</td>
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<td>References/Support Identified</td>
<td>Results</td>
<td>Outcomes</td>
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<tr>
<td><strong>Singer, G. H. S. et al. (1999)</strong>&lt;br&gt;Peer support</td>
<td>1. Parents who participated in Parent to Parent had positive perceptions of their child and his or her impact on the family. 2. Initial contacts in Parent to Parent were not associated with changes in parents’ perceptions of empowerment. 3. Parents who participated in Parent to Parent made statistically greater progress than the control group in getting help with their initial problem. 4. Eighty-nine percent of the parents who participated in Parent to Parent rated it as helpful.</td>
<td>ECO outcomes&lt;br&gt;● Families have support systems&lt;br&gt;● Families are able to gain access to desired services, programs, and activities in their community&lt;br&gt;FQOL Outcomes&lt;br&gt;● Emotional well-being&lt;br&gt;● Disability-related support</td>
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<tr>
<td><strong>Gomby, D. S. et al. (1999)</strong>&lt;br&gt;Evaluation of home visiting programs using various models; most focused on providing parent information, but also providing supports to parents</td>
<td>1. Home visiting programs may be associated with changes in some parent attitudes, though not necessarily their behaviors that are related to the prevention of abuse and neglect. 2. Home visiting may be beneficial in decreased child maltreatment, though evidence was primarily from self-report measures. 3. Only Nurse Home Visiting Program found benefits in altering maternal life course for poor unmarried women. Women who had been home visited had fewer subsequent pregnancies and births, deferred their second birth, spent fewer months on welfare, and had fewer problems resulting from substance abuse and arrests than the control group.</td>
<td>ECO Outcomes&lt;br&gt;● Families help their child learn and grow&lt;br&gt;● Families have support systems&lt;br&gt;● Families are able to gain access to desired services, programs and activities in their community&lt;br&gt;FQOL Outcomes&lt;br&gt;● Family interaction&lt;br&gt;● Parenting&lt;br&gt;● Physical/Material well-being</td>
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<td><strong>Love, J. M. et al. (2002)</strong>&lt;br&gt;Two-generation intervention model providing comprehensive family supports for self-sufficiency and mental health; parent training and child-oriented services. Some programs were home visiting models, others were center-based; most were combination.</td>
<td>1. Families in Early Head Start programs measured more positive impacts on parenting behaviors, and support for parents’ emotional well-being. 2. The programs led to lower levels of insensitivity and hostile parenting behavior and the use of less punitive discipline strategies. 3. At age 3, there were no overall impacts on measures of parent’s health or mental health and family functioning. 4. Overall, results showed continued impacts on parent training and education activities for families in the program compared to control group families.</td>
<td>ECO Outcomes&lt;br&gt;● Families help their child learn and grow&lt;br&gt;● Families have support systems&lt;br&gt;● Families are able to gain access to desired services, programs and activities in their community&lt;br&gt;FQOL Outcomes&lt;br&gt;● Family interaction&lt;br&gt;● Parenting&lt;br&gt;● Emotional well-being&lt;br&gt;● Physical/Material well-being</td>
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<td><strong>St. Pierre, R. G. et al. (1995)</strong>&lt;br&gt;Two generation service programs focusing simultaneously on improving outcomes for families and providing supports (usually through parent training) for children.</td>
<td>1. Two-generation programs increase the rate of participation for both children and parents in social and educational services. 2. Two-generation programs have positive effects on parenting, including time spent with child, parent teaching skills, expectations for child’s success, attitudes about child rearing and parent-child interactions. 3. Two-generation programs have large positive effects on attaining a GED. There are no effects on mothers’ depression levels, self-esteem, and social supports. 4. There was a positive correlation to the amount of participation and GED attainment.</td>
<td>ECO Outcomes&lt;br&gt;● Families help their child learn and grow&lt;br&gt;● Families are able to gain access to desired services, programs and activities in their community&lt;br&gt;FQOL Outcomes&lt;br&gt;● Family interaction&lt;br&gt;● Parenting&lt;br&gt;● Emotional well-being&lt;br&gt;● Physical/Material well-being</td>
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Only half of the articles included in this section of Table 1 were specific to families who have children with disabilities; the remainder of the articles focused on “at-risk” children and families. Programs aimed at families of children with disabilities tended to use measures of maternal/parental stress or depression and family interaction; the programs for

<table>
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<th>References/Support Identified</th>
<th>Results</th>
<th>Outcomes</th>
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<td>Zeece, P. D. &amp; Wang, A. (1998) Two-generational program-Head Start and the Family Empowerment Transition Program</td>
<td>1. Over a three-year time span, parent-centered risk decreased for the participants in the Head Start +Family Empowerment Transition Program. 2. There were no significant differences between the two groups regarding family economic risk over time.</td>
<td>ECO Outcomes  ● Families know their rights and advocate effectively for their children  ● Families help their child learn and grow  ● Families have support systems  ● Families are able to gain access to desired services, programs and activities in their community  FQOL Outcomes  ● Parenting  ● Emotional well-being  ● Physical/Material well-being</td>
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<td>Chan, J. B. &amp; Sigafos, J. (2001) Respite care</td>
<td>1. The use of respite care was associated with reduced parental stress, especially for mothers, in the majority of families who have children with developmental disabilities.</td>
<td>ECO Outcomes  ● Families have support systems  ● Families are able to gain access to desired services, programs and activities in their community  FQOL Outcomes  ● Emotional well-being</td>
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<td>Cowen, P. S. &amp; Reed, D. A. (2002) Respite care</td>
<td>1. Reported parental stress scores (parent-child relationship) were significantly lower following respite care interventions. 2. Following respite care intervention, scores reporting parents’ perception of the child’s traits were significantly lower.</td>
<td>ECO Outcomes  ● Families have support systems  ● Families are able to gain access to desired services, programs and activities in their community  FQOL Outcomes  ● Family interaction  ● Emotional well-being</td>
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<td>Herman, S. E. &amp; Marcenko, M. O. (1997) Respite care</td>
<td>1. Respite care use indirectly effected parental depression. The quality of care and the perception of time the parent has for themselves were mediating variables.</td>
<td>ECO Outcomes  ● Families have support systems  ● Families are able to gain access to desired services, programs and activities in their community  FQOL Outcomes  ● Emotional well-being</td>
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“at risk” children and families centered more on the acquisition of parenting skills and involvement with their children.

Effectiveness of parent training programs was typically measured in terms of gains in child outcomes, e.g., in reductions of behavior problems or improved child language and literacy behaviors or other cognitive gains. Impacts on parents that were measured included the acquisition of parenting skills, parenting stress or depression, and parenting satisfaction. In the intervention studies that also measured parents in terms of depression or stress levels, parents reported reductions of these variables (Kucuker, 2006; Niccols & Mohamed, 2000; Roberts et al., 2003). Last, a meta-analysis by Bakersman-Kranenburg, van Ijzendoorn and Bradley (2005) revealed that (a) middle-class, non-adolescent parents benefited more from early childhood interventions than adolescent or low income parents, (b) limited (between 5–16), home-based sessions were more effective than interventions with sessions numbering more than 16, and (c) sessions for families with children either older than six months or during the prenatal stage were more effective than during the first six months of a child’s life.

Based on the ECO Center family outcome definitions, we concluded that interventions that improve parenting and reduce stress or depression are consistent with the ECO family outcomes of (a) families understand their child’s strengths, abilities and special needs, (c) families help their children learn and grow, and (d) families have support systems. We also concluded that the primary area of Beach Center family quality of life domains impacted by these programs was the Parenting and Emotional Well-Being sub-scales.

General Family-Centered Practice Models

A number of investigators have reported results of evaluations of early intervention programs described as “family-centered” services. These programs may or may not provide service components specifically targeted to parents (e.g., parent support groups), but investigators describe the programs as family-centered in the sense of developing empowering partnerships with families in decision-making and delivering services to children with disabilities (i.e., the how of family-centered practice). Evaluations of studies included in this review include both those that identified specific supports provided to families and those that did not describe family support but did include family impact measures in the evaluation design.

General family-centered practice models described in this section included home visiting or center-based programs that provided a component of family support and collaboration (see Table 1). Families in these studies may have received a variety of types of family support depending on their individual needs and preferences. These included counseling, parenting skills, respite care, and/or support groups. Although the interventions may have focused primarily on outcomes for children, the evaluation of these programs also investigated the impact on families. The general theme from this group of research studies indicates that early intervention programs that provide general family-centered practices that focused on relationships between the parent and child positively impacted parent-child interaction and improved family communication and cohesion (Dunst, Bruder, & Trivette, 2001; Kim & Mahoney, 2003; Mahoney & Perales, 2003; Mahoney & Perales, 2005). Additionally, the parent’s use of responsive teaching methods (Dunst et al.) and participation in support groups improved parental emotional well-being (Erickson-Warfield, Hauser-Cram, Krauss, Shonkoff, & Upshur, 2000; Mahoney & Bella, 1998). Lastly, the child’s participation or enrollment in an intervention program with different types of family support, which included parent training and counseling, positively impacted parental well-being and family cohesion (Hendriks, De Moor, Oud, & Savelberg, 2000).

In comparisons of the reported outcomes from these studies, we concluded that family-centered early intervention programs that provided an array of family support achieved a number of the ECO outcomes for families. These included (c) families help their child grow and learn; (d) families have support systems; and (e) families have access to desired services, programs and activities in their community. With respect to family quality of life domains, we concluded that the outcomes re-
ported were most relevant to Emotional Well-being, Parenting, and Family Interaction.

**Peer Support**

Peer support offers a way for people in similar circumstances to offer each other emotional and informational supports, as well as other self-help. For families of young children with disabilities or at-risk for disabilities, parents may be offered one-to-one peer support or parent support groups as a component of the overall early intervention program. Support groups also may be offered for siblings of a child with a disability or for other extended family members such as grandparents. We were unable to find recent specific research focusing exclusively on the impact of support groups on families, but there were overall evaluations of the general family-centered programs which included support groups, which were discussed above. In this section, we discuss two types of peer support models for which there is evaluation research available, the Parent to Parent model (Ainbinder et al., 1998; Singer et al., 1999) and one-to-one peer mentoring programs (Ireys, Sills, Kolodner, & Walsh, 1996; Rosenberg, Robinson, & Fryer, 2002).

Parent to Parent groups match trained parents with parents who request assistance (Ainbinder et al., 1998; Singer et al., 1999). Parent to Parent organizations provide parents with connection to resources and services in their community, emotional support, and practical information about caring for a child with a disability (Ainbinder et al.; Singer et al.). Singer et al. evaluated Parent to Parent mentoring programs in multiple sites across five states. As a smaller component of the larger study, Ainbinder et al. conducted a qualitative evaluation of Parent to Parent programs by interviewing 24 parents. The majority of the families participating in these two studies was Caucasian and married. The children with disabilities ranged in ages from one to 16, with an average age of seven. The population for this group of studies was expanded to include children beyond the age of eight, as we found no peer support intervention studies that focused exclusively on the early childhood population.

The evaluation studies of one-to-one peer mentoring programs were similar in that mentoring services were provided by mothers, mothers of children with Juvenile Rheumatoid Arthritis (Ireys et al., 1996) or mothers of children with special needs (Rosenberg et al., 2002). The study by Rosenberg et al. evaluated home visiting services delivered to families considered to be in an at-risk situation due to environmental or caregiving factors. The services were delivered by trained paraprofessionals who were all mothers of children with special needs and were recruited from the neighborhoods in which they provided services. The families received two visits per month and the visits focused on building family strengths, identifying needs, assisting with accessing services and supports within the community, and providing a parent mentor to guide maternal care and home safety issues (Rosenberg et al.). The mentoring program evaluated by Ireys et al. (1996) focused on enhancing three types of social support—informational, affirmational, and emotional support. Mothers in the intervention group were in contact with their peer mentor every two weeks via telephone, through home visits held every 6 weeks, and at group events, such as picnics or group lunches (Ireys et al.).

The multi-site Parent to Parent study reported that peer supports had a significant impact on attitudes regarding acceptance of family and disability; however, contacts with the organization did not change parents’ perception of empowerment (Singer et al., 1999). Further, successful matches were contingent upon equality and mutuality in their Parent to Parent relationships (Ainbinder et al., 1998). The evaluation of the home visiting model using peers as paraprofessionals reported improvement for families in care giving skills, home environment, and employment status (Rosenberg et al., 2002). One-to-one peer mentoring also decreased the number of reported mental health symptoms mothers experienced (Ireys et al., 1996). Additionally, families who received support from other parents who have children with special needs made greater progress in getting help with their disability-related problems than parents did on their own (Ireys et al.; Rosenberg et al.; Singer et al.). Overall, participants rated the
programs with peer support as helpful (Rosenberg et al.; Singer et al.).

In comparing these findings to definitions of the ECO Center family outcomes, we concluded that peer support programs typically offer families (a) information to understand their children’s strengths, abilities and special needs, (d) support systems, and (e) information to gain access to desired services, programs, and activities in their community. The outcomes reported in these peer support studies also appear to be relevant to the family quality of life domains of Emotional and Physical/Material Well-Being and Disability-Related Support.

Two-Generation Programs

The term “two-generation programs” arises from the theory that long-term improvements in outcomes for children from families with multiple challenges requires a comprehensive and intensive array of services that are focused simultaneously on interventions for the child and on supports for the family as a whole (St. Pierre, Layzer, & Barnes, 1995). With respect to the family enhancement component of two-generation programs, these services generally involve the development of an individualized family support plan to help parents reach goals in education (e.g., completing a GED or learning English), self-sufficiency, mental health (e.g., accessing substance abuse treatment or shelter from domestic violence), and health and nutrition. A part of the child enhancement component of two-generation programs also typically includes parent training and information, using group and/or home visiting approaches (Love et al., 2002).

The desired outcomes of two-generation programs are to produce improved cognitive and developmental functioning in children, as well as increase family functioning and self-sufficiency (Love et al.), thus negating the effects of poverty on families.

One article included in Table 1 is a review of several two-generation programs, including Avance, Child Family Resource Program, Comprehensive Child Development Program, Even Start, Head Start Family Service Centers and New Chance (St. Pierre et al., 1995). The second article is a report of a longitudinal study of the impacts of Early Head Start on children and families (Love et al., 2002). Also included is an evaluation of five national home visiting models, including Nurse Home Visitation Program, Hawaii’s Healthy Start, Home Instruction Program for Preschool Youngsters, Comprehensive Child Development Program, and Healthy Families America (Gomby, Culross, & Behrman, 1999). Finally, Table 1 includes a review of an article evaluating the effects of Head Start plus a Family Empowerment Transitioning Program for at-risk children and their families (Zeece & Wang, 1998). It is important to note that all of these studies included populations of at-risk children and families; none were specifically designed for families of children with disabilities.

There was some controversy over the effects of two-generation programs on children since the effect sizes of the programs reviewed by St. Pierre, Layzer, and Barnes (1995) were relatively small. The Early Head Start study found modest effect sizes for child outcomes that were sustained until the age of three years (Love et al., 2002). Additionally, the Head Start plus Family Empowerment Transitioning Program decreased parent-centered risk (emotional/social issues) and improved child developmental outcomes over a three-year period (Zeece & Wang, 1998). With respect to impacts on families, the results are more consistent: These programs appeared to have a positive impact on parenting, including parent-child interactions and reductions in negative discipline (Gomby et al., 1999; Love et al.; St. Pierre et al.). In addition, two-generation programs appeared to have an impact on improvements in parents’ educational attainments, but did not have significant effect on parents’ health or mental health (St. Pierre et al.).

In analyzing the reported family outcomes of two-generation programs in comparison to the ECO Center family outcomes, we conclude the results were potentially relevant to all five outcomes. However, given the variables in these studies, it appears that two-generation programs most often addressed the ECO outcomes of (b) families know their rights and advocate effectively for their children, (c) families help their child learn and grow, (d) families have support systems, and (e) families are able to gain access to desired services, programs, and activities in their community. Further,
comparison of the reported results of these studies suggests that two-generation programs may address family quality of life domains of Family Interaction, Parenting, Emotional Well-Being and Physical/Material Well-Being of families.

**Respite Care**

Respite care services provide temporary child care and support to families with a child with a disability (Cowen & Reed, 2002). The use of respite care has been proposed as a way to reduce stress and depression for parents. In 2002, respite care was only cited on IFSPs a total of 135 times for all Part C programs in the 50 states, including DC and Puerto Rico (Danaher & Armijo, 2005).

Table 1 includes data on three articles that evaluated the impact of respite care on families. All studies focused on measuring families’ emotional well-being, including stress and depression levels. Unlike the other intervention models in this paper, we selected respite care studies that included families with children from ages two through 20, because we could find no evaluations of respite care focused specifically for young children with disabilities and their families. The population of these studies tended to be Caucasian, low-to-middle class families.

Themes of results from these three articles indicate that utilizing respite care services reduced parental stress (Chan & Sigafoos, 2001; Cowen & Reed, 2002). The quality of the child care and the frequency by which parents utilized the service affected their level of depression; the higher the quality of care, the more often the services are used, which was associated with lower depression levels (Herman & Marcenko, 1997). All of these studies focused on short-term interventions (18 months or less); more information is needed on the impact of long-term use of respite for families (Chan & Sigafoos).

Based on these reported results, we conclude that early intervention programs providing or referring families to respite care services may be relevant to the ECO Center family outcomes of: (d) families have support systems, and (e) families are able to gain access to desired services, programs and activities in their community. With respect to family quality of life domains, the reported results appear to be relevant to improved Family Emotional Well-Being.

**Discussion**

**Limitations**

There are some limitations to this review of intervention research for family supports. First, there are evaluations of commercial programs and models that are aimed at improving family outcomes that were excluded from our review. We chose to exclude commercially available curriculum or materials for early intervention since all Part C programs would not have the opportunity to pursue these programs. Also, the majority of the studies were aimed at mothers, thus limiting generalizations of the findings to the entire family unit.

**Research Implications**

There are four research implications to consider from the results of this literature review. They include (a) inconsistent and loosely defined terminology in intervention research articles, (b) lack of family outcomes and measures tailored to families in intervention research, (c) limited intervention research targeting families and young children with disabilities, and (d) few evaluations specifically focused on family emotional supports.

First, the intervention research included in this review measured outcomes for families using many different variables. Those variables included stress or depression levels, health benefits, abuse and pregnancy rates, home environment, self-esteem, satisfaction, attitudes, frustration levels, acceptance, negativity, parenting behavior, participation, interaction, income and employment levels, social supports, use of teaching practices, family cohesion, perceptions, affective styles, number of services received, responsiveness, socialization, helping practices, and control. The definitions and model descriptions to evaluate family support and outcomes in intervention literature are not mutually exclusive; therefore, it is difficult to parcel out what aspect of the support is truly impacting the family. For example, in this review the category of general family-centered practices had a variety of dif-
ferent interventions grouped together which made it difficult to delineate the specific support that was being offered to families. Either the research or model description was vague or the field of early intervention has not clearly defined the terminology or definitions related to family support. Therefore, more specificity is needed in the terminology and definitions that the field uses to guide research on family support and outcomes.

Secondly, the overlap in variables measured leads to confusion in interpreting the outcomes for families. In this review, we attempted to categorize the results of each study according to the ECO outcomes and Beach Center family quality of life domains as a framework for discussing family support outcomes. A framework for the field in measuring family outcomes, both short-term and long-term, is needed. To meet this goal, measurements with psychometric properties tailored to assess families’ outcomes are warranted. Further research on family support is needed that specifically measures both short-term and long-term family outcomes.

The third research implication is the limited intervention research targeting families and young children with disabilities. Because a primary purpose of this article was to determine how family support is defined and delivered in early intervention studies, we broadened our search beyond programs focused on families of children with disabilities in order to include more types of family support in this analysis. This necessity in itself underscores the lack of emphasis on supports for families of children with disabilities. Only 18 of the 26 articles in this paper evaluated interventions for this population. There were more intervention studies available that sampled general early childhood populations, especially in regard to parent training programs and two-generation programs. In this article, only approximately half of the articles included in the parent training programs category measured parenting aspects in relation to families with children having disabilities. None of the studies evaluating two-generation programs sampled families and children with disabilities. The intervention in these two areas is promising; however, the research needs to be extended to deliberately include families and children with disabilities.

Another research implication from this review is the limited number of intervention research targeting families and young children with disabilities evaluating family emotional support. One category of intervention models, peer support, examined the intervention research on emotional supports for families. Included were studies evaluating Parent to Parent and peer mentoring programs. There were no studies specifically evaluating support groups as the primary intervention for families. Support groups were evaluated as part of more comprehensive interventions in the category of general family-centered services, therefore, making it difficult to determine the specific impact group supports had on families. Family emotional support would be an area for further research.

Policy Implications

There are two policy implications that have evolved from this literature review. They include (a) policy adoption of an established set of family outcomes using specific definitions of family support and (b) policy adoption of evidence-based family support in IDEA.

First, policy must adopt an established set of family outcomes using specific definitions and terminology for family support. This paper has attempted to link family support intervention research with outcomes defined by the ECO Center and the Beach Center family quality of life domains. The goals developed by the ECO Center reflect short-term outcomes, though long-term impacts also need to be emphasized. Long-term family outcomes are reflected in the Beach Center’s family quality of life domains. A challenge to developing an established set of family outcomes in policy is the overlap or lack of specificity in terminology and definitions of family support. As previously recommended in this paper, research needs to delineate the specific terminology for defining family support. Once delineated through research, the family support definitions and terms need to be incorporated into a framework for family outcomes. Further, a family outcome framework should be adopted into federal policy, such as IDEA Part C and the DD Act.

Second, policy must adopt evidence-based family support in the next reauthorization of
IDEA. The intervention research evaluating outcomes for families is limited in scope to only a few types of support outlined in IDEA. There is a gap between the types of supports stated in IDEA and evidence-based family support reviewed in this article. For example, IDEA does not require agencies to provide families with respite care, though the intervention research indicates respite care enhances the emotional well-being of families by decreasing parents’ stress and depression levels. Similar positive outcomes for Parent to Parent and peer mentoring programs were reported. Families reported receiving emotional and informational support from peers. In knowing the positive impacts respite care programs and peer support have on families, it would seem feasible to include these types of family support in the available services outlined in IDEA under Part C in the next reauthorization. Policy should mandate the types of family support that are empirically validated.

Summary

We have reviewed intervention studies that evaluated support for families which included parent training programs, general family-centered practice models offering comprehensive family support, peer support, two-generation programs, and respite care. The majority of studies reviewed did not clearly define the specific support provided to families and, thus, it is not often clear just what the interventions entailed. However, we are able to identify impacts on families of this support, both those that were specifically defined (e.g., respite care, peer supports) and those that were broadly comprehensive. Intervention research suggests that parent training programs improved parenting skills and parent satisfaction and reduced parental stress (Niccols & Mohamed, 2000; Roberts et al., 2003). Additionally, general family-centered practice models offering an array of support improved overall family cohesion and parental emotional well-being (Dunst et al., 2001; Erickson-Warfield et al., 2000; Hendriks et al., 2000; Mahoney & Bella, 1998). An evaluation of peer supports indicated parental attitudes towards family and disability improved, but not parental empowerment (Singer et al., 1999). Two-generation programs positively impacted parenting (Gomby et al., 1999; Love et al., 2002) and improved parents’ educational attainments, but did not have significant effects on parental health or mental health (St. Pierre et al., 1995). Finally, respite care has short-term effects of reducing parental stress (Chan & Sigafoos, 2001; Cowen & Reed, 2002). The intervention research reviewed in this article, overall, reported positive outcomes for families. Most often, the evaluations focused on child outcomes and family impacts were incidental in the reporting of the findings of the study. The outcomes for families could be characterized by the family quality of life domains of family interaction, parenting, emotional and physical/material well-being, and disability-related supports, as well as by the categories of family outcomes defined by the ECO Center. In reviewing the intervention research, it is apparent that the implication for the early intervention field is to adopt consistent terminology defining family support. Research on family support is also needed that specifically links to family outcomes, thus guiding future policy decisions for families and young children with disabilities.

References


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Differences Between Employees’ and Supervisors’ Evaluations of Work Performance and Support Needs

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Abstract: Assessment systems are needed that are sensitive to employees’ work performance as well as their need for support, while incorporating the input from both employees and their supervisors. This study examined the correspondence of one such evaluation system, the Job Observation and Behavior Scale (JOBS) and the JOBS: Opportunity for Self-Determination (JOBS: OSD), to establish whether performance and support evaluations administered by work supervisors would match self-determined perceptions of the same variables by sheltered and supported employees with disabilities. Results showed that JOBS ratings established by supervisors did not correspond closely to employees’ self-determined ratings for any of the JOBS’ subscales (Work-Required Daily Living Activities, Work-Required Behavior, and Work-Required Job Duties). Results also showed that employees consistently overestimated their work performance and underestimated their support needs relative to supervisors’ ratings. These results suggest that major discrepancies exist between supervisors’ and employees’ perceptions of their work performance and support needs. These discrepancies may be important as job coaches, teachers, rehabilitation professionals, and employees and students with disabilities participate in employment preparation and transition planning.

For most adults, employment is intricately tied to culture and social values, and is central to the roles adults hold in their communities and within their families. Because most people spend the majority of each day working, work is significant in how adults define themselves (Abrams, DonAroma, & Karan, 1997; Grossi, Schaaf, Steigerwald, & Mank, 2002; Kolstoe, 1961). For most adults, employment has personal benefits including self-confidence, direction, and increased life satisfaction (Griffin, Rosenberg, Cheyney, & Greenberg, 1996; Skinner, 2003). Economic benefits include the opportunity to shape one’s own financial independence and to decrease reliance on families and others for economic support (Anthony, 1994; Kim & Morningstar, 2005; Reisman & Reisman, 1993). Work also provides social benefits including the opportunity to establish meaningful relationships and the opportunity to contribute to one’s community (Mancuso, 1990; Storey, 2002).

Unfortunately, the benefits of work have yet to reach many individuals with disabilities, and community employment continues to be an elusive goal (Brady & Rosenberg, 2002a). For example, nearly 2/3 of adults with disabilities remain unemployed or under-employed, or only have access to employment in sheltered workshops (Levy, Jessop, Rimmerman, Francis, & Levy, 1993; Murphy, Rogan, Handley, Kincaid, & Royce-Davis, 2002). Access to community employment is particularly troublesome for individuals with more complex disabilities and behavior challenges (Hurlbutt & Chalmers, 2004; Mank, Cioffi, & Yovanoff, 1998; McDermott, Martin, & Butkus, 1999; Muller, Schuler, Burton, & Yates, 2003).

For community employment to be a successful outcome, many individuals with disabilities require explicit and purposeful employment...
and transition planning. This includes active interventions to improve work performance (such as job coaching) and attention to the design and delivery of work supports (Brady & Rosenberg, 2002a; Mancuso, 1990; Stoddent, 1998; Targett, Wehman, McKinley, & Young, 2004). In addition, employment evaluations need to be sensitive to these two separate, but inter-related dimensions. To date, evaluations of supported and sheltered employees have seldom been linked directly both to demonstrated work performance and employment support needs (Brady, Rosenberg, & Frain, 2008).

As important as it is to evaluate both of these employment dimensions (performance and support needs), it is equally important that employment evaluations include the perceptions of both employers and the employees themselves. In most community employment settings, work supervisors are most responsible for these evaluations; employment factors such as promotions, raises, and retention rely heavily on the perceptions of performance by supervisors (Graffam, Shinkfield, Smith, Polzin, 2002; Hamilton & Shumate, 2005; Krantz, 1971). However, for individuals with disabilities and other employment challenges, gaining input from employees directly is critical when making employment decisions (Brady et al., 2008; Lynn, Sumsion, McWilliam, & MacKinnon, 2004; Wehman, 2006), particularly when planning interventions to promote job skills or developing employment and transition plans (Martin & Huber Marshall, 1996; Menchetti & Garcia, 2003; Olney & Salomone, 1992; Rogan, Banks & Howard, 2000). Unfortunately, few employment evaluations include self-determination when establishing instructional or support goals and transition plans for community employment (Thoma, Williams, & Davis, 2005; Wehmeyer & Schwartz, 1997). Fewer still include both employer and employee perceptions of work performance and support needs (Shaw, McMahon, Chan, & Hannold, 2004; Valenzuela & Martin, 2005).

If employment evaluations are going to be helpful in developing employment and transition plans for individuals with disabilities, then assessment information is needed along all four of these dimensions. First, it is important to establish whether or not an employee’s work productivity matches the productivity of other employees without disabilities. This performance dimension is typically the focus of employer and supervisor evaluations (Hamilton & Shumate, 2005; Morgan & Alexander, 2005). Second, for an employment evaluation to be useful in a supported employment context, it needs to incorporate input on the type and level of support an employee uses to establish that level of performance (Rogan et al., 2000; Targett et al., 2004). Third, since employers are responsible for the continued operation of the business or enterprise, the evaluation necessarily includes the employer’s perception of an employee’s performance and support needs (Graffam et al., 2002). Finally, if transition and employment plans are to be developmental in nature – that is, the plans are to promote growth and opportunity in employees with disabilities – then evaluations must include employees’ own self-determined perspectives of their performance and support needs (Brady et al., 2008).

An evaluation model that incorporates these four employment dimensions will provide important information when developing transition and employment plans, and selecting potential job roles, work placements, performance interventions, and support. The evaluation data could establish, for example, that a supported employee’s work performance is not sufficient to maintain continued employment, and that some type of employment support (e.g., adapting materials or routines; restructuring a complex job into several single tasks) is necessary to improve that performance. Numerous models of supported and sheltered employment exist that use evaluation data to make employment decisions such as this (Brady & Rosenberg, 2002a; Nisbet & Callahan, 1987; Olney & Salomone, 1992; Wehman, 1996). However, few models of assessment exist which incorporate both employee and employer perceptions of performance and support, and the extent to which these different perceptions correspond is relatively unknown.

The purpose of the study was to investigate the correspondence between employees’ and supervisors’ evaluations of work performance and support needs of people with disabilities in supported and sheltered employment. In areas where there was a lack of correspondence, we sought to establish the direction of any differences (over-estimations or under-
estimations) of the two groups, and whether there were differences across the dimensions of performance vs. support.

**Method**

**Participants and Setting**

Nineteen employees with developmental disabilities (11 males and 8 females) participated in this study. Fifteen of the participants were diagnosed with a cognitive impairment, and four were diagnosed with an autism spectrum disorder. All participated in supported (n = 14) or sheltered (n = 5) employment programs. The employees ranged in age from 20 years and 11 months to 54 years and 3 months (M = 36 years, 4 months). All individuals who gave consent participated in this study, and no compensation was provided for participation. All employees worked on a part-time basis, ranging from 6 hours to 30 hours per week on the job. Job tasks for the five sheltered employees included sorting, collating, and preparing mailings for local businesses; job tasks for the 14 supported employees included child and animal care, custodial and kitchen duties, bagging groceries, and working as a cashier and office assistant. At the time of this study, employees had been in their job roles from 5 months to 9 years (M = 4 years, 1 month).

**Dependent Measures**

The *Job Observation and Behavior Scale (JOBS)* (Rosenberg & Brady, 2000) was used to gather supervisors’ evaluations of the employees; the *Job Observation and Behavior Scale: Opportunity for Self-Determination (JOBS: OSD)* (Brady, Rosenberg, & Frain, 2006) was used to gather employees’ self-ratings. The two instruments comprise a system of evaluation in which both external evaluators’ (supervisors, job coaches, teachers) ratings and employees’ own self-determined ratings are used for employment and training decisions. Both instruments target critical vocational behaviors and support needs of people in community employment settings. The evaluation assists employment professionals to evaluate an individual’s work performance and support needs, then to compare these results to the norms for other people who perform similar jobs in sheltered or supported employment. Validity, reliability, and standardization data are available for three groups: secondary students with disabilities, adults in supported and sheltered work settings, and adults in entry level community jobs (Brady & Rosenberg, 2002b; Brady et al., 2008). Both *JOBS* and *JOBS: OSD* contain the same 30 items organized into three subscales titled Work-Required Daily Living Activities, Work-Required Behavior, and Work-Required Job Duties. The three subscales and a summary of items are found in Table 1.

Although the scales and items are identical on both instruments, there are alternate phrasings for the *JOBS: OSD* items for instances when an employee has difficulty determining what is being asked. In addition, scoring protocols differ slightly for the *JOBS* and the *JOBS: OSD*. For each item on the *JOBS*, the supervisor rates each employee on the *Quality of Performance, Type of Support* needed, and whether any *Adaptive or Prosthetic Materials* are needed. Quality of Job Performance is rated with a 5-point Likert-type scale with 5 indicating superior performance, 4 indicating above average performance, 3 indicating average performance, 2 indicating below average performance, and 1 indicating performance which is not acceptable for competitive employment. The Type of Support is also rated on a 5-point scale with a rating of 5 meaning that no unique supervision or support is needed beyond that provided to other workers. A rating of 4 indicates that intermittent supervision is needed from a co-worker and a rating of 3 indicates that intermittent supervision is needed from the job coach or supervisor. Ratings of 2 and 1 respectively indicate that supervision from the job coach or supervisor is needed either frequently or continuously.

Because *JOBS: OSD* requires a self-assessment from individuals with a wide range of cognitive and communication abilities, several alterations exist for the scoring. First, each *JOBS: OSD* item is modified into a *self-determination* question format so that the information can be obtained through a standardized interview. This response format requires that data be obtained from individual employees (an internal source of information) rather than from work supervisors, job coaches, or reha-
bilitation counselors (an external evaluation source). Second, the scoring protocol is simplified to a 3-point scale. For Quality of Performance ratings, respondents report (a) “Yes”, (b) “Sometimes”, or (c) “No, not really” to the interviewer’s query about how well the individual performs each item. For Type of Support ratings an interviewer asks respondents to select one of three options to indicate their need for support:

“Can you do it by yourself?”
“Can you do it with some help?”
“Do you need a lot of help?”

Procedure

For each employee, a work supervisor or job coach (hereafter referred to as supervisor) completed a JOBS recording and scoring form. Each of the supervisors had worked directly with the employees previously, and had the knowledge necessary to complete the form. After the supervisors scored the individuals, the forms were returned to the investigators for data entry and analysis. The investigators tallied the total of points scored for each of the three subscales (Work-Required Daily Living Activities, Work-Required Behavior, and Work-Required Job Duties) for Quality of Performance and Type of Support.

Next, each employee was interviewed by one of the authors to obtain the JOBS: OSD ratings. Interviews were conducted in a private area at the employees’ worksites. Supervisors were not present during the interviews. Employees were informed of the answer choices prior to the interview and items and answer choices were restated as needed. To administer the JOBS: OSD, the interviewer read each item to the employee. The alternate phrasing provided in the evaluation protocol was provided if an employee needed clarification on the initial wording of the item. The investigators then totaled the scores for each of the three subscales for Quality of Performance and Type of Support.

Data Analysis

Data were hand scored by the lead author and then analyzed using SPSS 15.0. The means and standard deviations were computed for each of the subscales and for the overall scores for both JOBS and JOBS: OSD. Next, Pearson product-moment correlation coefficients were computed between the supervisors’ and employees’ ratings for each subscale, as well as for the overall scores, to determine the degree of correspondence between the groups. A related samples t-test was used to study any difference between employees’ and supervisors’ perceptions on employees’ Quality of Performance and Types of Support needs for each subscale for both JOBS and JOBS: OSD (Work-Required Daily Living Activities, Work-Required Behavior, and Work-Required Job Duties). Prior to this analysis; however, scores were transformed to a standard score on a

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Number of items</th>
<th>Item examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-Required Daily Living</td>
<td>13</td>
<td>Attendance; Punctuality; Personal Hygiene; Travel; Communication; Money; Reading; Math; Self Identification; Work &amp; Personal Scheduling; Work Facilities; Motivation</td>
</tr>
<tr>
<td>Work-Required Behavior</td>
<td>8</td>
<td>Stress Tolerance; Interpersonal Work &amp; Social Interactions; Changes in Routines; Honesty; Reaction to Criticism; Work Initiative &amp; Endurance</td>
</tr>
<tr>
<td>Work-Required Job Duties</td>
<td>9</td>
<td>Quality &amp; Quantity of Work; Speed of Learning New Tasks; Performance on Previously Learned &amp; Multiple Tasks; Organization of Work Tasks; Safety; Cleanliness of Work Environment</td>
</tr>
</tbody>
</table>
linear scale from 0-100, with 0 being the lowest score and 100 being the best possible score. The formula for this transformation followed Holmes and Shea’s (1998) transformation formula:

\[
\text{Transformed Standard Score} = \frac{100 \times (\text{Actual Score} - \# \text{ of Items on Scale})}{\text{Total Possible Score}}
\]

For example, the raw Quality of Performance score for Daily Living Activities for each employee was converted to a transformed standard score on a linear scale as follows:

\[
\text{Transformed Standard Score for Quality of Performance for Daily Living Activities} = \frac{100 \times (65 - 13)}{76.5 - 83.0}
\]

Using this formula, each employee’s JOBS and JOBS: OSD raw scores were transformed to a standardized score so that their ratings could be compared.

Results

Nineteen pairs of surveys were completed for a total of 38 surveys (19 JOBS; 19 JOBS: OSD). Means and standard deviations for each of the three subscales, and for overall scores for each of the instruments are provided in Table 2. The means and standard deviations for this sample were similar to the normative sample for both JOBS and JOBS: OSD (Brady et al., 2006; Rosenberg & Brady, 2000). For instance, the raw scores for individuals on the JOBS: OSD Work Related Activities of Daily Living QOP scale in our sample was 34.6 (3.1); very similar to the normative sample of Brady et al. which found raw scores of 34.3 (4.1). (For more information on normative samples please refer to Brady & Rosenberg, 2002b, and Brady et al., 2008).

Also seen in Table 2 are the Pearson product-moment correlation coefficients between the two groups for each subscale. These coefficients indicated generally low correlations, and in three instances (Quality of Performance ratings for both Daily Living Activities and Work-Required Behavior, and Type of Support scores for Work-Required Behavior) showed a reverse correlation. That is, as employees’ scores improved on JOBS: OSD, the supervisors’ scores for these employees decreased on JOBS. This trend was also seen in overall scores for both scales. The subscale correlations ranged from −.13 to .19 Correlation coefficients for the overall scores were −.09 for Quality of Performance and −.12 for

<table>
<thead>
<tr>
<th>JOBS Construct</th>
<th>Supervisor</th>
<th>Employee</th>
<th>Supervisor &amp; employee correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Work-Required Daily Living Activities subscale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QOP</td>
<td>76.5</td>
<td>15.9</td>
<td>83.0</td>
</tr>
<tr>
<td>TOS</td>
<td>80.1</td>
<td>16.1</td>
<td>74.5</td>
</tr>
<tr>
<td>Work-Required Behavior subscale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QOP</td>
<td>68.7</td>
<td>19.8</td>
<td>87.5</td>
</tr>
<tr>
<td>TOS</td>
<td>70.5</td>
<td>18.5</td>
<td>80.9</td>
</tr>
<tr>
<td>Work-Required Job Duties subscale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QOP</td>
<td>72.0</td>
<td>16.9</td>
<td>79.5</td>
</tr>
<tr>
<td>TOS</td>
<td>71.5</td>
<td>17.1</td>
<td>74.0</td>
</tr>
<tr>
<td>Total scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QOP</td>
<td>73.3</td>
<td>14.7</td>
<td>82.2</td>
</tr>
<tr>
<td>TOS</td>
<td>75.4</td>
<td>14.5</td>
<td>75.6</td>
</tr>
</tbody>
</table>

QOP = Quality of Performance
TOS = Type of Support

TABLE 2
Standardized Means, Standard Deviations, and Correlations for Subscale and Overall Scores N = 19 for Each Scale
Type of Support. These findings indicate that there was generally a very small correlation between the supervisors’ scores and the employees’ scores of themselves. None of the correlations were statistically significant ($p < .05$).

Results of the related samples $t$-test comparing employees’ and supervisors’ perceptions of the employees’ ratings of their Quality of Performance and Type of Support needs for the three subscales are included in Table 3. This table shows that significant differences exist between employees’ and supervisors’ ratings in the employees’ overall Quality of Performance scores, as well as on the Work-Required Behavior subscale.

Given the small sample size in this study, the statistical power necessary to find a significant difference between the two sets of ratings was low; the power to find statistical significance at the .05 level, if it existed at a medium effect size was .69. Therefore, an alternate way of looking at the results was also pursued. This involved establishing the effect sizes for the differences. Effect sizes present the differences between scores in standard deviation terms [where the Difference = (Mean of Supervisors’ Scores – Mean of Employees’ Scores/Standard Deviation)]. This allowed for more practical significance to be examined. In social science research, Cohen (1988) indicated that the practical significance of the size of an effect should be compared to the following standards: (a) for a large effect, $d = .80$; (b) for a medium effect, $d = .50$; and (c) for a small effect, $d = .20$. In this study, effect sizes show that employees rated themselves higher in every scale, but one, when compared to their supervisors. Effect sizes ranged from a low of .14 (small effect) for the Type of Support for Work-Required Job Duties to a large effect size of 1.18 for the Quality of Performance Work-Required Behavior subscale. In all, five of the eight paired samples had effect sizes that would be considered a medium to large effect; this included Quality of Performance for Work-Required Daily Living Activities, Work-Required Behavior, Work-Required Job Duties subscales; the Total Quality of Performance rating; and the Type of Support rating for the Work-Required Behavior subscale. Two ratings fell in the small effect size range, including the Type of Support rating for the work required Job Duties, and the Type of Support rating for the Work-Required Daily Living Activities subscale (.14 and .32, respectively). These findings indicate that supervisors’ ratings were approximately half of a standard deviation below employees’ self-determined ratings. Only the Type of Support overall ratings failed to show an effect. It is important to note that all comparisons indi-

<table>
<thead>
<tr>
<th>Measures</th>
<th>Mean difference</th>
<th>95% confidence interval</th>
<th>t</th>
<th>sig</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supervisor-employee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Score</td>
<td>-8.8</td>
<td>-1.2</td>
<td>-16.5</td>
<td>-2.3</td>
<td>.02</td>
</tr>
<tr>
<td>DLA</td>
<td>-6.4</td>
<td>2.7</td>
<td>-15.6</td>
<td>-1.4</td>
<td>.16</td>
</tr>
<tr>
<td>BEH</td>
<td>-18.7</td>
<td>-8.0</td>
<td>-29.5</td>
<td>-3.5</td>
<td>.001</td>
</tr>
<tr>
<td>JD</td>
<td>-2.5</td>
<td>1.7</td>
<td>-16.9</td>
<td>-.5</td>
<td>.66</td>
</tr>
<tr>
<td>Type of Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Score</td>
<td>-2.0</td>
<td>9.0</td>
<td>-9.4</td>
<td>-0.04</td>
<td>.97</td>
</tr>
<tr>
<td>DLA</td>
<td>+5.6</td>
<td>17.1</td>
<td>-5.9</td>
<td>-.98</td>
<td>.33</td>
</tr>
<tr>
<td>BEH</td>
<td>-10.4</td>
<td>.81</td>
<td>-21.6</td>
<td>-1.8</td>
<td>.07</td>
</tr>
<tr>
<td>JD</td>
<td>-7.6</td>
<td>1.7</td>
<td>-16.8</td>
<td>-1.7</td>
<td>.11</td>
</tr>
</tbody>
</table>

DLA = Work-Required Daily Living Activities  
BEH = Work-Required Behavior  
JD = Work-Required Job Duties
cate effect size differences in the direction indicating that supervisors were *always* significantly lower in their perceptions than employees, with one exception. The Type of Support rating for the Work-Required Daily Living Activities subscale was the only one in which employers scored higher than employees.

**Discussion**

Overall, these results indicate that employees and their supervisors have a very different opinion concerning the quality of work accomplished by employees with disabilities. Since the number of comparison pairs was relatively small in this initial study, significance levels are better addressed by effect sizes than statistical significance testing. In this case, most of the pair comparisons for the six subscales and two overall scores showed important differences between how supervisors rated employees and how employees rated themselves in terms of Quality of Performance. There is a similar disconnect on the Type of Support that is needed by employees to do their jobs, also demonstrated by the effect sizes. It may be that employees are overconfident of their abilities, or employers might focus more on aspects of the job with which they are not satisfied. It also may be that employees with disabilities are unaware of how their work performance is judged by employers. Alternatively, it is possible that many individuals with disabilities have inherent difficulty with skills associated with self-determination (such as self-assessment) and may not be proficient in evaluating their strengths and needs accurately. In one study that supports this notion, Wehmeyer and Schwartz (1998) reported that educational plans rarely targeted self-determination skills for secondary students with cognitive impairments, and recommended that these skills be given priority for development. In the current study, it is important to note that the results (both the large effect sizes and the low correlations) show that employers rated the quality of performance *differently* and *lower* in most every category compared to employees.

Overall and subscale scores in this study were very similar to the normed sample for *JOBS: OSD* on all of the Quality of Performance, and Type of Support measures. This indicates that in terms of work performance, the employees in this study were similar (all scores well within one standard deviation of the normative group) to the sample on which this measure was normed. Although when comparing this sample to others who were in work experience or supported employment (in the normed sample), the Type of Support scores for the Job-Related Duties subscale and the overall scores were somewhat higher for those in this study. Thus, it may be that this sample had slightly less work related support needs than those in the past sample.

There are many uses for employment and transition assessments, particularly when assessment systems incorporate the multiple dimensions targeted in this study (productivity vs. support needs; employees’ vs. supervisors’ perceptions). The *JOBS* evaluation system (Brady et al., 2006; Rosenberg & Brady, 2000) is one such example, and this study indicates a new area of use for such assessments. The discrepancy scores found in this study indicate that employers and employees disagreed about the quality of work and the support needs of entry-level workers with disabilities. While not knowing who was “right” in this debate, different theories emerge. It may be that employees with disabilities overestimate their ability level and need professionals in the field to give them honest feedback concerning how their performance will be judged by future employers. One way of using *JOBS* to achieve this aim is to ask individuals in the early days of employment (or before being employed) to evaluate for themselves how other workers are doing, and then compare those ratings to their own self-determined ratings.

An alternate explanation for the discrepancy in scores could be employers underestimating the skills of these employees. It may be that employers have preconceived ideas about how well employees with disabilities will perform on a job, and unknowingly hold a rater bias when judging the quality of employees’ work performance. It is also possible that the mere presence of a disability predisposes supervisors to watch these employees differently or more closely. It may be that *any* employee who is watched closely could obtain many suggestions from an employer on how to improve one’s work. Employment professionals can
share this information with employers, and perhaps have them rate other very successful and marginally successful employees on the job. These ratings could be compared to the individual with a disability to understand whether there is a need for improved performance, or whether the employee is performing at an acceptable or normative rate.

The different ratings obtained by employees and supervisors can be used to identify changes needed for successful employment to be maintained. Employment professionals, for example, could use these scores to create specific target goals based on these assessment scores. For instance, if an employee reported that his or her job was conducted with a high degree of safety, but the supervisor reported that this only happens some of the time, the two can work with a job coach so that both understand what constitutes safe job performance. They could then develop an intervention to reach that goal. Support interventions can be developed in a similar fashion, with the goal of educating community employers about the types of supports that are available to help employees successfully perform their jobs. For instance, if employees identify that they always need help to get back from breaks on time, the employment professional can discuss with the supervisor and employees the various ways to get the help needed to get back to work on time. For example, a co-worker can be recruited to remind an employee when break time is over, or an alarm watch might be used as an adaptation to remind an employee that it is time to return to work.

Finally, employment professionals can think about using supervisors’ and employees’ scores on the JOBS system as a measure of when successful employment has been achieved. Currently, many people with disabilities only receive employment support on a temporary basis, and lose such support when a rehabilitation counselor affirms that the employment status of the person is stable. This leads to many cases being closed before the individual is in a successful long-term employment situation. By including JOBS and JOBS: OSD ratings into an Individual Plan for Employment (IPE), these data could be used to determine whether the individual with a disability is stable in his or her work behavior, and likely to continue success on the job (as indicated by minimum performance scores, and the support scores needed to maintain success). By inputting these criteria into an IPE, employment professionals can be more confident that employees are not losing jobs due to inaccurate perceptions of work skills and premature termination of services (Martin et al., 2006).

Historically, people with disabilities have had difficulty obtaining and maintaining community employment (Brady & Rosenberg, 2002a; Levy et al., 1993; Murphy et al., 2002). There are many factors that contribute to this situation. These factors include providing and fading support (Rogan, Luecking, & Grossi, 2007), funding for supported employment efforts (Rusch & Braddock, 2004), and integrating employees with disabilities into the culture of the workplace (Rogan, Callahan, Griffin, & Hammis, 2007). An additional variable that may impact the employment status of people with disabilities is the degree to which their self-determined evaluations of their own work performance and support needs correspond with those of their supervisors’ evaluations. Thus, it seems prudent for supervisors, employment professionals, and related service providers to obtain the self-evaluations of employees with disabilities (see Brady et al., 2008; Lynn et al., 2004), and compare those evaluations to supervisors’ evaluations. In addition to learning the employees’ perspective, such information may highlight any existing discrepancies and allow supervisors and employees to address these areas of concern prior to any changes to the individual’s employment status.

References


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Abstract: Play is widely acknowledged to be an integral part of human development and children with autism often experience substantial delays in the development of play behaviors. This review updates older reviews by covering the last 10 years of research targeting functional and symbolic play in children with autism. The review differs from other reviews concerning play by including all conceptual models and intervention environments, while also limiting inclusion to studies demonstrating experimental control. Additionally, this is the first review of play studies to report results in quantifiable terms (e.g., PND). Studies are grouped into two categories (i.e., studies of functional versus symbolic play). Three components (i.e., modeling, prompting with contingent reinforcement, and child directed or “naturalistic” instruction) appear related to successful play interventions. The results of this review suggest that these components underlie the effectiveness of successful play intervention for children with autism.

Play is widely acknowledged to be an integral part of human development and a large percentage of typically developing children’s time is spent engaged in play (Boutot, Guenther, & Crozier, 2005; Sigelman & Rider, 2006). As children develop, play serves increasingly more complex and vital functions (Rutherford & Rogers, 2003; Williams, 2003). For example, play has been linked to the development of sensory processing systems (Ruff, 1984), communication skills (Bakeman & Adamson, 1984, Toth, Munson, Meltzoff, & Dawson, 2006), cognition (Piaget, 1962; Rutherford & Rogers, 2003; Vygotsky, 2000), and social and emotional interactions (Erikson, 1951). Delayed or abnormal development of play behaviors can adversely affect an individual across their lifespan (Sigelman & Rider, 2006).

Children with autism and related developmental disabilities often experience substantial delays in the development of play behavior (Baron-Cohen, 1987). In a longitudinal study, Sigafos, Roberts-Pennell, and Graves (1999) reported that while other areas of adaptive behavior showed gains over a 3-year period, there was very little improvement in play among a sample of 13 preschool children with autism and related developmental disabilities. Even when matched with children according to mental age, children with autism engage in significantly more stereotypic and repetitive behaviors and fewer appropriate play behaviors (Wing, Gould, Yeates, & Brierley, 1977). Indeed, these deficits are central to the definition of autism (DSM-IV; APA, 1994) and items related to play are integral components on autism diagnostic tools (e.g., Autism Diagnostic Observation Schedule, Autism Diagnostic Interview). Deficits in play behavior can further exacerbate the social and communication delays experienced by children with au-
tism and make play an important area for early intervention (Jarrold, Boucher, & Smith, 1993).

Given that play deficits are prevalent, persistent, and a core feature of autism, it is not surprising that a considerable amount of intervention research has focused on developing successful procedures for teaching play skills to children with autism (Terpstra, Higgins, & Pierce, 2002; Stahmer, Ingersol, & Carter, 2003). In addition to increases in diversity, flexibility, and spontaneity of play skills, successful play interventions have also been associated with improvements in socialization, language, cognition, functional use of objects, motor skills, and exercise (Brown & Murray, 2001).

In the current review, we aim to assist practitioners with implementing evidence-based practice, by reviewing research that has focused on teaching play to children with autism. This focus is important because children with autism are known to have more profound and global deficits in play (Boutot et al., 2005). In addition, unlike previous reviews, we have aimed for a more inclusive and comprehensive review by including studies derived from a range of conceptual models (e.g., behaviorism, developmental, sensory integration) (cf. Luckett, Bundy, & Roberts, 2007; Stahmer et al., 2003), and settings (e.g., school or home based interventions) (cf. Terpstra et al., 2002). To ensure the certainty of evidence, which is important for guiding evidence-based practice (Schlosser & Sigafous, 2007), we limited the current review to studies in which experimental control was demonstrated and summarized results in quantifiable terms.

Method

Search Procedures and Selection Criteria

Systematic computerized literature searches were conducted on two databases: the Educational Resources Information Clearing House (ERIC) and PsychINFO to identify research studies targeting play behaviors in children with autism. The search was limited to English language journal articles published between 1998 and July 2008. Combination of the following search terms were entered into the keywords field: autism, autistic, symbolic play, sociodramatic play, functional play, object manipulation, toy play, stereotypic play, leisure skills, games, and pretend. This initial search resulted in the identification of 425 studies. The titles and abstracts of these studies were then screened for general appropriateness. The reference lists from the resulting 65 studies were then hand searched for additional relevant studies leading to the identification of a total of 73 studies.

These 73 studies were then included or excluded based on the following criteria. To be included a study: (a) contained participants ages 0 to 8 years old diagnosed with autism; (b) included the improvement in toy play as a dependent variable; and (c) experimental control was demonstrated by means of single-case or control-group experimental designs (Kennedy, 2005). Studies in which the intervention procedures were not described in sufficient detail to enable replication or that did not demonstrate experimental control were excluded (e.g., Bernard-Opitz, Ing, & Kong, 2004). Also excluded were studies in which play was used as a context to increase communication or other social skills because the focus of these interventions was not on improving play skills (e.g., Baker, Koegel & Koegel, 1998; Bevill, Gast, Maguire, & Vail, 2001; Kohler, Anthony, Steighner, & Hoyson, 2001; Krantz & McClannahan, 1998; Loncola & Craig-Unkefer, 2005; Shabani, Katz, Wilder, Beauchamp, Taylor, & Fisher, 2002). Studies in which the topography of the play behavior was unclear (e.g., “targeted play skill”) or did not require functional or symbolic play (provision of sensory stimulation) were also excluded (e.g., Ingersoll, Schreibman, & Tran, 2003).

Fifteen studies met the inclusion criteria. These 15 studies included a total of 53 participants. Table 1 provides a summary of each included study.

Coding and Summary of the Studies

The 15 studies were coded using a data sheet designed specifically for this review (available from the first author upon request). Every article was read in its entirety and pertinent information was extracted and recorded on the data sheet.

Each study was classified into one of two
### TABLE 1

*Studies Categorized into Functional and Symbolic Play Behaviors, Lists Number of Participants, Independent and Dependent Variables, Experimental Design, and Results in Percent Non-overlapping Data (PND) or as Reported by Authors*

<table>
<thead>
<tr>
<th>Citation &amp; Category</th>
<th>n</th>
<th>Independent Variables</th>
<th>Experimental Design</th>
<th>Dependent Variables &amp; Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Functional Play</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D’Ateno, Mangiapanello &amp; Taylor (2003)</td>
<td>1</td>
<td>Video Modeling</td>
<td>MBL* across toys</td>
<td>Modeled play behaviors increased M* PND* = 87% (range, 60% to 100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Novel play behaviors increased with some toys but not with others M* PND* = 18% (range, 0% to 50%)</td>
</tr>
<tr>
<td>Gillet &amp; LeBlanc (2007)</td>
<td>3</td>
<td>Parent-implement Natural Language Paradigm</td>
<td>MBL across part*</td>
<td>Functional play increased M PND = 93% (range, 80% to 100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stereotypy was not affected by intervention M PND = 0%</td>
</tr>
<tr>
<td>Hine &amp; Wolery (2006)</td>
<td>2</td>
<td>Point-of-View Video Modeling</td>
<td>Multiple probe across play behaviors</td>
<td>Modeled play increased M PND = 94% (range, 85% to 100%)</td>
</tr>
<tr>
<td>Hume &amp; Odom (2007)</td>
<td>2</td>
<td>TEACHH developed Structured Work Systems</td>
<td>Reversal (ABAB)</td>
<td>On task behaviors increased M PND = 100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Teacher delivered prompts to play decreased M PND = 83.5% (range, 81% to 86%)</td>
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<td></td>
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<td></td>
<td>Number of play materials utilized increased M PND = 100%</td>
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<tr>
<td>Nuzzolo-Gomez,Leonard, Ortiz,Rivera &amp; Greer (2002)</td>
<td>3</td>
<td>Pairing toy play with reinforcer</td>
<td>MBL across part</td>
<td>Functional play increased M PND = 55%</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Stereotypy decreased M PND = 33% (range, 0 to 100%) Note: variable rates of behavior in baseline lowered PND Visual analysis of data indicates a more powerful positive effect</td>
</tr>
<tr>
<td><strong>II. Symbolic Play</strong></td>
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<tr>
<td>Barry &amp; Burlew (2004)</td>
<td>2</td>
<td>Social Stories</td>
<td>MBL across part</td>
<td>Teacher delivered prompts to play decreased M PND = 97.25% (range, 94.5% to 100%)</td>
</tr>
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<td></td>
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<td></td>
<td>Symbolic play increased M PND = 100%</td>
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<td></td>
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<td></td>
<td>Novel play behaviors increased Note: Data could not be converted into PND, Results were positive for both variables.</td>
</tr>
<tr>
<td>Ingersoll &amp; Schreibman (2006)</td>
<td>5</td>
<td>Reciprocal Imitation Training</td>
<td>MBL across part &amp; behaviors</td>
<td>Total symbolic play increased M PND = 29% (range, 0 to 60%) Spontaneous symbolic play increased M PND = 27% (range, 0 to 63%) Note: 1 of the 5 parts made no improvements in play skills</td>
</tr>
<tr>
<td>Kasari, Freeman &amp; Paparella (2006)</td>
<td>21</td>
<td>Combined Behavioral Drill &amp; Milieu Teaching</td>
<td>F Statistics in mixed effect regression models</td>
<td>Significant group x time interaction, play intervention group showed significantly greater improvements over time in both functional and symbolic play skills compared to a joint attention intervention group and a no treatment control group</td>
</tr>
<tr>
<td>MacDonald, Clark Garrigan &amp; Vangala, (2005)</td>
<td>2</td>
<td>Video Modeling</td>
<td>Multiple probe across toys</td>
<td>Modeled behaviors increased M PND = 100%</td>
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<tr>
<td></td>
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<td>Novel play behaviors decreased Note: Only means were reported for novel play behaviors, therefore PND calculation is not possible</td>
</tr>
</tbody>
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TABLE 1—(Continued)

<table>
<thead>
<tr>
<th>Citation &amp; Category</th>
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<th>Experimental Design</th>
<th>Dependent Variables &amp; Results</th>
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<td>Morrison, Sainato, Benchaab &amp; Endo, (2002)</td>
<td>4</td>
<td>Correspondence Training, Activity Schedules</td>
<td>MBL across part</td>
<td>On task symbolic play increased M PND = 100%</td>
</tr>
<tr>
<td>Newman, Reinecke &amp; Meinberg, (2000)</td>
<td>2</td>
<td>Self Management</td>
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<td>Variability of play increased M PND = 91.5% (range, 90% to 93%)</td>
</tr>
<tr>
<td>Paterson &amp; Arco (2007)</td>
<td>2</td>
<td>Video Modeling Reversal embedded into a MLB across toys</td>
<td>MBL across part</td>
<td>Appropriate play increased M PND = 100% Stereotypy decreased M PND = 100%</td>
</tr>
<tr>
<td>Reagon, Higbee &amp; Endicott (2006)</td>
<td>1</td>
<td>Video Modeling MBL across play scenarios</td>
<td>MBL across part</td>
<td>Model behaviors increased M PND = 100% Note: Only 1 baseline data point</td>
</tr>
<tr>
<td>Zercher, Hunt, Schuler &amp; Webster (2001)</td>
<td>2</td>
<td>Integrated Play Therapy</td>
<td>MBL across part</td>
<td>Symbolic play increased M PND = 72% (range, 50% to 94%)</td>
</tr>
</tbody>
</table>

* Multiple baseline
a Participants
b Mean
c Percent Non-Overlapping Data
Italics denote the name of the dependent variable

possible categories according to the type of play skill targeted for intervention. The two categories of play skills were (a) functional play and (b) symbolic play (termed in some studies as “pretend play”, “sociodramatic play” or “imaginative play”). A study was classified as functional play if the behavior targeted involved use of a toy in a manner consistent with its intended function preserving the unique physical properties of the toy. Examples of functional play include (a) placing puzzle pieces into a puzzle, (b) using toy tools to build (c) stringing beads, (d) stirring a bowel with a spoon in a toy cooking set (e) looking at a picture book. These studies are presented in the first section of Table 1.

A study was classified as symbolic play if the behavior targeted involved any of the following (a) use of one object to stand for another object (e.g. a hairbrush used as a microphone), (b) appears to use something that is not present (e.g. strums an imaginary guitar), (c) uses a toy figure as if it were capable of performing actions (e.g. makes a teddy bear dance and sing), (d) uses a toy as a prop (e.g. a book becomes a ramp for a car), or (e) adopts a role or persona that does not belong to the child (e.g. acts as if they are a parent, teacher, or super hero). When a study targeted both functional and symbolic play, that study was classified as symbolic because symbolic play is considered to be more advanced. These studies are presented in the second section of Table 1.

For each study in the review, Table 1 summarizes the following variables: (a) number of participants (b) independent variable intended to increase play skills (c) experimental design and (d) effectiveness of the intervention on increasing play behaviors. Other dependent variables that are not directly related to play are not listed (e.g. language and social skills). Intervention effectiveness is reported as either percentage of non-overlapping data (PND), the statistical findings reported by the author (e.g. Kasari et al., 2006), or when baseline data prevented the use of PND, the authors’ visual analysis of the results are reported (e.g. Dauphin et al., 2004).

PND is one method of synthesizing single
subject data (Scruggs & Mastropieri, 1998). A higher PND suggests that the participant’s behavior changed in the desired direction (i.e. increased or decreased) during or following intervention. A lower PND suggests that the intervention may have failed to change behavior in the desired direction. While several other methods for synthesizing single subject data exist (e.g. Standard Mean Difference, Percentage Reduction Measure) a recent review and empirical comparison of these methods found consistent results across methods (Olive & Smith, 2005). Therefore, PND was chosen for its simplicity.

To calculate PND for behavior reduction, the lowest baseline data point is identified. Next, the data points in the intervention phase that fall below the lowest baseline point are counted. This number is then divided by the total number of data points in the intervention phase (data points below lowest baseline point / data points equal to and above lowest baseline point). The quotient is then converted to a percentage by multiplying by 100%. For behaviors in which an increase is desired, the highest baseline point is identified and identical calculations are made; except that the number of intervention data points above (instead of below) the highest baseline point is used as the divisor. PND cannot be calculated when a zero quantity is in the baseline of reduction studies or a maximum possible quantity is found in behavior increase studies (Olive & Smith, 2005). When a design contains more than one baseline phase (e.g. an ABAB design), the lowest or highest baseline point was identified across all baseline phases.

When single subject data cannot be converted into PND, due to the presence of an extreme baseline point, the methodology used by Machalicek et al. (2008) was used to describe results as positive, negative, or mixed. “Positive” meant that all the participants experienced some improvement from baseline levels during or following intervention. “Mixed” meant that, although one or more participants experienced some improvement, one or more participants did not. “Negative” meant that no participants in the study benefited from the intervention. No study in this review reported negative findings.

This review is organized into three sections: (a) results, (b) discussion, and (c) future research. The results section presents an overview of the studies within each category (i.e. functional or symbolic play) and two studies are discussed in detail to illustrate the interventions that typify the category. The discussion section evaluates the reviewed studies towards identifying common components of successful play interventions. The final section highlights possible areas of future research.

**Results**

**Increasing Functional Play**

Five studies (n = 11 participants) evaluated interventions designed to increase the functional play skills of children with autism (D’Ateno, Mangiapanello & Taylor, 2003; Gillett & Leblanc, 2007; Hine & Wolery, 2006; Hume & Odom, 2007; Nuzzolo-Gomez, Leonard, Ortiz, Rivera & Greer, 2002). Two of these studies evaluated the use of video modeling (D’Ateno et al., 2003; Hine & Wolery, 2006). Other independent variables included natural language paradigm (Gillett & LeBlanc, 2007), structured work systems (Hume & Odom, 2007), and pairing (Nuzzolo-Gomez et al., 2002). Dependent variables, other than functional play included, stereotypy (Gillett & LeBlanc, 2007; Nuzzolo-Gomez et al., 2002) verbal communication variables (D’Ateno et al., 2003; Gillett & LeBlanc, 2007), off task behavior (Hume & Odom, 2007), and teacher delivered prompts (Hume & Odom, 2007). All of these studies used single-case experimental designs (e.g., ABAB reversal design, multiple-baseline), The three studies that assessed social validity reported that parents and educators found the interventions to be successful, acceptable, and targeting important skills (Gillett & LeBlanc, 2007; Hine & Wolery, 2006; Hume & Odom, 2007). Maintenance data was collected in two studies. Acquired play skills were maintained at 1 month (Hume & Odom, 2007) and 2 months (Hine & Wolery, 2006). Generalization of newly acquired play skills to new toys and settings was reported in one study (Hine & Wolery, 2006). Across all the functional play studies, the mean PND for increasing functional play skills was 88% (range, 60% to 100%). This indicates that participants improved more than the best
baseline point across 88% of the intervention and post intervention sessions, on average.

Hine and Wolery (2006) evaluated the effects of video modeling on increasing toy-play skills of two children with autism (ages 30 months and 43 months). The first targeted play skill involved using a toy gardening set to dig holes, put soil into empty pots, and plant toy flowers. The second play skill involved using a toy cooking to set the table and perform cooking motions with the toys (e.g. stir a bowl). Point-of-view video model tapes were made by holding the camera at the child’s eye level without including any people in the camera shot. This camera angle was used to show the environment as the child would see it if they were performing the targeted behaviors. The effects of point-of-view video modeling were evaluated in a multiple probe design across both participants and both sets of toys. The intervention was effective at increasing the participants’ engagement in the modeled behaviors (M PND = 94% range, 85% to 100%).

Hine and Wolery also collected generalization, social validity, and maintenance data. Generalization probes showed mixed results. Both children demonstrated the ability to generalize to new play materials but only one participant generalized to a second environment. Social validity was evaluated by a group of 10 graduate students for each participant. Graduate students watched pre/post training videos and rated the children’s play behaviors on a 5 point Likert Scale. Raters concluded that in the post-training videos children were more engaged, used multiple actions/materials, played appropriately, enjoyed the activity, and needed less help than during baseline videos. Maintenance data shows that the participants still engaged in the modeled behaviors two months after the intervention had ceased.

Gillett and LeBlanc (2007) evaluated the effects of a natural language paradigm (NLP) intervention, implemented by participants’ parents, on increasing the appropriate play and decreasing the inappropriate play of three children with autism between the ages of 4 and 5 years old. Appropriate play was defined as “using the toy in the manner it was intended”. Inappropriate play included “use of the toy in a stereotyped manner”. The modified NLP procedures used in this study consisted of six steps; (a) displaying three toys to the child, (b) preventing access to these toys, (c) providing an action model for 5s and then a vocal model, (d) reinforcing appropriate child responses with access to the selected toy, (e) repetition with a novel modeled play behavior, and (f) continued play modeling throughout sessions. A multiple baseline across participants was used to evaluate the effects on appropriate and inappropriate play behaviors. Results showed that all 3 parents learned to correctly implement the NLP intervention and that while appropriate play increased (M PND = 93% range: 80% to 100%) and that levels of inappropriate play (i.e. challenging behavior or stereotypy) remained the same from baseline to intervention (PND = 0%) suggesting no reduction in inappropriate play. Social validity data was collected via written questionnaire from 2 of the 3 parents who found the intervention to be “very useful”, “very easy”, and “very helpful”.

Increasing Symbolic Play

Ten studies, including a total of 42 participants (21 from Kasari et al., 2006), evaluated interventions designed to increase the symbolic play skills of children with autism (Barry & Burlew, 2004; Dauphin et al., 2004; Ingersoll & Schreibman, 2006; Kasrai et al., 2006; McDonald, Clark, Garrigan & Vangala, 2005; Morrison, Sainato, Benchaaban & Endo, 2002; Newman, Reinecke & Meinberg, 2000; Paterson & Arco, 2007; Reagon, Higbee & Endicott, 2006; Zercher, Hunt, Schuler & Webster, 2001). Three of these studies evaluated some form of video modeling (MacDonald et al., 2005; Paterson & Arco, 2007; Reagon et al., 2006). Other independent variables included Social Stories™ (Barry & Burlew, 2004), activity and matrix training (Dauphin et al., 2004), reciprocal imitation training (Ingersoll & Schreibman, 2006), behavioral drill and milieu teaching (Kasari et al., 2006), activity schedules (Morrison et al., 2002), self management (Newman et al., 2000), and integrated play therapy (Zercher et al., 2001). Dependent variables, other than symbolic play, included stereotypy (Paterson & Arco, 2007), off-task behavior (Morrison et al., 2002), and teacher delivered prompts (Barry
Burlew, 2004). All studies, with the exception of Kasari and colleagues (2006), used single subject designs. Kasari and colleagues (2006) utilized a group design. The mean PND across the symbolic play studies that used single subject designs was 86% (range, 27% to 100%). This indicates that, on average, participants improved symbolic play skills more than the best baseline point across 86% of the intervention and post intervention sessions.

The five studies that assessed social validity reported that parents and educators found the interventions to be successful, acceptable, and targeting important skills (Barry & Burlew, 2004; Ingersoll & Schreibman, 2006; Morrison et al., 2002; Paterson & Arco, 2007; Reagon et al., 2006; Zercher et al., 2001). Maintenance data was collected in four studies. Acquired play skills were maintained at 1 week (Paterson & Arco, 2007), 1 month (Ingersoll & Schreibman, 2006; Newman et al., 2000) and 2 months (McDonald et al., 2005). Generalization of new play skills to (a) new settings was reported in two studies (Barry & Burlew, 2004; Ingersoll & Schreibman, 2006), (b) new toys in two studies (Ingersoll & Schreibman, 2006; Paterson & Arco, 2007), (c) new play partners in three studies (Ingersoll & Schreibman, 2006; Kasari et al., 2006; Reagon et al., 2006) and to (d) new combinations of play behaviors in one study (Dauphin et al., 2004).

Ingersoll and Schreibman (2006) evaluated the effects of a naturalistic behavioral intervention on the language, imitation, joint attention, and pretend (i.e. symbolic) play skills of five children with autism. Naturalistic behavioral interventions are a hybrid of behavioral techniques (e.g. prompting, shaping, contingent reinforcement) and child lead teaching procedures (e.g. incidental teaching, milieu teaching, pivotal response training). The intervention used in this study consisted of five phases. In the first phase, the therapist used the following two strategies (a) contingent imitation (in which the therapist imitated the child’s actions and language) and (b) linguistic mapping (in which the therapist provided a verbal description of the actions of the child). In the second phase, requests for the child to imitate the therapist were interspersed with the therapist’s contingent imitation of the child. For example, the therapist would move the toy in the same manner as the child for several repetitions and would then prompt the child to imitate the therapist’s novel movement with the toy. In the third phase, more novel and familiar movements were modeled with familiar toys. In the fourth phase, novel and familiar movements were again modeled with the same toy and familiar movements were modeled with novel toys. In the final phase, novel movements were modeled with novel toys. During each phase systematic prompting for the modeled behavior was used and reinforcement in the form of praise was given contingent on the child’s imitation of the play behavior. Each phase lasted 2 weeks.

A single-subject multiple-baseline design across participants (Kennedy, 2005) was used to evaluate the effects of the intervention. Symbolic play was defined in two ways (a) total pretend play (“child performs a distinct action with miniature objects, directs a pretend action towards self, adult or inanimate object, uses object as if it were another object, attributes properties to an object which it does not have or refers to an object that is not present”) and (b) spontaneous pretend play (child performs a pretend play scheme that is not imitative of a therapists movements within the last 30 s). Average total pretend play increased (Mean PND = 29 %, range 0 to 60%). Average spontaneous pretend play increased (Mean PND = 29%, range 0 to 90%). However, the overall results were mixed because 1 out of the 4 participants did not have any gains in play behaviors.

Newman, Reinecke, and Meinberg (2000) implemented a self-management intervention designed to increase the variability of play behaviors in 3 children with autism. The self-management intervention consisted of first teaching the participants to take a penny following novel play responses by providing verbal prompts and contingent social praise. The pennies were traded in for reinforcers following the play sessions. Once the participants learned to collect the penny following novel play behaviors the therapist stopped providing the verbal prompts and praise. A single-subject multiple-baseline design across participants (Kennedy, 2005) was used to evaluate the effects of the self-management intervention. All three participants learned to
engage in a variety of novel play behaviors. Average number of different play behaviors per session increased (M PND = 94 %, range 90% to 95%). Follow-up data, collected 1 month after the intervention had been removed, indicated that the participants continued to engage in less repetitive and more dynamic topographies of play.

Discussion

Identification of Common Components of Successful Play Interventions

The most common intervention component found in studies targeting both functional and symbolic play is modeling of appropriate play behavior. Modeling was a component in 3 of the 5 functional play studies and 8 of the 10 symbolic play studies. Modeling involves the participant attending to another person (in vivo or on film) engaging in the targeted behavior. Modeling has been shown to be effective in teaching many complex skills to children with autism, such as conversational speech (Charlop & Milstein, 1989) and perspective taking (Charlop & Daneshvar, 2003). Modeling has been identified in other reviews as a promising practice for increasing the play behaviors of children with autism (Stahmer et al., 2003). This review provides additional and quantifiable support for this assertion.

Given the evidence supporting the use of modeling to teach children with autism functional and symbolic play, it would seem that modeling is an important instructional strategy for teaching play. However, the use of modeling to increase play behaviors has been criticized by some researchers who reason that imitative behaviors may not be true forms of play because they lack spontaneity (e.g. Luckett et al., 2007). This concern is compounded when the modeling also involves some form of vicarious reinforcement (i.e., the observer witnesses the model receive reinforcement for their behavior) (Bandura, 1965) because many feel play should be internally motivated (Luckett et al., 2007).

Hine and Wolery (2006) offer several reasons for targeting modeled actions as dependent variables in a play intervention. First, an increase in appropriate play behaviors (even if imitative) may reduce stereotypic or challenging behaviors. Second, an increase in recognizable behaviors should also increase the number of appropriate behaviors on which an adult can comment. This leads to an increase in opportunities for language instruction. Third, an increase in modeled behavior should reduce apparent differences between the child with autism and his typically developing classmates; potentially allowing for an increased opportunity for inclusion in social activities.

The next most common component used in both functional and symbolic play interventions was systematic prompting and contingent reinforcement of the target behavior. The combination of prompting and reinforcement was used in 2 of the 5 functional play studies and 7 of the 10 symbolic play studies. Prompting and reinforcement were implemented both from a discrete trail instructional format (e.g. Kasari et al., 2006) and from a child directed instructional format (e.g. Ingersoll & Schreibman, 2006).

Prompts are behaviors provided by the teacher or parent that increase the likelihood that the participant will engage in the desired behavior. Prompts vary from highly intrusive (e.g. physically guiding the participants hand to manipulate the toy appropriately) to very covert (e.g. the teacher uses her eye gaze to signal to the participant what item is used next in the play sequence). All studies in which prompts were used employed a least-to-most prompting hierarchy. In this system the least intrusive prompt is used first and more direct prompts are used only when the lesser prompts fail to produce the desired behavior.

Contingent reinforcement was used in all of the studies that included prompting. Contingent reinforcement involves providing the participant with a reward (pleasant consequence) following the occurrence of the target behavior. A reinforcer can come in many forms, for example, preferred edible items (e.g. Hine & Wolery, 2006) or praise from an adult (e.g. Barry & Burlew, 2004). When a behavior is reinforced it is more likely to occur again.

Some have suggested that approaches that involve external reinforcement (reinforcement delivered from the environment) do not teach “play” but instead teach a child to merely appear to be playing (e.g. Luckett et
(al., 2007) because play is internally motivated (Garvey, 1991; Wolfberg, 2003). Several studies in this review that utilize contingent reinforcement also collected maintenance data. In these instances, reinforcement was used in the initial teaching of play behaviors, but was then withdrawn when the intervention phase ended. The participants in these studies continued to engage in the new play behaviors for as long as two months without programmed external reinforcement (e.g. Hine & Wolery, 2006; Ingersoll & Schreibman, 2006). While the numbers of participants in each of these studies are limited, it does suggest play behaviors initially paired with external reinforcers may become “internally reinforcing” over time (Nuzzolo-Gomez et al., 2002).

Another common strategy used in both functional and symbolic play interventions was child directed or “naturalistic” instruction. Interventions containing this component involved attending to the participant’s focus, imitating the participant’s play behaviors, identifying toys the participant prefers for use in the intervention, and conducting the intervention in a natural play setting (e.g. on the floor as opposed to seated at a desk). Naturalistic instruction is an integral part of the Natural Language Paradigm (Gillett & Leblanc, 2007), Reciprocal Imitation Training (Ingersoll & Schreibman, 2006), Milieu Teaching (Kasari et al., 2006), and Integrated Play Therapy (Zercher et al., 2001).

Kasari et al. (2006) evaluated a play intervention consisting of all three of the above identified components (i.e. modeling, prompting with contingent reinforcement, and naturalistic teaching) in a rigorous experimental design. Specifically, Kasari et al. randomly assigned 58 children with autism between 3 and 4 years old to a play intervention group (n = 21), a joint attention intervention group (n = 20), or a no treatment control group (n = 17). The impact on play skills (and joint attention, although only the result related to play will be discussed in this review) were then compared across the three groups. The symbolic play intervention consisted of modeling, systematic prompting and reinforcing of play skills followed by milieu teaching. The Milieu teaching component of the same intervention consisted of (a) following the child’s lead and interest in activities, (b) talking about what the child was doing, (c) repeating back what the child said and expanding on it, (d) staying close in proximity and making eye contact, and (e) making environmental adjustments designed to encourage engagement. While all three groups demonstrated improvements in play over time, the group that received the play intervention showed significantly more diverse types of play and a greater overall play level over time compared to both the joint attention and the control group. Thus the play intervention produced significantly more types of symbolic play and greater overall play than either the joint attention or the control group.

Despite concerns that the nature of play precludes the use of external motivators (reinforcement), prompting, and modeled examples, no recent research has been conducted without using these components in some manner to teach play skills to children with autism. However, recent research does suggest that these components may in some instances be best used within a child-directed instructional format and within natural environments (e.g. on the floor as opposed to seated at a desk). Additionally, there seems to be little difference in the manner in which functional play and symbolic play are taught. Therefore, when designing any play intervention, practitioners should strongly consider incorporating the three common components of play interventions reviewed above.

Future Research

A number of interventions to teach functional and symbolic play behaviors to children with autism have been examined in the literature. This review suggests that the most commonly used strategies are modeling, systematic prompting with contingent reinforcement, and naturalistic teaching procedures. Several research questions have emerged from this review.

First, no research identified in this review or in past reviews attempts to isolate the effects of any one single component within a multi-component play intervention. Hine and Wolery (2006) evaluated the effects of video modeling without any additional prompting or reinforcement. However, only one of the two participants improved. The second participant
did not improve until contingent reinforcement was added (i.e. small edible given following occurrence of the modeled behavior). Such an example demonstrates the necessity of a better understanding of how to initially design these interventions in order to be most efficient and effective. Future research could be conducted in which common components are systematically evaluated individually and then in tandem in order to identify the most effective and parsimonious play intervention tailored to the specific characteristics of the child.

Second, many researchers and practitioners report that stereotypic behavior (e.g. rocking, spinning and mouthing toys) often interferes with attempts to teach play skills (Baker, 2000; Honey, Leekam, Turner, McConachie, 2007; Koegel, Firestone, Kramme, & Dunlap; 1974). Blocking or restricting these stereotypic behaviors may elicit challenging behavior (e.g. tantrum, aggression, self injury) (Green & Striefel, 1988) further complicating play interventions. Several of the reviewed studies address this issue by collecting data regarding challenging behavior and stereotypy while evaluating interventions designed to increase play skills (e.g. Gillett & LeBlanc, 2007; Hume & Odom, 2007; Paterson & Arco, 2007).

Results of these studies suggest that a negative correlation between stereotypy and play skills may exist for some children. Evidence of such a relationship is also suggested when an intervention designed to decrease challenging behaviors also occasions an increase in appropriate play behaviors (e.g. Koegel et al., 1974). When inappropriate behavior decreases following a successful play intervention, the exact mechanism of action for the decrease is often not apparent beyond the assertion that the more time spent playing appropriately leaves less time available during the session for challenging behavior and stereotypy. However, this is not always the case. For example, Gillett and LeBlanc (2007) successfully increased play behaviors, but found no difference in challenging behavior and stereotypy between baseline and intervention. Such an example highlights the need for future research concerning the relationship between stereotypy, challenging behavior, and play in children with autism.

References


Schlosser, R. W., & Sigafoos, J. (2007). Editorial:
Moving evidence-based practice forward. *Evidence-based Communication Assessment and Intervention*, 1, 1, 3.


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Acquisition and Generalization of Chained Tasks Taught with Computer Based Video Instruction to Children with Autism

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Abstract: Three elementary aged students with autism participated in an evaluation of computer based video instruction that targeted functional life skills. The effects of the software were analyzed in the context of a multiple probe design across and replicated across participants. This study represents a departure from more traditional video based instruction for individuals with autism because it combines video modeling as well as computer based simulation training in absence of any in-vivo instruction. All instruction took place on the computer and student's performance in vivo was the primary dependent measure. The participants each mastered all the skills they were taught via the computer and generalized this to the natural environment. They maintained the skills after a two-week follow up.

Learning functional life skills is the cornerstone of many Individualized Education Plans for students with autism. A focus on functional skill instruction allows students the opportunity to learn valuable skills that lead to greater independence and autonomy (Brown, 1979). One of the key features of special education services is the ability of educators and parents to focus instruction and curriculum on those areas where a student needs the greatest amount of assistance to increase their independence. In the classroom, proving student with frequent enough practice, sufficient guided repetition, and opportunities to use a wide range of materials to promote generalization can be a challenge when a teacher has a group of learners with heterogeneous needs who all require intensive instruction. One solution to this logistical challenge is to staff more paraprofessionals or teacher’s aides in the classroom to provide more individualized attention to students. Another solution is to plan ways for students to independently engage in learning activities that do not require direct teacher supervision.

Learning activities centered on functional skills and supported by video or computer based video instruction (CBVI) have a small but growing body of literature support and may be one way to address students’ needs for individualized instruction. The use of CBVI takes many forms but relies heavily on the growing body of evidence that suggests video can be a powerful teaching tool (Ayres & Langone, 2005). For example, Charlop-Christy, Le, and Freeman (2000) used video modeling to effectively teach hygiene skills (among other pre-academic and social skills). Alberto, Cihak, and Gama (2005) used video as an instructional tool to teach the use of an ATM machine to middle school aged students. Similarly, Sigafoos et al. (2005) employed video modeling to teach microwave use to adults with developmental disabilities. Even when students are taught to access video independently (on video tape or DVD), adult interaction is still integral to the instruction. The role of the adult may not be as a teacher per se, but their role is important to the instructional arrangement because they often set up the instructional setting for the video or aide the student in moving from video to in-vivo practice.

CBVI allows greater student independence during instructional activities because the video interactions are mediated by computer which provides prompting (often in the form of video) and an opportunity for the student to practice aspects of the target behavior. In
this way, the instruction becomes more of an active simulation. In 2004, Simpson, Langone, and Ayres used CBVI to effectively deliver social skills instruction to young students with autism in teaching the students to appropriately engage in social protocols like turn taking and waiting for a turn. Mechling, Pridgen, and Cronin (2005) used CBVI to teach verbal responses to questions that a student would encounter in fast food restaurant. This particular intervention required teacher involvement (prompting and error correction) however, it provides an example of how as technology improves, there is greater potential for students to engage in more independent learning activities. In 2007, Mechling and Ortega-Hurndon used CBVI to teach three complex chained tasks to young adults with developmental disabilities. Similar to the methodology used in Mechling et al. (2005), computer controlled the delivery of video and the teacher assisted with prompting. Ayres, Langone, Boon, and Norman (2006) used CBVI to teach purchasing skills to middle school aged students with intellectual disabilities. In this case, all instruction and prompting were delivered by the computer and students worked independently during this portion of instruction. Participants still engaged in related purchasing skill instruction with a teacher though. Mitchell, Parsons, and Leanard (2007) present one of the most technologically advanced examples of combining video and computer interaction for students with autism. They used a virtual reality environment to instruct teenaged students how to interact in a café (order food, sit at a table etc). In the cases listed above, teachers were an integral part of facilitating the interactions of the student with the technology and video. With one of the potential values of CBVI being independent student usage, further efforts are needed to examine how students can engage in technology based instruction with their teachers playing a more limited role.

The current study focused on teaching chained tasks with CBVI without direct teacher support. Advances in technology have revolutionized the types of simulations that can be used to supplement or augment instruction. Taking note of that, Browning, White, Nave, and Barkins (1986) cautioned about the importance of similarities of stimuli between natural and contrived training environments, researchers have continued to look for ways to improve simulations in various ways. For example, Cihak, Alberto, Kessler, and Taber (2004) documented the superior efficiency of combing in-vivo instruction with simulation instruction over in-vivo or simulated instruction alone for teaching fax machine, ATM, debit machine, and copy machine use. This implies that students benefit greatly from the repeated practice and extension that simulation training affords but they also need the in-vivo instruction to ensure efficient generalization.

This investigation was built around the rationale that CBVI is a powerful intervention that can present students a range of multiple exemplars and provide instructional prompting and feedback. Further, if students are able to engage in a behavior that is topographically related to the criterion behavior (the behavior expected in-vivo), the behavior may generalize to the natural environment without additional in-vivo instruction. This would allow teachers the ability to provide individualize instructional opportunities to students for functional skills while maximizing time and reducing cost on instructional materials (e.g. food, consumable products) or travel (to appropriate in-vivo locations in the community or school).

The fundamental research question addressed in this investigation is whether students acquire a functional skill (making soup, making a sandwich and setting the table) using CBVI and then generalize this skill to an in-vivo setting without additional instruction.

**Method**

**Participants**

This study was approved by school system, private, and university IRBs. Three participants were recruited through the local school system as well with the assistance of the Autism Society of America in a medium sized southern city to take part in this study. All three participants were diagnosed with autism by the TEACCH program in North Carolina and had autism special education eligibilities. In addition to having autism, participants also...
had to: consent to participate, have parental permission to participate, be elementary school aged, have sufficient fine motor skills to complete the target tasks, use a mouse to move the cursor and click on icons, and attend to a computer screen for at least 10 minutes. Lastly, all potential participants were screened and to be included in this study, students had to be performing below 60% independent (averaged across skills) on the tasks targeted by intervention. This liberal criterion meant that one student (Stephen) was allowed to participate despite demonstrating above 60% independence for one of the target skills.

Depending on the school system, different standardized test information was available to the researchers and not all existing information was made available. Therefore caution is warranted relative to the generality of findings to others with autism diagnoses. In the descriptions below we have attempted to detail as much as possible about the students. The first student, Stephan was a 9 year 2 month old male student who enjoyed using the computer. He showed stereotypical behavior when excited or after successfully completing tasks by flapping his hands and rocking. School records indicated that Stephen was performing significantly below grade level in academic areas and that he exhibited characteristics of ADHD. The second student, Natalie, was 9 years and 6 months old at the beginning of the study. She had difficulty paying attention to task for long periods of time and she was especially distracted by other student behavior and noises. The Bayley Scales of Infant Development II (Bayley, 1993) indicated that she had an IQ of 53. Her adaptive behavior was evaluated with the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984), which showed standard scores of 43 for daily living, 52 for socialization, 55 for communication with a composite of 55. Like Stephan, she was highly distractible and would occasionally walk away from in-vivo probes. During the game, she wore headphones to reduce distractions. The third student, Ray, was a quiet, soft spoken 7 year 7 month old boy who would respond to greetings verbally but only after being reminded. He was very sensitive to sensory simulation and gagged if he got mustard or mayonnaise on his fingers during testing. Ray would exhibit signs of frustration and anxiety (whining, making faces, and not responding) when presented with difficult tasks. He enjoyed using the computer and could turn on the computer and log in to his favorite games. He had a history of refusing to respond to standardized assessment tests. The only test scores available for Ray were from the Preschool Language Scale 3rd Edition (Zimmerman, Steiner, & Pond, 1992) that showed standard scores of 68 for auditory comprehension, 52 for expressive communication with a composite score of 56 for language.

Setting and Instructional Arrangement

The study took place in multiple locations and included both home and classroom environments. Ray received CBVI in his home on a Windows computer. Natalie and Stephen received CBVI in their respective classrooms on a Mac laptop with an attached mouse. In-vivo probes took place in the school for Natalie and Stephen and in the home for Ray.

The arrangement of CBVI setting and in-vivo setting for Ray was in his home kitchen and dining room. For Natalie and Stephen CBVI and in-vivo setting were in different areas of their schools including at the classroom snack area (all 3 skills), in the cafeteria (all 3 skills), and at a picnic table outside (sandwich and setting the table).

Materials

Materials for the in-vivo probes varied depending on the task. For preparing soup, students were provided an individual serving sized 8oz microwavable container of soup (Campbell’s or Progresso and different kinds such as chicken and stars, vegetable, etc.) situated approximately 1 ft from a microwave. Each container had a metal lid (with sharp edges) that was removed prior to instruction. For making sandwiches, students were provided a cafeteria tray with two slices of bread, meat (turkey, chicken, bologna, or salami), cheese (Swiss, American, baby Swiss, or provolone), and a condiment (mayonnaise or mustard) in a pre-opened single serving package. These materials were situated on a tray to the left of the food preparation area. After intervention and once students demonstrated mastery of mak-
ing a sandwich, a full bottle of the condiments was used from which students would have to squeeze an appropriate amount. During training, a pre-opened package was used to reduce the chance that fine motor difficulty would prevent the student from opening the package and not completing the task. Finally, for setting the table, students’ materials were positioned to the left of the child in random order. Materials included with a plate, fork, spoon, knife, napkin, and cup. The specific materials varied but included paper, plastic, and ceramic plates; plastic and metal flatware; cloth and paper napkins (folded in triangles or rectangles; and glass, Styrofoam and plastic cups.

During CBVI, students sat at a computer and used a two button mouse to interact with the software program called *I Can!- Daily Living and Community Skills* (Sandbox Learning Company, unpublished) software was developed by Sandbox Learning Company (owned by the second and third authors). The software included video models and required the student to manipulate images on the screen that simulated the natural environment. The instructional procedures and interaction are detailed in the procedures section.

The images that the student saw during CBVI consisted of video images filmed from a 1st person perspective (c.f. Ayres & Langone, 2007) which are depicted in the left column of Figure 1. Videos showed a narrated step-by-step walk-through of each target skill. Items used in the filming making a sandwich included two different types of bread (wheat and white), two types of cheese (Swiss and cheddar), two condiments (mustard and mayonnaise) and two types of meat (turkey and bologna). The video for making soup used two different but similar microwaves and three different types of soup. The materials filmed for the table setting sequences included white ceramic and white Styrofoam plates, plastic and stainless steel silverware, a white Styrofoam cup and a blue plastic cup, and white and orange napkins. These were combined in various combinations for each skill to produce five video examples of each task being completed. The longest video was 1:10 minutes (setting the table). The average video length was 50s.

In addition to video models, students saw professionally illustrated materials designed to mirror the stimuli they depicted in the videos (see right column of Figure 1). These materials (e.g. a slice of bread) were drawn to facilitate programming the computer game and allow the programmers maximal control over manipulating movement of the images. Every video image had an illustrated counterpart that was used during the interactive instructional portion of the program. The students manipulated these materials to mirror in-vivo actions. This will be described in the procedures section.

**Response Definitions**

**In-vivo.** All three target behaviors were task analyzed (see Table 1) and during in-vivo probes, students were presented the task in a total task format (Alberto & Troutman, 2003) whereby they had the opportunity to respond correctly or incorrectly for each individual step of the task analysis regardless of whether or not they correctly responded to earlier steps of the task analysis. A correct response occurred when a student began the response within 5s of the task direction (e.g. “Please set the table”) or within 5s of completing the previous step (e.g. beginning to place a piece of meat on a slice of bread with in 5s of placing the bread on the plate) and the student had to complete the step within 5s of starting the step. Any other response was scored as incorrect. This included not beginning a response soon enough after the task request or previous step completion (latency error or no response), failing to complete the step within 5s of beginning the step (duration error), or engaging in a topographically incorrect behavior given the step on the task analysis (topography error).

In cases where the student made any error (latency, duration, topography), the researcher stopped the student, blocked the student’s view of the task materials, and corrected or completed the step without allowing the student to see what was being done. The rationale behind this procedure was two fold. First, the step was completed or corrected to allow the student the opportunity to respond correctly to subsequent steps of the task analysis rather than terminating the session and scoring all steps after the error as incorrect.
Second, the completion of one step and the arrangement of the stimuli are the $S^p$ for the subsequent steps; therefore, in order to evaluate student knowledge of the subsequent steps, the stimuli had to be properly placed. This total task presentation provides a conservative estimate of baseline behavior because it allows measurement of student performance on all steps.

It is important to note the difference in latency parameters between in-vivo and CBVI. With in-vivo the latency for a correct response was 5s whereas on the computer, the latency for responses (and prompting) was set at 10s.
This was a function of software coding in this prototype where coordination of the programming to allow recording and multiple “events” to take place simultaneously on the computer made a 5s latency too short for student response. Based on our pilot testing with a 5s latency, students did not have a reasonable amount of time to identify the appropriate target to “click” and then initiate moving the mouse toward the target. We found that 10s allowed a much more reasonable time.

### Computer Based Video Instruction

During CBVI, four responses were scored. Independent correct responses were scored if the student completed the correct step of the task analysis within 10s of the task direction (for the initial step) or within 10s of completing the previous step. Prompted corrects were scored when students did not respond within 10s of the task direction or completion of the previous step but responded correctly after the computer delivered a prompt. Three types of prompted corrects were possible: verbal, verbal plus model, verbal plus stimulus prompt. To have a prompted correct that was verbal plus model or verbal plus stimulus prompt the student would have to have not responded at all to the less intrusive levels of prompting. These prompt levels and their application are defined below in the section detailing the instructional methodology. Only independent corrects were counted toward meeting the mastery criteria. The program recorded responses and reported the total percent independent correct after the student completed the session.

### General Procedures

*In-vivo probes.* Students were brought to the testing area (part of the classroom, school kitchen, or home kitchen), one of the researchers (second author) pointed at the materials for the task and gave the task direction (e.g. “Make the soup”). Students were allowed 5s to begin the response. If they failed to begin the response, the researcher shielded the student from viewing the correct response and completed the step on the task analysis for the student and then repeated the task direction. This was an attempt to prevent the student from acquiring the skill by watching the researcher model the response. In some instances, this shielding would not wholly keep the participant from seeing what occurred. For example, several steps of the task analyses required the student to pick up an object. In these instances, the researcher would place her body or clipboard between the student and the materials, pick up the correct material and place it in the student’s hand.

If students responded incorrectly or ex-

<table>
<thead>
<tr>
<th>Setting the Table</th>
<th>Making Soup</th>
<th>Making a Sandwich</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pick up the plate</td>
<td>1. Open the microwave</td>
<td>1. Pick up a piece of bread</td>
</tr>
<tr>
<td>2. Put the plate on the mat</td>
<td>2. Get the soup</td>
<td>2. Put the bread on the plate</td>
</tr>
<tr>
<td>3. Pick up the napkin</td>
<td>3. Put the soup in the microwave</td>
<td>3. Pick up the condiment</td>
</tr>
<tr>
<td>4. Put the napkin to the left of the plate</td>
<td>4. Close the microwave door</td>
<td>4. Spread the condiment on the bread</td>
</tr>
<tr>
<td>5. Pick up the fork</td>
<td>5. Press “Stop/Clear”</td>
<td>5. Put the package in the trash</td>
</tr>
<tr>
<td>7. Pick up the knife</td>
<td>7. Press “I”</td>
<td>7. Put the meat on the condiment</td>
</tr>
<tr>
<td>8. Put the knife to the right of the plate</td>
<td>8. Press “3”</td>
<td>8. Pick up the cheese</td>
</tr>
<tr>
<td>10. Put the spoon to the right of the knife</td>
<td>10. Press “Start”</td>
<td>10. Pick up the bread</td>
</tr>
<tr>
<td>11. Pick up the cup</td>
<td></td>
<td>11. Put the bread on the cheese</td>
</tr>
<tr>
<td>12. Put the cup to above the knife and spoon</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ceeded the allowable duration for the response, the researcher interrupted the response, placed the materials in the correct place for the next step of the task sequence and repeated the task direction. We believed that these efforts were the most prudent way to allow students a complete opportunity to demonstrate how to perform as many steps of the task analysis as possible while recognizing the risk that students might “learn” from the intervention of the researcher. After students completed the entire task, they were allowed to consume whatever food they made if they wanted. Sessions for individual skills lasted approximately 10 min (shorter once students mastered the skills) and all three skills were probed in succession on the same day.

CBVI procedures. Pilot testing of the software with other students with autism revealed that the computer interface was intuitive and that the instructions in the program (e.g. “Now we are going to watch a video, when the video finishes press the arrow button”; or “Now it is your turn, use the mouse to ______.”) were sufficient to train students to use the software. Because of this previous testing, no additional training was planned or needed. The teacher or parent assisted the student with logging into the computer program. Once in the program, the student viewed two narrated video models of the target task being completed. After the first video ended, the second video exemplar played. Figure 1 shows screen captures of videos for each skill in the left hand column.

Once the student completed viewing the video models, the program asked them to complete the skill in a computer simulation. Figure 1 shows screen captures of the interactive simulation screens for each task. The computer displayed an image of all materials on the screen and then issued a task direction (e.g. “Make a sandwich”). Students responded by using the mouse to click on items, move items across the screen, and then click on locations to drop or place items. For example, part of the in-vivo task analysis for making a sandwich consisted of these steps: pick up the bread, place the bread on the plate, pick up the meat, place the meat on the bread. On the computer, these steps were identical. The student had to click on the bread to pick it up, move the bread to the place, and place the bread on the plate by clicking on the plate. The clicking response on the bread to pick it up was one step of the TA and then clicking the plate to place the bread on the plate was another step of the TA. Each of these was prompted as needed in a modified system of least prompts (SLP) instructional arrangement (Wolery, Ault, & Doyle, 1992).

Students were allowed 10s to respond using the mouse, if they did not respond, or began an incorrect response (e.g. clicked on the wrong item to pick up), the computer stopped them and delivered the next level in the prompt hierarchy. The SLP procedure consisted of levels:

1. Independent: student begins a response and finishes the response within 10s of the previous step or task direction.
2. Verbal: computer provides an auditory response prompt telling the student what to do (e.g. “Put the bread on the plate”).
3. Model prompt: computer shows a visual response prompt in the form of a video model where a live actor completes the step (identical to the pre-session video models). The middle image in the right column of figure one displays the model prompt being delivered.
4. Stimulus Prompt: analogous to a “partial physical” prompt in terms of level of intrusion, the stimulus prompt created a bright yellow “halo” on the location where the student needed to click. The image in the top right of Figure 1 shows the spoon being highlighted.
5. “Full Physical”: the computer controlled the images on the screen and completed the step for the student.

If students responded correctly before any prompting was required, the response for that step of the TA was scored as independent. If the student did not respond until after a prompt, the highest level of prompt required for the student to respond correctly was scored. If the student made an error, the computer prompted them and allowed them to complete the step, the response was scored based on the highest level of prompt required and a notion was made that the student made an error on that step before completing the step. All sessions were scored and recorded by the computer.
No programmed reinforcement was provided for correct responses during CBVI. A reinforcer game was available non-contingently on student performance after the student completed the simulation. A teacher, or a parent (for Ray in the home), supervised all CBVI sessions and did not provide any feedback to the student. They were present only to monitor the performance of the computer program and to keep students on task. During the course of the study, students generally displayed eagerness to work on the program and no attention problems were noted. Students usually engaged in two sessions per day with each session lasting approximately 5 min total. Inter-session intervals varied based on school and home schedules.

**Experimental Design**

CBVI was evaluated in the context of a multiple probe design across behaviors and replicated across students. The sequence of target behaviors was counterbalanced across participants. Pre/post in-vivo probes were used to evaluate generalization and were the principle measure of interest. Pre/Intervention probes functioned as the baseline measure. All students were evaluated in-vivo on all target skills prior to receiving instruction on the computer. Once their data were stable across at least three sessions, each student began computer-based intervention on their first skill. Once a student responded independently to 90% or more of the steps of the task analysis during CBVI for his or her target skill on at least three occasions (consecutive sessions at 90% were not required), the researcher tested for generalization with in-vivo probes on all skills and the student began intervention on their next skill. This continued until each student had received intervention on all target skills. The criterion for moving to in-vivo testing was set at 90% independent on three separate occasions for multiple reasons. First, we wanted to evaluate in-vivo performance as soon as possible but yet allow adequate acquisition time on the computer and second we wanted students to have an opportunity to engage in all skills (if possible) as quickly as experimentally possible and using a 90% criterion seemed like a reasonable compromise.

**Reliability**

The primary observer scored student responses during the in-vivo probes. All in-vivo sessions were video taped to allow for collection of reliability and procedural fidelity data. Interobserver agreement (IOA) data were gathered for student responses as well as procedural fidelity. For in-vivo sessions, data were collected by an observer in real time. A second observer viewed video of at least 20% sessions for each student (mean of 27.69% of all sessions) on each skill before and after intervention and scored student behavior as well as procedural fidelity. IOA was calculated by dividing the number of agreements on student responses by the sum of the agreements and disagreements and this number was multiplied by 100. Interobserver agreement for these averaged 98% with a range of 96.2-100%. The disagreements on student performance were always a matter of differences in counting response time. For example, one observer saw the student begin the response within the specified time frame while the other observer scored the behavior as incorrect because the behavior was on started within the allotted time.

Procedural fidelity was calculated by scoring researcher behavior for all critical steps of the in-vivo probe interaction. These included 1) setting out the appropriate materials, 2) providing the student with a verbal instruction to begin the target task. Then for each step of the task analysis, the researchers behavior was scored for whether they 3) responded correctly to the student action whether they had to interrupt an incorrect response or allow the participant to condition, and 4) whether or not they adhered to the latency limit before moving the student to the next step. Because these last two components were scored for each step of the task analysis, the total number of steps varied based on the skill. The number of correctly performed researcher responses was divided by the sum of appropriate and inappropriate responses and multiplied by 100. Procedural fidelity was 96.6%, calculated by dividing the total number of procedural steps followed by the total number of procedural steps scripted to be followed and then multiplying by 100. The procedural steps that were not followed were always related to la-
tency intervals and the researcher allowing 1-2 additional seconds for a student to initiate a response.

During intervention, the computer collected all data on student responses. Prior to deploying the program, it was extensively tested and reviewed by the software development team and the researchers. No procedural or scoring errors were reported during this evaluation. The teacher, researcher or parent completed a protocol checklist after each session to record any irregularities in computer function during intervention. However, with this prototype software, the program did not log and save student data for each session keyed to students’ names and dates.

Results

Figures 2 through 4 show student performance data for in-vivo probes. All students demonstrated improvement during in-vivo probes following mastery of the target skill on the computer. The percent of non-overlapping data (PND) from pre-intervention to post-intervention in-vivo for Stephan and Ray was 0% for all skills. The PND for Natalie was 16% for making a sandwich and 0% on setting the table.

Stephen

Stephen showed low levels of accurate responding during in-vivo probes for setting the table with a mean percentage correct of 11% (See Figure 2). After he reached criterion on the computer simulation in six sessions, he scored 100% correct on in-vivo probes for three consecutive sessions after which his performance dipped slightly to 92% correct before rebounding to 100% and back to 92%. Two weeks after intervention he responded at 100% correct for three consecutive sessions. Stephen demonstrated slightly higher abilities with making a sandwich. Prior to CBVI, he averaged 65% of steps correct. Once he met the 90% criteria in CBVI in 11 sessions, he demonstrated complete independence during in-vivo probes and maintained 100% accuracy at a two week follow up probe. With micro-waving soup, he showed stable responding in-vivo prior to intervention where his mean performance was 39% correct. In ten sessions of CBVI he met criterion and generalized his performance to in-vivo probes where he responded correctly for 100% of the steps across three sessions and then maintained at 90% correct at a two week follow up.

Natalie

Natalie’s first skill was making a sandwich. Prior to intervention, she responded at low levels averaging 34% correct (See Figure 3). The only step she consistently got correct was putting the final piece of bread on the sandwich. After she initially met criteria on CBVI in nine sessions, she demonstrated higher independent performance in-vivo by responding correctly for but was not completing the task independently. The decision was made to return to intervention until she met criterion again and she also received probes on the remaining skills and began intervention on setting the table. Once Natalie reached criterion on making a sandwich for the second time (eight additional sessions) she was probed in-vivo again and showed more consistently high performance than previous in-vivo probes but she was not responding at 100%. Again she returned to intervention for four sessions and then back to in-vivo where she again responded better than during baseline but not at 100%. She consistently and correctly responded for the final four steps of the task analysis. Her errors were always with the first four steps. For setting the table, Natalie’s performance was low and stable with a mean of 19% independent during in-vivo probes. Her errors were inconsistent across sessions. Upon beginning intervention, she responded slowly at first and ultimately required 20 CBVI sessions to meet criterion. She engaged in one additional CBVI session beyond criteria. In post intervention (and maintenance probes) she generalized her performance to the natural setting with a mean of 79% of steps correct. Natalie did not have enough time to begin CBVI for making soup because the school year ended, however, her performance data remained low and stable throughout the intervention.

Ray

The evaluation of performance with the software was intended to be conducted in the
The context of a multiple probe design (like with Stephen and Natalie), however, it was discovered through the session logs on Ray’s computer that he likely gained access to all three instructional programs prior to demonstrating mastery on the first skill. In addition, reviews of the logs revealed that Ray accessed the program three additional times for his
first skill (microwaving soup) after he had demonstrated mastery. Therefore his graph (see Figure 4) essentially reflects three concurrent AB designs because we believed this would be the most conservative way to present his data because he could not have access the

![Graph showing response data for Natalie](Image)

**Figure 3.** Response data for Natalie. Closed circles represent responses in-vivo and open circles represent responses on the computer.
software until after he completed initial baseline testing in-vivo. After he saw how to log into the software during the first session, he could then have accessed the program at any time and on multiple times during the same day. His data are displayed as if he accessed the software for all skills immediately after having access to it.

Ray showed low levels of independent performance for micro-waving soup with a mean of 23% correct during pre-intervention probes. Ray required 19 CBVI sessions to mas-
ter micro-waving soup after which he demonstrated independent performance during the first six post intervention in-vivo probes. After 11 sessions on CBVI for making soup, Ray’s performance had stagnated, he was probed for his performance on the remaining skills, with the intention of beginning intervention on setting the table. At this time, because of the high degree of independent performance, it was discovered that Ray had accessed the remaining skills on the computer. The computer tracked his activity however and this showed that after 11 sessions of accessing CBVI for setting the table, and 10 for making a sandwich, Ray had achieved mastery on the computer. During pre-intervention probes for setting the table, Ray had averaged 11% correct responses and during post intervention he demonstrated a mean of 93%; achieving 100% accuracy during several sessions. Ray’s pre-intervention ability to make a sandwich was higher relative to the other target skills. His pre-intervention performance ranged from 36 to 73% correct with a mean of 58%. He averaged 93% correct during post intervention with several sessions at 100% correct. During in-vivo probes, Ray would regularly repeat the verbal prompts from the software verbatim.

Social Validity
A social validity survey was given to parents, teachers, teaching assistants, speech therapists, and occupational therapists working with the participants. Half of the surveys returned were from parents, and half were from service providers. A 5-point Likert Scale was used (1 = strongly disagree; 5 = strongly agree) for individuals to respond to attitudinal questions about the goals and procedures of the study. Parents and professionals felt elementary school rather than pre-school, middle school, or high school was the time to learn these skills (4.4 average). Parents and professionals would use a version of this game to teach other functional skills for independence, work, or leisure (4.8, 4.4, and 4.6 average, respectively). Professionals were asked additional questions about the game but only four responses out of the six surveys were completed since they were not involved in using this instruction. Overall, professionals felt the students enjoyed the game (average 4.8), but they did not feel it reduced the time they would spend teaching making a sandwich, setting the table, or using a microwave (2.5, 2.8, 2.5, respectively).

Judging the social validity of the study outcomes came from informal feedback from parents. One saw their child microwave something and set the table. Another reported that their child used the microwave and made a sandwich. One saw the child complete all of the skills. The parents were not asked to involve the children in these skills at home so they were not directly tested in this environment. In an email one parent wrote, “he has talked about setting the table since then. He told me just last night that I was putting the napkins on the wrong side of the plate.” Anecdotal reports from parents and teachers as well as observations of students confirmed that they enjoyed using the game. All participants wanted to work on the game and all participants tried to access the other skills in the game before they mastered the target skills on which they were working.

Discussion
To consider using a computer game to teach a functional life skill, seems, on the surface, impractical and counterintuitive. Results of this study demonstrated that it can be accomplished and that the student will generalize the skill to the natural environment. This begs the question as to why one would use computer technology to teach these skills when they might be best taught in-vivo using the natural materials.

Using technology to teach functional skills in this way has distinct advantages that are important considerations for instruction. First, technology is “recyclable” in that once the lesson is developed (scheduled, program, individualized), the teacher does not have to prepare for the lesson in the same way every time. Similarly, with a lesson that is tightly structured and delivered reliably through technology, the teacher does not have to worry about procedural variations that other staff may introduce as a child is acquiring a skill. For example, if a teacher is teaching a student to wash clothes in a washing machine and teaches the student to load the clothes,
turn on the water, wait for the water to reach the top, and then put in the powdered detergent but another professional is teaching the student to turn the water on in the washing machine, put in the soap and then load the clothes, the student may fail to acquire the skill as quickly as he or she would have if they were initially taught a single correct way to complete the task.

Beyond the computer’s ability to deliver consistent instruction ad nauseum, it also provides the opportunity for independent learning. The teacher is freed to work 1:1 or in small groups with other students; perhaps other students who are trying to generalize what they learned on the computer. In terms of generalization, computer and video technology allow for a wide range of examples to be inserted into a lesson beyond what a teacher could reasonably assemble for use in the classroom. For example, in the current study, five different place settings combinations were used to teach setting the table and these were depicted in different settings and on different tables. Technology can bring that all into one place and allow the teacher to control the degree of variability in an attempt to prompt stimulus generalization. If this sort of technology proves to be successful in replications, it is reasonable to assume, if adopted, students would be able to spend more time in the community working on social skill related tasks that are more difficult to program on a computer and less time focused on repeated trials of functional skills.

**Limitations**

This study attempted to control for threats to internal validity by using a multiple probe design across behaviors and then replicating that across participants. The logistics of this design made it difficult for one of the students, Natalie, to complete all of her target skills; yet, intra and intersubject replication of effect were still demonstrated. More narrowly, to interpret these results, one must be cautious of the accelerating baseline data for Natalie on making a sandwich and, to a lesser extent on setting the table. Ray also exhibited some variable data with some baselines showing slight accelerations.

In terms of research design, Stephen’s results document the most convincing evidence that the software was an effective instructional tool with three demonstrations of effect. To a lesser extent, Natalie’s mastery of two of the skills she had time to do show promise. Ray’s results have to be approached with the greatest caution since the three AB designs, though illustrating acquisition, fail to achieve the experimental control offered by the evaluation on Stephen’s data. However, Ray’s violation of the procedural protocols and accessing skills that were to remain in baseline may yield one of the most valuable findings of the study. Ray’s exploration of the software and eagerness to engage with the activities may have led to him learn the target skills (the experimental design does not permit this conclusion to be drawn though) and be motivational but beyond this, his initiative demonstrates the ease with which systematically designed software can be used by a student without a great deal of adult supervision. The design could have been tightened more by requiring a criterion level of 90% or 100% over three consecutive sessions rather than three sessions. Admittedly, the decision to use the more relaxed criteria (90% independent or better across three sessions) was one of expedience rather than experimental rigor but the results still indicated that once students were able to meet the criteria, they were able to generalize the skill to the natural environment.

Other limitations that impact the external validity of this study include the availability of the software to teachers. Currently this study evaluated proprietary software to answer research questions about the possibility of teaching functional skills with CBVI. However, in the future, when such software is more widely available, teachers will be able to incorporate this into their instruction. Until that time, this study does demonstrate that interactive CBVI can lead to positive outcomes and teachers can incorporate some of these techniques into simple authoring tools like IntelliStudio and even PowerPoint.

Another limitation that should be considered is that, from an instructional standpoint, strictly defining the order of steps for making a sandwich may seem arbitrary and in some ways limits the generality of these results. In other words, one can make a sandwich by placing a slice of bread on a plate, then meat,
then condiments, then cheese and then the last slice of bread. This is certainly a socially valid way to construct a sandwich. However, for the purposes of this study, we were interested in evaluating whether such tight stimulus control could be achieved on the computer and then generalized to the natural setting. Therefore the sequence of all steps in all skills became critical. One should note that no student, regardless of sequencing preference was able to perform any of the skills in baseline to the same level of mastery that they did following intervention. While sequence errors were evident during pre-intervention probes, many of the student errors were latency or duration errors. This indicates that they would not have been able to perform the skills fluently if at all without intervention. Lastly, had the software been able to track daily student data by session and step and log that information, we may have been able to make data based decisions that could have led to faster acquisition.

Future Directions

While this study demonstrated the impact of CBVI on the acquisition and generalization of functional skills for three students with autism, future investigations could consider a broader range of skills. Within CBVI, no consistent evidence base exists for what prompting strategy is the best. For example, Mechling and Ortega-Hurndon (2007) used a constant time delay and this study used a modified system of least prompts. Future research can examine the relative efficiency of these two procedures within the delivery model of CBVI. Further research is also warranted for the evaluation of how students interact with the software. This study required to students to complete mouse clicking and moving operations that were mirrored on the screen as genuine movement. With new input computer devices becoming available (e.g. Nintendo Wii) that inexpensively allow a user to interact with a game using gross and fine motor movements in topographically similar ways one would use in-vivo, the possibility of allowing a student to actually rehearse the motor movements required for a task increases and may impact acquisition. Using technology to teach, specifically, CBVI, is not substitute for teacher directed in-vivo instruction. However, if researchers are able to consistently document the efficacy of CBVI to teach generalized functional skills to students with autism and intellectual disabilities, these can become powerful supplements to traditional instruction and all the classroom teacher greater freedom to spend individual time with students.

References


Comparison of Self, Other, and Subjective Video Models for Teaching Daily Living Skills to Individuals with Developmental Disabilities

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Abstract: This study compared the effectiveness of self-, other-, and subjective-video models on teaching daily living skills to three individuals with developmental disabilities. Results indicated that all conditions were effective in promoting independent correct responding in both instructional and generalization settings and that the effects maintained over time. Two of the three participants engaged in more independent correct responding when they were taught skills with the other model condition, while the other participant engaged in more independent responding on the target skill when the subjective model condition was the instructional procedure. However, there were significant differences between the model types when time needed to create the stimulus materials was considered. Creation of self-modeling materials required almost twice as much time as the other- and subjective-modeling materials, which made self-models less cost effective in terms of teacher time and outcomes.

Video instruction is considered a “promising practice” for teaching a variety of skills such as cooking, cleaning, spelling, social skills, communication, as well as other life skills to individuals with developmental disabilities. It involves showing learners a video of a model (i.e., self, peer, expert, or “first person viewpoint”) performing a skill or skill sequence. Typically, these videos are viewed either on a television or computer prior to task engagement (video modeling) and the learner is expected to perform the skill shortly after viewing the video. To date, researchers who have studied video-based instruction have demonstrated that it usually results in faster skill acquisition on the part of the learners and that the skills can often generalize to untrained settings (Ayers & Langone, 2005; Hitchcock, Dowrick, & Prater, 2003; Mechling, 2005).

Although video instruction appears to be a very effective instructional tool, there are many variables associated with video instruction that need to be evaluated to determine how it can be more efficient and effective for the learners as well as the educators who will be responsible for creation of the materials. Research is needed to investigate the combinations of variables that will result in the most effective and efficient implementation package for video-based instruction (Cihak, Alberto, Kessler, Taber-Doughty, & Gama, 2006).

Type of Model (self, other, subjective)

One of the variables associated with video modeling that is in need of further study involves the type of model that is depicted in the video sequences. Some researchers have used self models (Buggey, 2005), peer models (Haring, Kennedy, Adams, & Pitts-Conway, 1987; Lasater & Brady, 1995), adult models (Alcantara, 1994; Charlop & Milstein, 1989), first person or “subjective viewpoint” (where video is shown from the perspective of the individual performing the task) (Schreibman, Whalen, & Stahmer, 2000), or a combination of models (Morgan & Salzberg, 1992; Van Laarhoven & Van Laarhoven-Myers, 2006; Van Laarhoven, Van Laarhoven-Myers, & Zurita, 2006).
Although all of these investigations resulted in improved performance, it is unclear whether or not one type of model would be better than the others or if one type of model would be more effective for a particular type of skill (e.g., social versus academic skill).

**Self-modeling.** Video self-modeling (VSM) is a technique that allows learners to observe themselves engaging in positive performances of a target behavior and has been used to teach skills such as math (Schunk & Hanson, 1989), language (Buggey, 1995; 2005), and social skills (Buggey, 2005; Lonnecker, Brady, McPherson, & Hawkins, 1994). Video self-modeling is thought to be effective because the learners can view themselves successfully performing a skill that may be difficult. By viewing their own successful performances, the learners are thought to be more interested and more confident in their abilities. The instructional materials are developed by either prompting the individual to perform the task during taping and editing out the “prompter”, or by videotaping the learner over a period of time and using only the footage that shows the individual performing the skill successfully. The drawback to this type of model is the time required to create the stimulus materials (videos). Because the learners serve as their own models, a great deal of time must be spent editing out the prompter or editing footage that has been videotaped over an extended period of time.

**Other models.** Several researchers have used models other than the learner to demonstrate skills, or to serve as models in instructional videos. Most cite the work of Bandura (1977) and his *Social Learning Theory*, which describes how humans can learn from observing others engaging in behaviors and by observing the consequences that follow. Based on this work, other models (typically adults) and peer models have also been used with video-based instruction. Some researchers have followed the work of Bandura (1969) and have suggested that the most effective “other” models are those who share common features with the learners (e.g., age, gender) and have chosen peers to serve as instructional models. Peer models have been used to instruct persons on community skills (Branham, Collins, Schuster, & Kleinert, 1999; Haring et al., 1987), vocational skills (Martin, Mithaug, & Frazier, 1992), social skills (Nikopoulos & Keenan, 2004), and cooking skills (Bidwell & Rehfeldt, 2004; Rehfeldt, Dahman, Young, Cherry, & Davis, 2003). Videos using models of other individuals instead of peer models have been used for a variety of skills including social and communication skills (Charlop & Milstein, 1989; Charlop-Christy, Le, & Freeman, 2000; Conyers, et al., 2004; LeBlanc, et al., 2003), daily living skills (Van Laarhoven & Van Laarhoven-Myers, 2006), and community skills (Alcantara, 1994; Ayers & Langone, 2002). Typically, the use of other models requires less time for material creation because the models that are depicted usually have the skills of interest in their repertoire and less editing time is required. However, depending on the age and/or cognitive level of the models, peer modeling can require more time than that of adult models. On the other hand, it would probably require less time than is required for the creation of video self models. In one of the very few comparative studies that exist with video-based instruction, Sherer, et al., (2001), compared video self-modeling with other models to teach conversation skills to five children with autism. Results indicated that, although there was some variability among participants, both conditions were equally effective in terms of percentage correct engagement and rate of acquisition.

**Subjective models.** Another approach that minimizes the need for extensive editing is the use of subjective viewpoint models or first-person perspective models. With this approach, the learner watches the video as if they were completing the task themselves. Typically, there is no model present, but rather, learners watch a video that shows what it would look like if they were completing the task. Subjective models have been used for video instruction of various skills, including self help skills (Norman, Collins, & Schuster, 2001), daily living skills (Shipley-Benamou, Lutzker, & Taubman, 2002), behavior regulation/transitioning from one activity to the next (Schreibman, et al., 2000), and cooking skills (Graves, Collins, Schuster, & Kleinert, 2005). In a comparative study, Ayres and Langone (2007) compared first-person (subjective) models with third-person (other) models and found that although there was...
some variability among participants related to efficiency, both models were equally effective.

Although different types of models have been used to teach various skills, several questions still remain unanswered in the research literature. For example, is one type of model (self, other, subjective) more conducive or more effective and efficient for teaching specific types of skills to individuals with disabilities? And, are any of the model types more cost effective in relation to teacher requirements (time needed to create materials) and student outcomes (e.g., time and number of sessions to criterion; growth between pre- and post-measures)?

The purpose of this study was to compare different types of models depicted within the instructional sequences to determine if there were differences regarding the effectiveness of each model. Cost benefit or “efficiency analyses” were conducted in order to assess the practical utility of each video-based procedure. These “costs” were compared to the accrued benefit to the participants as measured by the relative effectiveness of each condition.

Method

Participant Selection

Participants were recruited from high school programs located in the suburbs of Chicago. To recruit, a description of the study was e-mailed to teachers in several school districts. Of those who responded, a follow-up questionnaire was sent to: 1) identify specific skills for instruction, 2) determine availability of the participant, and 3) obtain personal information for the participant to obtain informed consent and assent. Participants were then selected from the pool of respondents based on similarity of IQ scores, skills requiring instruction, and scores on pretests.

Participants

Two females and one male with moderate disabilities (IQ range 35–55) between the ages of 12–17 participated. All participants came from homes where Spanish was the primary language, all had similar skills requiring instruction, and all were functioning within the moderate range of mental retardation.

Pablo was a 17-year-old high school student with Down syndrome who functioned in the moderate range of mental retardation. His full-scale IQ score on the WAIS-III (Wechsler, 1997) was 40. He received special education services in a self-contained classroom to meet his individualized needs. He was also involved in a vocational training program and worked on skills such as item assembly, washing tables and chairs, and also worked on functional academic skills such as money handling and reading. He generally required direct instruction and practice/repetition to acquire or attain new and/or difficult skills and prompting to stay on task. Behaviorally, Pablo was fairly even tempered, but did have a tendency to exhibit non-compliant behaviors when asked to complete tasks that were outside of his normal routine, were unfamiliar, or non-preferred.

Alanna was a 15-year-old female who functioned within the moderate range of mental retardation. Her full-scale IQ score on the Leiter International Performance Scale-Revised (Roid & Miller, 1997) was 30. She received special education services in a self-contained classroom where she practiced academic skills, basic domestic skills such as cooking and cleaning, and vocational skills such as gathering recycling and sorting and assembling piece work. Alanna was quite distractible and required cueing, prompting, and redirection to focus on the task in which she was engaged, and also needed a great deal of repetition and direct instruction to acquire new skills.

Breanne was a 12-year-old girl who was functioning within the moderate range of mental retardation. Although her files indicated that the Stanford-Binet-Fourth Edition (Thorndike, Hagen, & Sattler, 1986) was administered several years prior to her participation in the study, there was no IQ score listed. However, the report indicated that she was functioning within the moderate range. Breanne received special education services in a self-contained classroom where she practiced academic skills such as reading sight words, telling time, counting money, as well as daily living and pre-vocational skills. She had a very pleasant personality and was willing to work hard on whatever task she was
given. She frequently praised her own work as well as the work of others (e.g., “you did it”)

Setting

Instructional sessions were conducted in three different areas in the school. Cooking hot dogs was done in a café in the school. It was a large room that had two l-shaped kitchenettes on one wall and then long rectangular tables or circular-shaped tables spread throughout the remainder of the room. The room appeared to have been used as a home economics room in the past. Cleaning a sink was done in a bathroom that was located in a “mock house” that was in the school, and changing batteries was done at a dining table that was connected to the mock house. Once participants met criterion (80% independent correct responding for three consecutive sessions), they were assessed on their ability to generalize the skill to novel environments (settings other than those used during instruction) while using different stimulus materials than were used during instructional sessions (e.g., different microwaves, brands of hot dogs, cooking equipment, battery-operated devices, and cleaning supplies). The generalization sessions for cooking hot dogs were conducted in the mock house kitchen, cleaning the sink was done in a bathroom that was connected to a classroom, and changing batteries was done at a table in the café.

Instructional and Generalization Stimulus Materials

All video-based materials were developed in the settings where instructional sessions took place. In addition, participants used a different set of materials in the instructional sessions than were used in the generalization settings. For example, Oscar Mayer hot dogs, Jewel brand buns, a black oven mitt, black-handled silverware, a blue plate, and a microwave and refrigerator located in the café were used for instructional sessions for cooking hot dogs. Ekrich hot dogs, Wonder hot dog buns, a green oven mitt, green-handled silverware, a green plate and different microwaves and refrigerator located in the mock house were used for generalization sessions. For the battery tasks, different battery operated devices were used in instructional (i.e., Roomba wall unit with D-sized batteries) versus generalization conditions (i.e., Tetris handheld game with AA-sized batteries). The batteries differed by brand and size, as did the types of screwdrivers that were used. Similarly, cleaning buckets that held different brands/colors of cleaning supplies (i.e., pink sponge, Fantastik cleaner, white bucket) were used in the mock house bathroom for instructional sessions while a different colored bucket and cleaning supplies were used to clean in the generalization setting (bathroom off of a classroom).

Skills Selected for Instruction

Each participant was taught three different skills (one per instructional condition). The targeted skills fell within the domestic or daily living domain, however, each student was taught skill sequences from three different sub-domains within the domestic realm (i.e., cooking, cleaning, maintenance) to ensure that the responses across the skill sequences were mutually exclusive and independent of one another. These skills included cooking a microwave hot dog, cleaning a bathroom sink, and using a screwdriver and changing batteries in different devices (i.e., a Roomba wall unit and a handheld game).

Controlling for Task Difficulty and Practice Effects

Once several skills were identified for possible inclusion in the study, task analyses were written for each sequence and four different teachers who had been teaching for at least two years rated them according to complexity and difficulty (easy, moderately difficult, & difficult). They then ranked skills within each difficulty level to determine which skills were equivalent in terms of complexity. Results of the ratings were used as a guide for determining skills to be targeted for instruction. In addition, participants’ pretest scores were used to equate the skills. In order to control for participant skill level prior to instruction, the scores for instructional pretests and generalization pretests were averaged and ranked. Each participant’s task with the highest score was randomly assigned to one of the three...
different conditions and the tasks with the lowest scores were assigned to three different conditions when possible. To control for practice effects, all participants were videotaped engaging in all three of the tasks prior to instruction. This was done to reduce the likelihood that practice would improve their performance within the self model condition.

Design

The design for this study was a within-subject adapted alternating treatments design (Wolery, Bailey, & Sugai, 1988). It differs from the alternating treatments design in that the treatments are applied to different but equally difficult, independent behaviors/skills, whereas, in the alternating treatments design, the treatments are applied to the same behavior/skill. With this design, two or more treatment conditions are introduced in a rapidly alternating fashion with the order of presentation being randomized. Each participant was taught a different skill within each condition and the skills were counter-balanced across conditions and subjects to control for task difficulty. The skills were assigned as indicated in Table 1.

Independent Variables

**Condition 1: Self Model.** Participants viewed a video-based multimedia sequence of themselves engaged in the skill prior to task engagement.

**Condition 2: Subjective Model.** Participants viewed a video-based multimedia sequence that was created as if they were performing the skill sequence (i.e., what it would look like from a first person perspective).

**Condition 3: Other Model.** Participants viewed a video-based multimedia sequence of another person (an adult female) engaging in skill sequence prior to task engagement.

**Instructional Materials**

The lead author/experimenter, who is an adult female, served as the model for both the “other” and “subjective” conditions, and the participants served as their own models during the “self-model” conditions. Video segments were shot in the settings where instruction took place. For the “other” condition, a combination of wide angle (full view of the model) and a few zoom shots (showing the arm of the model reaching for hot dogs) were used. When the subjective model was created, the videographer placed the camera on the lead author’s shoulder while she performed the task. The resulting materials showed the task being completed from a first person perspective and usually only the hands of the experimenter were shown. For the “self” models, each participant was videotaped engaging in the skill sequence and the prompter and/or mistakes were edited out of the video. Again, to minimize practice effects for the self-model conditions, all participants were videotaped engaging in all three skill sequences; however, only one self-model video was used for each participant during the study.

Skill sequences (e.g., making a microwave hot dog) were broken into short video segments (for each step). Photos of the most salient feature of the steps (e.g., a still of water being squeezed from a sponge) were “grabbed” out of the video and placed at the beginning of each video segment. Each video segment, or each step of the task was edited using Pinnacle Studio 10.1™ (Pinnacle Systems, 2005) and saved as a separate file and then later placed on a PowerPoint™, 2003 presentation. Each slide in the PowerPoint™ had written directions for each step on the top of the screen, the “grabbed” photo visible in the middle of the screen, and narration that described the step to be completed. The slide show was set so that the participants had to move the cursor to the photo and use a mouse click to view the video and a mouse click on a hyperlinked “next” button on the bottom right of the screen to advance to the next slide. Please refer to Figure 1 for an example screenshot.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Self</th>
<th>Subjective</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pablo</td>
<td>Hot dog</td>
<td>Clean sink</td>
<td>Batteries</td>
</tr>
<tr>
<td>Alanna</td>
<td>Batteries</td>
<td>Hot dog</td>
<td>Clean sink</td>
</tr>
<tr>
<td>Breanne</td>
<td>Clean sink</td>
<td>Batteries</td>
<td>Hot dog</td>
</tr>
</tbody>
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Instructional Sessions

Video modeling, or viewing the video-based sequence prior to task engagement, was used for all of the instructional sessions. Participants sat at a large dining table in the mock house in the school and independently navigated through the PowerPoint presentation that was loaded on a laptop computer. Once participants viewed the video sequences, they then immediately engaged in the instructional task.

Training Participants to Use Technology/photos

Prior to engaging in instructional sessions, each participant was taught to operate the laptop and to navigate through the PowerPoint™ presentation (i.e., using a mouse click to view the video segment and advance to the next slide) independently for two consecutive sessions before they engaged in the instructional task.

Data Collection Procedures

During pre/post-testing, acquisition phases, and generalization testing, task analytic data were collected with correct and incorrect performance being reported on each step of the skill sequence. A ‘+’ was recorded for independent correct responses, a ‘A−’ was recorded for incorrect attempts, an ‘N−’ was recorded for no attempt, and an ‘S−’ was recorded for a sequence error. During acquisition phases, data were also collected on prompt levels and a ‘√’ was recorded for each prompt given at each step (with a maximum of two per step). To obtain data on prompt levels, a two-level prompting hierarchy was used. In the event of an error or no attempt within 5 seconds of the natural discriminative stimulus, participants were given a verbal prompt to respond. If the verbal prompt was not sufficient to prompt a correct response, a gestural or physical prompt was provided (depending on what was necessary for the particular step) to ensure correct responding.

Dependent Measures

Percentage of independent correct responses. Participants were assessed on how independently they performed the skills selected for instruction prior to engaging in the instructional sequences (pretest), during instruction (acquisition), and following instruction (posttest). The score was determined by dividing the number of steps with independent responding by the total number of steps in the skill sequence and multiplying by 100. Pre/post tests differed from instructional sessions in that participants were expected to perform the skill in the training/generalization environment without video models. In addition, no prompts were delivered during testing. If participants made errors during the testing phases, the experimenter asked them to turn away or close their eyes as the step with the error was completed for them. Post-tests were conducted in the instructional setting one or two days after participants met criterion on all three tasks and the generalization and maintenance post-tests were conducted 1- and 6-weeks following training (in environments that were different than the instructional setting).

Percentage of prompts. Participants were assessed on the number of external prompts they needed to complete the skill sequence during acquisition phases of the study. The score was determined by dividing the number of prompts given by the total number of prompts possible (i.e., two per step) and multiplying by 100.

Number of sessions to reach criterion. The acquisition criteria for each skill sequence was a score of 80% independent correct responses or higher for three consecutive sessions. The
number of instructional sessions required for the participant to reach criterion was counted to determine if any of the instructional conditions resulted in faster acquisition.

**Percentage of independent correct responses on measures of generalization.** Prior to and following instruction (at 1- & 6-weeks), participants performed the skill in novel environments without video materials or prompting to obtain baseline levels and to determine if their skills generalized to untrained environments and stimulus materials following instruction.

**Efficiency measures.** An efficiency score was computed by considering the ratio of each participant’s growth (from pre-test to post-test) to the measured “cost” of minutes required to create instructional materials [i.e., (posttest-pretest)/(minutes of preparation)]. To determine the number of minutes of preparation, a stop-watch was used to calculate the number of minutes to videotape, capture the video, edit the video, and to prepare the video-based instructional sequences.

**Data Analysis**

Experimental control was determined primarily through visual inspection of the data and through comparisons of means for each condition. With the adapted alternating treatments design, experimental control is demonstrated by a consistent level and/or trend difference between the interventions (Wolery et al., 1988). At a quick glance, one can determine if one intervention is better than the other if there is little or no overlap between the data paths. In addition, although baseline measures are not necessary with the alternating treatments design, the pre/post scores for each condition were also compared.

**Reliability**

Additional authors conducted reliability sessions for 28% of all sessions (including pre/post-tests and instructional sequences). The percentage agreement index (i.e., number of agreements divided by number of agreements plus disagreements and multiplied by 100) was used to calculate interobserver agreement. Agreement for independent correct responses averaged 98% (range = 93–100). Agreement for Instructional prompts across sessions resulted in a mean score of 95% (range = 83–100). In addition, the second observer collected procedural reliability data (Billingsley, White, & Munson, 1980). These measures included the following: a) checking to ensure that the correct condition was being applied to the intended task for each participant, b) checking to determine if the order of tasks were presented as stated in the research protocol, c) checking to make sure that the correct stimulus materials were used, and d) that the prompting hierarchy was delivered as intended. Reliability was calculated by dividing number of correct measures by the total number of assessed variables and multiplying by 100. Procedural reliability agreement averaged 100%.

**Results**

All of the instructional procedures were effective in increasing independent responding and/or decreasing prompting during acquisition for all participants, however, some differential effects were observed between the conditions.

**Percentage of independent correct responses.** When the percentage of independent correct responses were measured across conditions/tasks, the data clearly indicated that all conditions or models were effective in increasing independent responding for all participants. During acquisition, Pablo and Breanne engaged in more independent correct responding during acquisition with the “other” model condition while Alanna engaged in more independent responding during the “subjective” model condition (see Figure 2).

Pablo engaged in more independent correct responding when the “other” model condition was used \(M = 87\) followed by “self” model \(M = 81\) and “subjective” model \(M = 73\). Breanne also had higher independent correct responding when the “other” model was used \(M = 90\) followed by the “subjective” model \(M = 84\) and then “self” model \(M = 71\). Alanna engaged in more independent correct responding when the “subjective” model was presented \(M = 88\) followed by “self” model \(M = 69\) and “other” model \(M = 66\).

During post-test phases, participants no longer viewed the videos prior to task engage-
Figure 2. Percentage of independent correct responding across phases and participants.
ment. This was done to determine if the participants improved their independent correct responding without video-based supports. They were tested using instructional materials in the initial post-test one or two days after reaching criterion on all three tasks. They were then given a generalization post-test one week later and again at six weeks after reaching criterion.

When post-test data were analyzed, Pablo continued to engage in more independent correct responding with the task he was taught using the “other” video model during instructional and generalization post-tests and these effects maintained over a 6-week period of time. Although Breanne also continued to have more independent correct responding with the “other” model condition as measured by the instructional post-tests, she had more independent correct responding with the “subjective” model condition when generalization was measured with the generalization post-test. However, this was not maintained and she performed better with the “other” model condition at the 6-week maintenance post-test. Alanna continued to engage in more independent correct responding when the “subjective” model was used as the instructional method and these skills also generalized to other settings and materials and were maintained over time.

Although every attempt was made to identify tasks of equal difficulty and to account for skill level prior to instruction, the cleaning sink task appeared to be the most difficult for all participants regardless of condition. However, each participant engaged in that task and the tasks were counter-balanced across all three modeling conditions. When the mean scores of participants were combined according to the type of model, the “subjective” model condition was associated with the highest independent correct responding during acquisition ($M = 82$) followed closely by the “other” model condition ($M = 81$) and the “self” model condition ($M = 74$) (see Figure 3). When the mean scores of participants were combined across conditions during instructional post-tests, the “other” model condition was associated with the highest independent correct responding ($M = 98$) followed by the “subjective” model condition ($M = 95$) and the “self” model condition ($M = 88$). Similar results were found with the one-week generalization post-tests with the “other” model condition being associated with the highest scores ($M = 92$) followed by the “subjective” model condition ($M = 90$) and the “self” model condition ($M = 86$). At the 6-wk test, the “subjective” model condition had the highest mean scores ($M = 90$) while the “other” and “self” model conditions were not far behind ($M = 88$). Overall, it appears that all three of the modeling conditions resulted in relatively high percentages of independent correct responding across all phases of the study. The “other” and “subjective” model conditions were associated with slightly higher percentages of independent correct responding during both acquisition and generalization, while all three conditions appeared to be somewhat similar in terms of maintenance.

**Percentage of prompts.** During instructional sessions, if the participants made errors, a two-step error correction prompting sequence was provided if necessary. Following errors, participants were first given a verbal prompt to perform the step. If they responded correctly, no additional prompts were given. If the participants made another error, a controlling modeling or physical prompt was delivered to ensure correct responding. As was expected, participants received fewer prompts in the conditions where they had the most independent correct responding. Pablo and Breanne received the fewest prompts when the “other” model condition was used while Alanna received the fewest percentage of prompts when the “subjective” model was used. When the mean scores were combined across participants, the “other” model was associated with
the fewest external prompts ($M = 11$), followed by the “subjective” model ($M = 13$) and “self” models ($M = 16$) (see Figure 4).

**Number of sessions to criterion.** To determine if any of the modeling conditions were more efficient than the others, the number of sessions to reach criterion (i.e., three consecutive sessions with 80% or higher independent correct responses) was also analyzed. Alanna and Breanne reached criterion more quickly when the “subjective” model was presented, while Pablo reached criterion more quickly when the “other” model was used. When the mean number of sessions were combined across participants and modeling conditions, the “subjective” and “other” model conditions required an average of 9.33 sessions to criterion while the “self” model condition required an average of 11.33 sessions to criterion (see Figure 5).

**Efficiency measures.** In order to determine which of the procedures was more cost effective, an efficiency score was calculated by considering the ratio of each participant’s growth (from pre-test to post-test) to the measured “cost” or minutes that were required to prepare the instructional materials. This score was calculated to determine if one type of model would be more efficient than the others in terms of teacher/caregiver time to create the materials and to measure the practical utility of each procedure. Results indicated that the “other” model condition was more cost effective for two of the participants while the “subjective” model condition was more cost effective for the third participant. With the exception of Pablo, the “self” models were the least efficient of the models (see Figure 6). When the efficiency scores were combined across participants, the “other” model condition was the most efficient ($M = 1.25$), followed by the “subjective” model condition ($M = 1.17$), and finally the “self” model condition ($M = .61$). In essence, each minute of time spent creating the materials “bought” an increase of $1.25$ percentage points from pre-to post-test scores for the “other” model, $1.17$ percentage points for the “subjective” model, and $.61$ percentage points for the “self” model, indicating that the other and subjective models were almost twice as efficient as the self models.

**Discussion**

In summary, all three of the video models were effective at increasing independent correct responding for all three participants. When means were combined across conditions, the “other” and “subjective” models appeared to be more effective and efficient than “self” models across all of the dependent measures. The “other” model condition was associated with somewhat higher scores in terms of independent correct responding for two of the participants for acquisition, maintenance, and generalization, while the other participant performed better during acquisition, maintenance, and generalization when the “subjective” model was used. Fewer external prompts were also used for two of the participants when the “other” model condition was in place while the third participant required fewer external prompts when the “subjective” model condition was in place. When the number of sessions to reach criterion were evaluated, two of the participants met criterion faster when the “subjective” model was presented while the third participant met criterion faster when the “other” model condition was in place. In addition, both the “other” and “subjective” models were far more efficient than “self” models when the time to create the materials were considered in relation to the amount of growth under each condition.

Self models appeared to be the least effective of all the model types across the different dependent measures, in particular, when the efficiency scores were calculated. Because the participants served as their own models and were not adept at performing the skill sequences, the videotaping and editing necessary for the development of the “self” modeling materials required far more time than the “other” and “subjective” models, thus making it less efficient. This is an important finding especially considering that a frequent criticism of video-based instruction is that the time to create the materials is a shortcoming that prevents its widespread use in applied settings. To reduce this limitation, it makes sense to use models that are more efficient and cost effective and perhaps using “other” or “subjective” models when teaching functional skills is the most logical and practical approach. In addition, using video-based mate-
Figure 4. Percentage of prompts across participants and conditions.
rials that present “other” and “subjective” models has the added advantage of being used across learners whereas “self” models do not.

In addition to being less efficient in terms of the time required to create the instructional materials, “self” models also resulted in lower scores when independent correct responding was analyzed across participants. One surprising outcome of this study was that the participants seemed to respond somewhat differently when they viewed the “self” models versus the “other” or “subjective” models. Although they were excited to see themselves on the computer and would often say things like, “Look! That’s me!”, they also often commented on things that were unrelated to the task. For instance, Pablo frequently pointed out the bruise on his arm in the hot dog video and then wanted to discuss how he got it from fighting with his brother. Alanna and Breanne frequently commented on the clothes they were wearing in the video (e.g., “That’s my favorite shirt”, “I’m wearing that same outfit today!”) and they all seemed to attend more to the irrelevant stimuli that were present in the “self” model videos rather than the task that was being presented. A possible explanation for the lower mean scores with independent correct responding with the self modeling tasks might be attributed to the fact that the participants were “star struck” and were attending to themselves or what they were wearing in the videos rather than the task that was being presented.

Although all of the video models appeared to be effective, one limitation to the study is that the participants performed less well when they were cleaning the sink. This was definitely a non-preferred task for all of the participants and it appeared to be somewhat more difficult than the other tasks regardless of the type of model that was used. Pablo and Alanna, in particular, did not like cleaning the sink and often verbalized their displeasure with having to clean it. Pablo often engaged in avoidance behaviors during the task (e.g., pretending to dry his hands on the heating vents; frequently adjusting the blinds on the bathroom window to obtain the best light; repeatedly wringing the sponge with exaggerated force), and although his antics were quite amusing at times, prompts often needed to be delivered to get him to complete the next step in the task sequence and this resulted in fewer steps with independent correct responding. Alanna also would throw the sponge in the sink after she completed a few steps and would declare that she “was done”. In addition, the cleaning task was probably more difficult because the stimulus/response relationships were less clear than with the other tasks. For example, once the hot dog was in the microwave, it was more clear that the next response would be to set the timer, whereas, after wiping the inside of the sink, the next step was not as obvious. However, all of the participants were required to engage in this task and each model type was represented. By combining the means across dependent measures it was possible to identify the differential effects of each of the modeling conditions.

Although all the video models increased independent responding across tasks, they were used in conjunction with a two step prompting sequence. As a result of using this combination, it cannot be stated that the video modeling procedures alone were responsible for the changes in student responding. Future research might be directed at in-
vestigating use of the video sequences in isolation rather than in conjunction with a prompting system (e.g., system of least prompts) or within the context of fading approaches (gradually fading out video models).

Research on video-based instruction to date has involved the use of different types of models to teach a broad range of skills; however, several questions still remain unanswered in the research literature. For example, is one type of model (self, other, subjective) more conducive or more effective and efficient for teaching specific types of skills to individuals with disabilities? Are different skill categories (academic/cognitive, social/communicative, and behavioral/self-regulatory skills), more conducive to specific types of models when teaching individuals with disabilities? And, depending on the type of skill that is taught, are any of the model types more cost effective in relation to teacher requirements (time needed to create materials) and student outcomes (e.g., time and number of sessions to criterion; rate of acquisition)? Future research should focus on answering these questions, as well as others, to ensure that the most efficient and effective models are used to improve the practicality and efficacy of video-based instruction across different types of tasks and populations.

References


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Parental Stress and Autism:
Are There Useful Coping Strategies?

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Abstract: According to previous researchers, parents of children diagnosed with Autism Spectrum Disorders (ASD) consistently report more stress than parents of typically developing children or children with other developmental disorders (e.g., Down syndrome). This has peaked interest in the field in a related area, that being, identifying the coping strategies parents use to deal with the stressors of rearing a child on the autism spectrum. The available literature on coping strategies primarily has focused on interviewing parents to find out what strategies they currently use and if these are effective, which has resulted in mixed findings. A selected synthesis of the stress literature pertaining to coping strategies is provided to highlight the high levels of reported stress already experienced by families of children with ASD and what strategies the parents report aid them in coping with the stress. This literature review is presented for two purposes: (a) highlight relevant findings and methodological issues with current research, and (b) discuss implications for researchers and practitioners working with children with ASD and their families who exhibit increased levels of stress.

According to previous researchers, parents of children diagnosed with Autism Spectrum Disorders (ASD) consistently report more stress than parents of typically developing children (Dyson, 1993; Wolf, Noh, Fisman, & Speechley, 1989) and children with other developmental disorders (e.g., Down syndrome) (Boyd, 2002; Sanders & Morgan, 1997). Further, parents of children with ASD report more symptoms of anxiety and marital dissatisfaction than parents of children with other types of disabilities (Dunn, Burbine, Boers, & Dunn, 2001; Holroyd & McArthur, 1976; Kostantareas & Homatidis, 1989). Researchers purport that the treatment of children with ASD may be compromised when parents are experiencing overwhelming levels of stress, exhibiting symptoms of psychopathology (e.g., anxiety, depression), or having difficulty living with and rearing their child with ASD (Robbins, Dunlap, & Plenis, 1991). Thus, effective treatments for this population must provide support to parents as well as their children. However, little is known about coping strategies parents employ to effectively deal with these various stressors or how to design effective parental education programs to combat perceived stressors.

The available literature on coping strategies for parents of children with autism primarily has focused on interviewing parents to find out what strategies they currently use and if these are effective. Previous researchers have found that parents used a variety of strategies to cope with stressors related to having a child with autism. Parents noted that professional services (Donovan, 1988) and spousal support (Higgins, Bailey, & Pearce, 2005) are effective coping strategies. Others have reported that planning appropriate responses to challenging behavior (e.g., if the child tantrums, I will ignore the behavior) and keeping children with ASD and comorbid behavior challenges separated from siblings also helps (Gray, 2003). Still others have noted that extended family support and social withdrawal decrease...
stress (1994). The parents explained it was easier to keep to themselves and avoid embarrassing incidents (e.g., tantrum) that results in stares and comments from others. Given the variety of coping strategies reported by parents, it is not surprising that conflicting research findings exist. For example, Erguner-Tekinalp and Akkok (2004) found social support was not an effective coping strategy for parents of children with autism. In contrast, the sample of parents in the study by Dunn et al. (2001) reported that social supports were effective coping mechanisms for dealing with the daily stress of rearing a child with autism. These discrepancies may be related to the differences between studies, which included socio-economic status, parent occupation, parent education, age of child, and severity of the child. However, the researchers did not provide any data explaining possible reasons for differences. In addition to conflicting findings, some of the strategies parents report as effective may only be providing short term solutions and although temporarily effective may have unanticipated long-term outcomes. For example, the parents who keep children separated from siblings and use social withdrawal as a means to cope may experience decreased levels of stress at first; however, this approach only temporarily displaces the problem, resulting in stress later that may be much worse in severity (Beck, 1995). In addition, the separation from siblings and social withdrawal may inhibit improvement in the social communicative behaviors of their children with ASD (Quill, 1995).

Although the aforementioned researchers have questioned parents regarding what coping strategies they find effective for dealing with stressors related to rearing a child with ASD, there is sparse research on designing educational or counseling programs to help parents cope with these various stressors. Some research has examined the correlation between child, parent, and environmental characteristics and that of parental stress (Bishop, Richler, Cain, & Lord, 2007; Mash & Johnston, 1990). Mash and Johnston’s findings suggest that child characteristics are the primary contributor to parent-child stress in families of hyperactive children. In addition, they found that parental cognitions influence parent behavior, which then can effect the parents’ relationships with their children. However, this has not been connected to educational or counseling services for parents of children on the autism spectrum.

In summary, researchers have noted elevated stress levels in parents of children with ASD since the 1970s (Lilly, 1977) and the need to address the problem, but much less information is known about effective coping strategies. Therefore, the purpose of this paper is to (a) review the literature on coping strategies parents of children with ASD use to deal with various stressors, and (b) discuss implications for researchers and practitioners working with children with ASD and their families who exhibit increased levels of stress.

Method

The literature review conducted on coping strategies for parents of children with ASD began with a search of electronic databases (ERIC, Education, PsycINFO, and Academic Search Premier) using various combinations of the following keywords: autism, autism spectrum disorders, aspergers syndrome, pervasive developmental disabilities, children, coping strategies, family, mothers, fathers, parents, siblings, and stress. Following the electronic data base search, a hand search was conducted of the following journals: American Journal of Mental Retardation, Journal of Autism and Developmental Disorders, Family Process, Journal of Abnormal Child Psychology, American Journal of Mental Deficiency, Community Mental Health Journal, and Focus on Autism and Other Developmental Disabilities. Finally, after reviewing the retrieved articles, an ancestral search was conducted. These searches produced in excess of 50 articles, 19 of which met the following predetermined inclusion criteria: (a) reported empirical findings or a summary of those findings on familial stress and coping strategies to help reduce stress, (b) focus of study was families with children who have a diagnosis of ASD, and (c) published in a peer-reviewed journal.

The 19 articles that met the criteria were reviewed to determine what coping strategies were effective for parents of children with ASD. Particularly, the studies were analyzed to
determine the characteristics of parents, children, and major findings across studies.

**Results**

**Characteristics of Study Participants**

**Parent characteristics.** As outlined in Table 1, there were 594 parents across studies. The majority of researchers reported the mean chronological age of parents by gender. In addition, most studies included the education level of parents, with only a few including additional information on the number of children in the household. The reported ages of mothers across studies ranged from 25 to 67 years, with the mean ages ranging from 32.46 to 42.4 years (see Table 1). Similarly, the reported ages of fathers across studies ranged 25 to 67 years, with the mean ages ranging from 35.12 to 43.44 years.

Parents’ education levels differed within and across studies. The education levels of parents ranged from the completion of some high school to the attainment of a doctoral degree (both mothers and fathers). For example, the study by Dunn et al. (2001) contained participants with partial high school, high school, partial college, college, and graduate school, with the majority having partial college or greater. In contrast, 22 out of 33 (66.7%) of the participants in Gray’s (1994) study had a high school education or less. As shown in Table 1, the majority of mothers in each of the 11 (out of 19) studies with reported education levels completed high school and/or attended college. Similarly, the majority of the reported fathers’ education levels indicated the completion of high school and the attendance and/or completion of a college degree.

In contrast to the reports of chronological ages and education level of parents, only 7 of the 19 studies reported the number of children in the household. Of the few studies that reported number of children, the number of children in the household ranged from one to eight. Future researchers may want to include data on the number of people, both children and adults, in the household as it may be related to parental stress levels.

**Child characteristics.** Similar to parent characteristics, child characteristics varied within and across studies (see Table 2). The chronological age of children ranged from 13 months to 26 years, with the mean ages across studies ranging from 28.35 months to 15.2 years. The study samples of children ranged in size from 3 to 141. Only two of the articles included the mental age or I.Q. of the children. Donovan (1988) reported an I.Q. range of eight to 83, and these data were collected from independent agencies that had previously served the children. Rodrigue, Morgan, and Geffken (1990) reported a mean mental age of 2.82 years, with a mean chronological age of 10.71 years, according to the Vineland Adaptive Behavior Scale. All children included in the literature review were diagnosed with an autism spectrum disorder; however, some articles did include only children with other disabilities (these articles were not included in the table or the overall literature review). The researchers did not describe the instruments that were used to confirm the child’s diagnosis. The majority of diagnoses were recorded from cumulative folders of the children. No studies reported the grade level or academic measures on the children. Further, only six of the 18 studies reported severity of symptoms or level of symptomology of the children. The researchers noted that the more severe the symptoms and challenging behaviors were in the children, the more stress parents reported (Baker-Ericzen, Brookman-Frazee, & Stahmer, 2005; Feldman & Werner, 2002; Hastings & Johnson, 2001; Higgins et al., 2005; Pakenham, Sohronoff, & Samios, 2004; Tunali & Power, 2002).

**Major Findings**

Researchers have used different instruments to measure parental stress levels across the studies. They also noted several types of stress affected parents. Further, researchers noted that parents used various strategies to cope with the stress, some more effective than others.

**Instruments.** Researchers used a variety of instruments to measure stress. Several researchers utilized stress measures previously developed, studied, and psychometrically validated for reliability. For example, Pakenham et al. (2004) used several tested instruments such as the COPE (Carver, Scheier, & Weintraub, 1989) and the Parental Self-Efficacy
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Age of Mother*</th>
<th>Age of Father*</th>
<th>Mother’s Education</th>
<th>Father’s Education</th>
<th>Siblings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baker-Ericzen, Brookman-Frazee, &amp; Stahmer 2005</td>
<td>64</td>
<td>M = 32.46 (SD = 3.36)</td>
<td>M = 35.12 (SD = 5.41)</td>
<td>HS (7%)</td>
<td>Some College (56%)</td>
<td>NR</td>
</tr>
<tr>
<td>Donovan 1988</td>
<td>36</td>
<td>M = 41.7</td>
<td>N/A</td>
<td>HS Graduate (n = 8)</td>
<td>Community College Diploma (n = 4)</td>
<td>M = 1.81</td>
</tr>
<tr>
<td>Dunn, Burbine, Bowers, &amp; Tantleff-Dunn 2001</td>
<td>58</td>
<td>M = 36.84 (SD = 9.21) - both</td>
<td>M = 39.5 (SD = 10.36)</td>
<td>University Graduate (n = 0) (EG)</td>
<td>University Graduate (n = 2) (EG)</td>
<td>N/R</td>
</tr>
<tr>
<td>Erguner-Tekinalp, &amp; Akkok 2004</td>
<td>10</td>
<td>M = 42.40 (SD = 7.02) - both</td>
<td>M = 39.5 (SD = 10.36)</td>
<td>University Graduate (n = 2) (CG)</td>
<td>University Graduate (n = 2) (CG)</td>
<td>N/R</td>
</tr>
<tr>
<td>Feldman &amp; Werner 2002</td>
<td>18 (EG)</td>
<td>M = 39.05 (EG)</td>
<td>M = 42.17 (EG)</td>
<td>HS Graduate (n = 6)</td>
<td>Community College Diploma (n = 0)</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td>18 (CG)</td>
<td>M = 39.5 (CG)</td>
<td>M = 42.13 (CG)</td>
<td>University Graduate (n = 6)</td>
<td>University Graduate (n = 2) (EG)</td>
<td>N/R</td>
</tr>
<tr>
<td>Gray 1994</td>
<td>33</td>
<td>N/R</td>
<td>N/R</td>
<td>HS Education or Less (66.7%)</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>Gray 2003</td>
<td>53</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>Hastings &amp; Brown 2002</td>
<td>46</td>
<td>M = 41.04 (SD = 5.00)</td>
<td>M = 43.50 (SD = 5.06)</td>
<td>College (15.3%)</td>
<td>College (25%)</td>
<td>N/R</td>
</tr>
<tr>
<td>Hastings &amp; Johnson 2001</td>
<td>141</td>
<td>M = 37.41 (SD = 4.87) - both</td>
<td>M = 37.41 (SD = 4.87)</td>
<td>College (45.4%)</td>
<td>College (37%)</td>
<td>N/R</td>
</tr>
<tr>
<td>Hastings et al. 2005</td>
<td>135</td>
<td>M = 37.75 (SD = 5.00)</td>
<td>M = 40.76 (SD = 5.14)</td>
<td>College (27%)</td>
<td>College (37%)</td>
<td>N/R</td>
</tr>
<tr>
<td>Higgins, Bailey &amp; Pearce 2005</td>
<td>52</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
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<tr>
<td>Study</td>
<td>N</td>
<td>Age of Mother*</td>
<td>Age of Father*</td>
<td>Mother’s Education</td>
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<tr>
<td>Hutton &amp; Caron 2005</td>
<td>21</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>Leyser &amp; Dekel 1991</td>
<td>82</td>
<td>M = 34.16</td>
<td>(SD = 6.72)</td>
<td>N/R</td>
<td>Bible School Graduate (84%)</td>
<td>M = 5.74 (SD = 2.82)</td>
</tr>
<tr>
<td>Luther, Canham, &amp; Cureton 2005</td>
<td>18</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>M = 2.3</td>
</tr>
<tr>
<td>Pakenham, Sofronoff, &amp; Samios 2004</td>
<td>59</td>
<td>M = 40.99</td>
<td>(SD = 5.03)</td>
<td>HS (47%)</td>
<td>HS (50%)</td>
<td>M = 2.51 (SD = .97)</td>
</tr>
<tr>
<td>Rodrigue, Morgan, &amp; Geffken 1990</td>
<td>20</td>
<td>M = 38.75</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>Most had two</td>
</tr>
<tr>
<td>Stoneman &amp; Gavidia-Payne 2006</td>
<td>67</td>
<td>M = 33</td>
<td>(SD = 6.01)</td>
<td>Some HS (9%)</td>
<td>Some HS (15%)</td>
<td>M = 2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M = 36</td>
<td>(SD = 7.26)</td>
<td>HS Graduate (30%)</td>
<td>HS Graduate (24%)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>Some College (27%)</td>
<td>Some College (24%)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>College Graduate (27%)</td>
<td>College Graduate (22%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Masters/Doctoral Degree (7%)</td>
<td>Masters/Doctoral Degree (13%)</td>
<td></td>
</tr>
<tr>
<td>Tarkakeshwar &amp; Pargament 2001</td>
<td>45</td>
<td>N/R</td>
<td>N/R</td>
<td>HS Graduate (15.6%)</td>
<td>Some College (37.8%)</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Some College (8.9%)</td>
<td>BS Degree (24.4%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Graduate Degree (13.3%)</td>
<td>Some Graduate School (8.9%)</td>
<td></td>
</tr>
<tr>
<td>Tunali &amp; Power 2002</td>
<td>58</td>
<td>N/R</td>
<td>N/R</td>
<td>Some College (n = 48)</td>
<td>N/R</td>
<td>Most had two (n = 30)</td>
</tr>
</tbody>
</table>

Note: M = mean; SD = standard deviation; N/R = not reported; N/A = not applicable; EG = experimental group; CG = control group; HS = high school; BS = bachelors degree; CC = community college; *Age is in years unless otherwise notated.
Scale (Sofronoff & Farbotko, 2002). In contrast, a few researchers solely relied on interviews developed for their particular studies. (see Gray 1994, 2003 as an example). As shown in Table 3, four research teams used a combination of formal and informal stress measures (Hastings & Brown, 2002; Luther, Canham, & Curekon, 2005; Tarakeshwar & Pargament, 2001; Tunali & Power, 2002).

Stress and other psychological factors. Research teams discovered numerous types of stress reported by parents of children with ASD. The types of stress (and other psychological factors) commonly identified by the researchers were child related stress (e.g., acceptability, hyperactivity), depression, anxiety, frustration, social isolation, and spousal relationship problems (see Table 3). Although the researchers listed these stresses within separate categories, they are not necessarily mutually exclusive. For example, one parent noted that the social isolation she felt made her more anxious and frustrated (Feldman & Werner, 2002).

Stress reduction strategies. Across studies, there was no one strategy found to be successful for reducing parental stress. While some studies found similar results, others contrasted their findings. Donovan (1988) found
<table>
<thead>
<tr>
<th>Study</th>
<th>Instrument(s)</th>
<th>Types of Stress</th>
<th>Effective</th>
<th>Ineffective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baker-Ericzen, Brookman-Frazee, &amp; Stahmer 2005</td>
<td>The Parenting Stress Index (PSI), Child Domain subscales, Parent Domain subscales</td>
<td>Child-related stress (adaptability, acceptability, demandingness, mood, distractibility/hyperactivity, reinforces parent) Parent-related stress (depression, attachment, restriction of role, sense of competence, social isolation, relationship with spouse, parent health)</td>
<td>Children with autism were enrolled in an inclusion childcare program. Mothers showed significant reductions in child-related stress only. There were no significant reductions for fathers.</td>
<td>N/R</td>
</tr>
<tr>
<td>Donovan 1988</td>
<td>The Questionnaire on Resources and Stress-Revised (QRS), The Locke-Wallace Marital Adjustment Scale-Short Form, The Coping Health Inventory for Parents, Form D</td>
<td>General (e.g., finances)</td>
<td>Reliance upon professional resources and programs outside the family. Optimistic definition of the situation. Mobilization of family resources. Maintenance and improvement of their own psychological well-being.</td>
<td></td>
</tr>
<tr>
<td>Dunn, Burbine, Bowers, &amp; Tantleff-Dunn 2001</td>
<td>The Inventory of Socially Supportive Behaviors, Ways of Coping Questionnaire-Revised, PSI, Internal-External Locus of Control Scale, Life Experiences Survey</td>
<td>Depression Social Isolation Spousal Relationship Problems</td>
<td>Positive reappraisal Confrontive coping Seek social support</td>
<td>Escape-avoidance Distancing External locus of control</td>
</tr>
<tr>
<td>Erguner-Tekinalp, &amp; Akkok 2004</td>
<td>QRS, Coping Strategy Indicator, Beck Hopelessness Scale Interviews</td>
<td>Child related stress</td>
<td>N/R</td>
<td>Coping Skills Training Program: - Understanding stress and coping - General coping strategies - Problem solving - Relaxation training - Positive thinking - Social support</td>
</tr>
</tbody>
</table>
TABLE 3—(Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Instrument(s)</th>
<th>Types of Stress</th>
<th>Effective</th>
<th>Ineffective</th>
</tr>
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<tbody>
<tr>
<td>Feldman &amp; Werner 2002</td>
<td>Child Behavior Management Survey (CBMS), QRSSF, Beck Depression Inventory (BDI), Interpersonal Support Evaluation List (ISEL), Family Quality of Life Questionnaire</td>
<td>Child related stress</td>
<td>Behavior Parent Training (BPT) is a full service, which included a comprehensive functional assessment, a treatment plan, parent training, and weekly home visits. The experimental group consisted of families that graduated from BPT within the last 5 years.</td>
<td>N/R</td>
</tr>
<tr>
<td>Gray 1994</td>
<td>Interviews (Researcher Developed)</td>
<td>General</td>
<td>Use of treatment services</td>
<td>N/R</td>
</tr>
<tr>
<td>Gray 2003</td>
<td>Semi-Structured Interviews (Researcher Developed)</td>
<td>Frustration</td>
<td>Planning appropriate responses</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Taking things one day at a time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Working with their child as a participant in their therapeutic regimen</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Keeping their autistic child separated from their siblings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Talking to friends and family</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spousal support</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Religious coping</td>
<td></td>
</tr>
<tr>
<td>Hastings &amp; Brown 2002</td>
<td>Teacher Report version of the Developmental Behavior Checklist Parent Questionnaire (Researcher Developed), Hospital Anxiety and Depression Scale</td>
<td>Anxiety Depression</td>
<td>Self-efficacy was a mediating variable in mother’s anxiety and depression</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Self-efficacy was not a mediating variable in father’s anxiety or depression</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Instrument(s)</td>
<td>Types of Stress</td>
<td>Effective</td>
<td>Ineffective</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Hastings et al. 2005</td>
<td>Brief-Coping Orientations to Problems Experienced Scale (COPE), Hospital Anxiety and Depression Scale</td>
<td>Depression, Mental Health Problems</td>
<td>Positive reframing, Religious coping</td>
<td>Avoidance</td>
</tr>
<tr>
<td>Higgins, Bailey &amp; Pearce 2005</td>
<td>Demographic questionnaire, Family Adaptability and Cohesion Evaluation Scales (FACES II), Quality Marriage Index (QMI), Rosenberg Self-Esteem Scale, Coping Health Inventory for Patients (CHIP)</td>
<td>Physical, Emotional, Financial, Marital relationship stress</td>
<td>Spousal support, Optimism, Positive self-esteem</td>
<td>N/R</td>
</tr>
<tr>
<td>Hutton &amp; Caron 2005</td>
<td>Parent Interview (Researcher Developed)</td>
<td>Stress on marriage, Safety concerns, Fear of children with autism hurting themselves or others</td>
<td>Adapting family schedules, Structure in the home</td>
<td>N/R</td>
</tr>
<tr>
<td>Leyser &amp; Dekel 1991</td>
<td>Parent Interview (Researcher Developed)</td>
<td>Financial status, Lack of community support</td>
<td>Close contact with family members, Seeking advice and information from health care professionals, Spiritual guidance</td>
<td>N/R</td>
</tr>
<tr>
<td>Luther, Canham, &amp; Cureton 2005</td>
<td>Full-COPES, Demographic questionnaire (Researcher Developed)</td>
<td>General</td>
<td>Parent support groups, Reframing (perception of stressful experience), Social support, Avoidance</td>
<td>Spiritual</td>
</tr>
<tr>
<td>Study</td>
<td>Instrument(s)</td>
<td>Types of Stress</td>
<td>Effective</td>
<td>Ineffective</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Pakenham, Sofronoff, &amp; Samios 2004</td>
<td>Demographic questionnaire (Researcher Developed), The Childhood Asperger Syndrome Test (CAST), ABCX, Eyberg Child Behaviour Inventory (ECBI), Modified version of the Social Readjustment Rating Scale (SRRS), Brief Social support Questionnaire, Parental Stress in the Management of Asperger Syndrome Scale, Parental Self-Efficacy Scale, COPE, Short Version of the Depression Anxiety Stress Scale (DASS21), Social Adjustment Self-report Questionnaire (SAS-SR),</td>
<td>Depression, Anxiety, Emotional stress</td>
<td>Benefit finding strategy (positive personality change)</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sense making strategy (understanding ASD)</td>
<td></td>
</tr>
<tr>
<td>Rodrigue, Morgan, &amp; Gefken 1990</td>
<td>Parenting Sense of Competence Scale, Ways of Coping Scale, Marital Adjustment Scale, FACES, Impact-on-Family Scale, Mother-child interaction (videotaped session), Social Support Questionnaire</td>
<td>Frustration, Anxiety, Tenseness</td>
<td>Information seeking, Wish-fulfilling fantasy</td>
<td>Self-blame</td>
</tr>
<tr>
<td>Stoneman &amp; Gavidia 2006</td>
<td>32-item Dyadic Adjustment Scale, Hassles and Uplifts Scale, COPE</td>
<td>Family adjustment, Daily Hassles</td>
<td>Problem-focused strategies were related to better family adjustment for fathers.</td>
<td>Problem-focused strategies were not related to better family adjustments for mothers. Problem-focused strategies were not effective for mothers or fathers with daily hassles.</td>
</tr>
<tr>
<td>Study</td>
<td>Instrument(s)</td>
<td>Types of Stress</td>
<td>Effective</td>
<td>Ineffective</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Tarakeshwar &amp; Pargament 2001</td>
<td>Center for Epidemiological Research-Depressed Mood Scale, State-Trait Anxiety Inventory, Stress-Related Growth Scale, Brief COPE Semi structured Interviews (Researcher Developed)</td>
<td>Depression, Anxiety</td>
<td>N/R</td>
<td>Negative Religious Coping Strategies (God as unhelpful in parenting their child, perception of religious experiences as aversive to the coping process, and feelings of punishment or having doubts about the benevolence of God) Positive Religious Coping Strategies (being part of God’s plan, an opportunity for spiritual growth)</td>
</tr>
<tr>
<td>Tunali &amp; Power 2002</td>
<td>Semi structured Interviews (Researcher Developed), Home/Career Questionnaire Revised Scale for Ambiguity Tolerance (AT-20), Self-Rating Depression Scale, Short-Marital Adjustment Test (SMAT)</td>
<td>N/R</td>
<td>Placed less emphasis on their careers and more on their parental role; Engaged in more leisure activities with extended family members; Placed less emphasis on others’ opinions about their child’s behavior; Placed more emphasis on spousal support and the parental role in their discussions of marriage; Experienced more ambiguity in their child’s behavior; Showed a tendency toward a greater overall tolerance of ambiguity</td>
<td>N/R</td>
</tr>
</tbody>
</table>
that parents who relied on professional resources and programs outside the family experienced decreased levels of stress. They further discovered that having an optimistic definition of the situation, mobilization of family, and maintenance and improvement of their own psychological well-being were not identified as effective for decreasing stress. Families in a study conducted by Luther et al. (2005) effectively coped with stress through parent support groups and social support. However, those researchers did not find spiritual support to be effective, which is in contrast to families in the studies by Leyser and Dekel (1991) and Gray (1994). Further, several parents across studies noted that spousal support helped them cope with stress (Gray, 2003; Higgins et al., 2005); yet, spousal relationship problems was a common type of stress experienced by some parents (Baker-Ericzen et al., 2005; Dunn et al., 2001; Hutton & Caron, 2005).

Discussion

Researchers who study familial stress find that parents of children with ASD are at an increased risk for high stress levels in comparison to parents of children with other developmental disorders or typically developing children. The exact source of their stress is undetermined, but may be attributed to difficulty finding an accurate diagnosis, dealing with characteristics of the child, and accessing social support (Dunn et al., 2001). Further, the anxiety related to raising aging children with disabilities increases over time as does the vulnerability to disruption in informal supports (White & Hastings, 2004). Thus, professionals need to provide education and support services early and longitudinally.

The perceived parental stress associated with rearing a child with ASD is a consistent finding (Feldman & Werner, 2002; Gray, 2003; Hutton & Caron, 2005). If a parent is concurrently experiencing high levels of stress because of the recent diagnosis of the child, then the service provider may be inadvertently adding an additional stressor. Access to formal (e.g., parent support groups) and informal sources (e.g., family, friends) of social support can provide a coping mechanism for families of children with autism (Boyd, 2002). In a review of the literature on the social support needs of mothers of children with autism, Boyd found that contact with supportive family members and parents of other children with autism decreased parental stress. It is important to note that high levels of parental stress are associated with an increased likelihood that the child with autism will be placed out-of-home (Raif & Rimmerman, 1993). Unfortunately for parents, as the age of their child increases, their number of support options often decreases. In a follow-up study of 31 Australian parents conducted ten years after the original, Gray (2002) found that as children with autism aged, the number of treatment and support options for them reduced. In addition, Minnes and Woodford (2005) found that 65% of parents reported age-related change adversely affected their life. For example, as parents aged, they worried more about lack of services for an older child with ASD and future guardianship of their child with ASD. Although levels of parental stress related to such areas as diagnosis and early intervention tend to subside over time (Gray, 2002), parents’ feelings of anxiety about their children’s future come to the forefront. Obviously, parents need continued access to treatment services and residential placement options for their aging children. Hopefully, this will help to avoid the feelings of “pessimism about their child’s future” Sanders and Morgan (1997) found among parents of children with ASD and Down syndrome. Parents of children with ASD also report less involvement in recreational and sporting activities, which may contribute to social isolation and subsequently higher stress levels. Providing parents respite care services for their children or information on programs that provide modifications and accommodations for individuals with disabilities may allow parents to participate in more leisure-type activities to help them cope, which has been reported to be an effective coping strategy for several parents (Dunn et al., 2001; Luther et al., 2005). Minnes and Woodford (2005) found that the two greatest concerns of parents with children with ASD were limited access to parent support groups and parent education.
Implications for Practitioners and Researchers

In the field of education, our roles as service providers are sometimes blurred as we offer counseling, friendship, and support to the family who has a child with disabilities. Although these services typically are performed in an effort to provide family-centered support, practitioners can cross the line into unfamiliar territory, which may lead to ill-conceived advice being given and or to the estrangement of the parent-provider relationship. One mother’s brief account of her child’s diagnostic evaluation provides such an example: “Well, the speech therapist came out of the room and just flat out told me that Matthew had autism, and I was floored by that, but then she proceeded to say that there was a 50/50 chance that the baby I was carrying would have autism too” (personal communication, 1999). Thus, coinciding with interventions for children with ASD, it is imperative for practitioners and researchers to (a) help parents cope with stress, and (b) examine options for aging individuals with ASD.

Address Parental Stress

Researchers need to examine the various coping strategies identified in this review and other literature and determine what strategies work best for various types of parents. The research also should match the appropriate strategies to parents with similar characteristics and determine the effects on parental stress. For example, researchers may examine the impact of parental education level or socioeconomic status on the reported parental stress and/or strategies that are effective. In addition, future research may examine how cultural or linguistic diversity affect parental stress and/or coping strategies that are effective. For example, are parents for whom English is not their first language more stressed because of limited access to support groups or information provided in their first (or native) language? However, to do this research, researchers may need more uniformity in measures used to measure stress in parents. When the coping strategies are identified and matched to particular stressors and parental characteristics in the research, practitioners may then teach parents to use the strategies that best align to their particular situation and characteristics.

Practitioners also could help strengthen informal and formal sources of support for parents. For example, practitioners could provide information on counseling services for the family or marriage counseling. However, practitioners should be careful about immediately assuming couples need intensive marriage counseling. In addition, practitioners could identify programs such as ‘parent night out’ where organizations provide care for children with ASD so couples can focus on strengthening their relationships.

Options

Another area under researched that is related to stress of parents of children with ASD, particularly to those of aging children, is treatment and options for older individuals on the autism spectrum. For example, what do parents do who have aging children with lower functioning autism? Currently, there is little to no research with this sub-population. Also, parents need to know service options that may help them plan for transitions to work or post-secondary placements. These options may include such services as vocational rehab, private organizations that provide training, a university that has support programs for individuals with ASD. Providing parents with these supports and options may help alleviate some stress.

Conclusion

In summary, the reported parental stress associated with rearing a child with autism is a consistent finding (Feldman & Werner, 2002; Gray, 2003; Hutton & Caron, 2005). As a result of this finding, a number of researchers have begun to identify coping strategies parents employ to cope with the stressors of rearing a child with ASD. The research in this area has not been consistent. Across studies identified in the current literature review, there was no one strategy found to be successful for reducing and/or coping with parental stress. Future research teams should examine the various coping strategies identified in this review and other literature and determine what strategies work best for various types of par-
ents. Research also should match the appropriate strategies to parents with similar characteristics and determine the effects on parental stress.

References


Teaching Organizational Skills to Children with High Functioning Autism and Asperger’s Syndrome

Kimberly Powers Dorminy, Deanna Luscre, and David L. Gast
University of Georgia

Abstract: A multiple baseline design across participants was used to evaluate the effectiveness of a file box system plus self-monitoring on the organizational skills of four fourth and fifth grade students with high functioning autism (HFA) and Asperger’s Syndrome (AS). Instruction took place in general education classrooms and consisted of teaching students to arrange academic materials (worksheets, note pages, study guides etc.) in a portable file box with hanging folders. Students were also taught to self-monitor their accuracy. The percentage of correctly filed items and the number of seconds it took students to retrieve requested items were the dependent variables assessed across conditions. Results showed that the percentage of correctly filed items increased and the number of seconds required to locate specific items decreased with the use of the file system box. These findings demonstrate how a simple noninvasive and affordable classroom modification can improve performance of children with HFA and AS in general education classrooms.

Autistic disorder (AD) is a neurodevelopmental disability with varying degrees of qualitative impairments in social interaction and communication, stereotypic repetitive interests or behaviors, and delays in social interaction, communicative language or play (American Psychiatric Association, 2000). Children with Asperger’s Syndrome (AS) subsume the social impairment of AD, but retain an interest in others, whom they distance by their socially odd behaviors (Elder, Caterino, Chao, Shacknai, & De Simone, 2006). Circumscribed interests are present as in AS, but often are confined to amassing large amounts of information about a specific topic (Tantam, 1991). Unlike AD, speech develops normally in children with AS, but nonverbal pragmatic abnormalities make social conversations pedantic and unproductive (Asperger, 1991). Absent from diagnostic criteria, yet prominent in both autism and Asperger syndrome (Pennington, Bennetto, McAlcer, & Roberts, 1996) are difficulty with inhibition, initiation, attention, flexibility, and self regulation, commonly associated with the “organizational aspect of executive function” (Killiani, Moore, Rehbein, & Moss, 2005).

Executive functions are “brain-based skills” (p. 817) that begin to develop in the first years of life (Griffith, Pennington, Wehner, & Rogers, 1999) and result in “the ability to maintain an appropriate problem-solving set for attainment of a future goal” (Welsh & Pennington 1988, p.201). Children with autism spectrum disorders (ASD) have consistently demonstrated impaired executive functioning deficits on tests that measure planning, inhibiting pre-potent responses, and mental flexibility (Hill, 2003). Deficiencies in executive functioning may be primary cognitive deficits in autism (Ozonoff & Jensen, 1999).

Although more positive outcomes are associated with AS than AD (Klin, Sparrow, Marns, Carter, & Volkmar, 2000), both disorders result in classroom performance deficits. Neuropsychological profiles of children with AS, which include deficits in fine and gross motor skills, visual motor integration, visual spatial perception, nonverbal concept formation and visual memory, are consistent with nonverbal learning disabilities (Klin, McPartland, & Volkmar, 2005, p. 103). Educational interventions (e.g., developing visual-spatial organizational skills) used for children with high functioning autism (HFA), Asperger’s...
Syndrome (AS), and nonverbal learning disabilities (NLD) are often interchangeable (Hooper & Bundy, 1998).

Students with HFA and AS are increasingly returning to general education classrooms from pull-out programs (Tincani, 2007; Simpson, 2004). A summary objective when teaching students with disabilities in a general education classroom is to provide them with skills to become independent learners. Children with HFA or AS often depend on adults for completing assignments, transitioning between activities, and staying on-task (Bryan & Gast, 2000; Giangreco, Edelman, Luiselli, & MacFarland, 1997). Once adult support is provided they frequently learn to rely on support in the future. Young, Simpson, Myles, and Kamps (1997) reported that when paraprofessionals were more than 2 feet from assigned students with autism, greater interaction occurred with the general education classroom teacher. In order to reduce reliance on adults and prompt dependency students with ASD need to be taught how to independently access information (Simpson, 2001, 2004).

Students with ASD commonly experience difficulty organizing their thoughts and processing auditory stimuli. When teachers, students, and educational personnel can enter a classroom and understand classroom expectations, structure is in place (Iovannone, Dunlap, Huber, & Kincaid, 2003). Visual supports for children with autism compensate for difficulties they experience in attention, auditory processing, sequencing, and organization (Hodgdon, 1995). These supports serve as visual cues that increase compliance by reminding students of behaviors they are expected to exhibit (Odom et al., 2003). When correctly implemented, visual supports can help children with ASD sequence daily events, organize their environment, and prepare for transitioning to another activity (Quill, 1995; Hodgdon, 1995). Structured teaching and environmental modifications will increase the child’s independence by making the environment and its expectations more understandable (Mesibov, Shea, & Schopler, 2005, chap. 4).

Organization is a fundamental principle of structure that supports the acquisition of language, appropriate behavior, social interactions, and academic goals (Iovannone et al., 2003). Visual organizational supports, such as picture schedules or work systems are visual strategies considered as standard for many children with autism (Prizant & Wetherby, 2005; Odom et al., 2003). Children with autism frequently have difficulty organizing personal belongings and school related materials (Arick, Krug, Fullerton, Loos, & Falco, 2005). A recent investigation of the needs of college students with ASD emphasized that for student success there is a need for organizational strategies, due to executive functioning deficits, (Adreon & Durocher, 2007). The earlier students on the autism spectrum are taught organizational strategies the greater the likelihood they will succeed in their educational, vocational and personal pursuits.

Visual schedules have been shown to be effective in helping students with ASD organize their daily activities. They have also been shown to be effective in teaching students to transition independently, thus reducing the need for adult prompting. Dettmer, Simpson, Myles, and Ganz (2000), for example, taught two elementary aged boys with autism to follow a portable schedule of daily activities assembled in a photo album. This resulted in a substantial decrease in prompts delivered by the teacher and a reduction in the time it took students to respond to adult instructions at home and in the community. Visual activity schedules have also been successful in increasing the on-task and on-schedule behaviors of elementary students with ASD (Bryan & Gast, 2000). Stromer, Kimball, Kinney, and Taylor (2006) demonstrated how activity schedules, presented on a computer, could enhance students’ ability to use multiple cues and then generalize information to the classroom environment. They admitted, however, that computers were more expensive, more time consuming, and less portable than simple visual activity schedules.

Self-monitoring has also been shown to be an effective strategy for increasing independent performance by children with ASD. Shearer, Kohler, Buchan, and McCullough (1996) taught three preschoolers to monitor their activity engagement and social interaction by moving beads to indicate a completed social exchange, a self-management skill as efficient as prompting by an adult. Students who learn self-regulation strategies require less support from peers and adults, and are
viewed by others as having greater learning potential than previously demonstrated (Weh- 
meyer, Yeager, Bolding, Agran, & Hughes, 2003). Shimabukuro, Prater, Jenkins, and 
Edelen-Smith (1999) investigated the effects of self-monitoring on the academic perfor-
manence of students with learning disabilities. Results were increased academic productivity, 
accuracy, and on-task behavior during independent work. Gains in productivity were 
greater than gains in accuracy, but an improvement was seen in both areas once stu-
dents learned the self-monitoring procedure (Shimabukuro et al., 1999).

Self-evaluation in the form of goal setting, and self-graphing the number of daily home-
work assignments completed, resulted in enhanced homework completion for middle 
school students with learning disabilities (Trammel & Schloss 1994). A seventeen year 
old boy with AS increased independent homework assignment recording across academic 
subjects through the use of a personal digital assistant (Myles, Ferguson, & Hagiwara, 2007). 
Results suggest that teaching students with HFA and AS to self-monitor their academic behaviors is a useful skill throughout their education.

Effective organizational strategies are required for success in all educational settings 
regardless of level. Elementary age students with ASD, for example, need to learn how to 
retrieve books, notebooks, papers etc. from an array of materials, when requested to do so, 
and they need to do so in a reasonable amount of time. This requires that that they 
learn an effective and efficient strategy that doesn’t call undue attention to their executive 
functioning deficits. By the time students transition to middle school, particularly if they are 
fully included in the general education program, they are expected to independently or-
ganize their school materials and locate items within a reasonable time period. With this 
objective in mind, the current study was designed to answer the following questions: Will 
elementary age children with HFA and AS, a) increase the percentage of items correctly 
filed across a school day, and b) decrease the number of seconds needed to retrieve a re-
quested item when using a file box organiza-
tional system?

Method

Participants

Four Caucasian male students attending a public school in a large metropolitan city and 
ranging in ages 9 years 4 months to 10 years 3 months participated in this study. 

All students met Georgia eligibility requirements for autism which were characteristics 
impacting (1) developmental rates and sequences, (2) social interaction and participa-
tion and (3) verbal and non-verbal communication resulting in an adverse effect on a 
student’s educational performance (Georgia Department of Education, 2008a). Three of 
the students were eligible for special education services under Georgia autism eligibility 
criteria because of behaviors associated with Asperger’s Syndrome (AS). Georgia autism el-
igibility can apply to students with other DSM-IV spectrum disorders including Asper- 
ger’s syndrome (Georgia Department of Education, 2008b). One student received Georgia autism eligibility based on characteristics associated with high functioning autism. Table 1 
presents diagnostic and related information. All students were included full time in a gen-
eral education classroom and received support services from the special education 
teacher or a paraprofessional two to five hours per day. The remaining time in the general 
education classroom was spent without special support.

Evan received autism support five hours per day in the general education fourth grade 
classroom and attended the gifted education program for four hours per week. Although 
Evan had an above average cognitive ability, his lack of organizational skills adversely af-
fected his performance in the classroom. He completed assignments accurately and 
quickly, but put them in his desk where they were forgotten, lost or thrown away before 
they were turned in to teachers to be graded.

Ben, a fifth grader, received two and a half 
hours of special education support per day in the general education classroom. Despite an 
average full scale IQ. Ben had difficulty orga-


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**TABLE 1**

Description of Participants

<table>
<thead>
<tr>
<th>Participants</th>
<th>Grade</th>
<th>Age</th>
<th>Autism</th>
<th>SPED Support</th>
<th>WISC-IV*</th>
<th>Standardized Achievement Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evan</td>
<td>fifth</td>
<td>9 years 4</td>
<td>Asperger</td>
<td>5 hrs autism per day</td>
<td>Full Scale: 120</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>months</td>
<td>Syndrome</td>
<td>4 hrs gifted per wk</td>
<td>Verbal: 102</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Perceptual Reasoning: 135</td>
<td>Oral Expression: 108</td>
</tr>
<tr>
<td>Ben</td>
<td>fifth</td>
<td>10 years 3</td>
<td>Asperger</td>
<td>2.5 hrs autism per day</td>
<td>Full Scale: 100</td>
<td>Broad Reading: 114</td>
</tr>
<tr>
<td></td>
<td></td>
<td>months</td>
<td>Syndrome</td>
<td></td>
<td>Verbal: 119</td>
<td>Academic Skills: 122</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Perceptual Reasoning: 100</td>
<td>Academic Knowledge: 110</td>
</tr>
<tr>
<td>Jake</td>
<td>fourth</td>
<td>9 years 10</td>
<td>Autism</td>
<td>3 hrs. autism per day</td>
<td>No Full Scale IQ Available</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrick</td>
<td>fourth</td>
<td>9 years 11</td>
<td>Asperger</td>
<td>5.5 hrs. autism per day</td>
<td>Full Scale: 86</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>months</td>
<td>Syndrome</td>
<td></td>
<td>Verbal: 110</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Perceptual Reasoning: 84</td>
<td></td>
</tr>
</tbody>
</table>

*** K-TEA = Kaufman Test of Educational Achievement (Kaufman & Kaufman, 1985).

Special Education support from autism program was not one/one, but shared with other students with autism placed in the regular education classroom.
ments in his desk, under books, or with other assignments and forgot or lost them. Failing to complete or turn in assignments negatively affected Ben’s grades.

Jake received three hours of special education support per day in the general education classroom. Although Jake completed grade-level assignments rapidly and accurately, he did not put them in the appropriate folder, but put them in his desk where they became lost and subsequently were not turned in to be graded. Jake needed to improve his ability to file completed work in the classroom. Jake had deficits in gross/fine motor abilities, perseverative/stereotypical behaviors, and delays in pragmatic language.

Patrick received five and a half hours of special education support per day in the general education classroom where his performance was in the “low average” range. Three of these hours were provided in a one-on-one arrangement in the general education classroom from the special educator or paraprofessional. Support was provided to help Patrick complete his assignments and submit them to the appropriate teacher in a timely manner. Patrick finished assignments and, like other participants, put them in his desk or inside unrelated books and when asked was unable to find them resulting in a zero grade.

Prior to the study all participants were assisted by the special education teacher or paraprofessional to retrieve and organize required materials. Over time, it became evident that for these students to become successful learners, independent filing and retrieving strategies needed to be learned. Participants’ IEPs included goals to improve organizational skills. None of the participants had previous experience with the file box system to organize class materials, but did have experience with visual strategies, including activity schedules and behavioral prompts (e.g., posted classroom rules, hand gestures etc.). No other organizational strategies had been attempted with students.

Students were selected for participation in the study because of their full inclusion in the general education classroom, with the expectation that they could perform at grade level, and their organizational skill deficits that negatively impacted their progress. All students had good attendance records having missed six or fewer school days the previous year. Parents signed consent forms and students signed assent forms prior to the start of the study.

**Settings and Arrangements**

Baseline and intervention conditions were conducted in three general education classrooms (two fourth grade classes and one fifth grade class) throughout the school day. Generalization assessments were administered in students’ homes by parents. Classroom arrangements were similar in each of the classrooms. Student desks were arranged in clusters of five to six desks. Participants did not sit at the same cluster. During intervention each student had his filing box sitting on the floor beside his desk for easy access. Most of the academic instruction took place at a dry erase board on the front wall of each classroom that was easily visible to all students. The daily schedule was posted on the front wall of the classroom. Students also had a copy of their daily schedules at their desks. The general education teacher and special education teacher collaborated in classroom instruction and provided assistance to students as needed. The special education teacher and first author was the primary investigator in this study.

**Materials**

During baseline condition, seven two-pocketed 9½ in × 12 in card stock weight file folders were available to students for organizing materials. These file folders were to be stored in students’ desks. Student organizational materials used during intervention and generalization conditions included a 14 in × 9 in × 11 in plastic file box, seven 9½ in × 12 in green hanging file folders with ½ in × 2 in labels, and an 8 in × 5 in plastic pencil box. A label was attached to the top of each folder identifying the following curricular content areas: math, reading, grammar, spelling, social studies, and science. The seventh folder was designated for 8 ½ in × 11 in wide ruled notebook paper. These materials were to be used by students to place all assignments related to each of the curricular content areas in the appropriate folder and in the file box. Students’ self-monitoring charts were divided
into seven columns, one for the date and one for each curricular content area sequenced to follow the student’s daily schedule. In the home setting, neither the file box nor the self-monitoring chart was used by parents. Students brought home the file folder for the curriculum content area in which they had homework.

**Dependent Variables**

The dependent variables in this study were: a) percentage of papers, notes, handouts, study guides, books, and workbooks filed in the appropriate folder for each curriculum area and b) number of seconds it took a student to retrieve a requested item. Each classroom had 1-2 items to be filed per curriculum area each day, resulting in 6-12 items that should be filed daily. During the generalization condition, the number of completed homework assignments placed in the correct file folder was recorded upon the student’s return to school. Retrieval time was recorded by counting the number of seconds it took a student to locate and submit a requested item. These data were collected on the average of every three days across all conditions with a minimum of three days in any one condition.

**Experimental Design**

A multiple baseline design across participants was used to evaluate the effectiveness of the file box organizational system. Initially baseline data were collected on all four students’ filing and item retrieval behaviors during the same time period. Once baseline data were stable for a minimum of three days, the intervention (file box) condition was introduced to the first student, while the other students remained in baseline (file folder) condition. Once the first student’s data reached criterion, the file box system was introduced to the second student, and so on until all students were introduced to the intervention. Experimental control would be demonstrated within the context of a multiple baseline design across participants if: a) stable baseline levels were maintained for each participant prior to the introduction of the file box system; b) the introduction of the intervention was systematically staggered across participants; c) upon introduction of intervention, not before, there was an immediate increase in the percentage of items filed correctly and a concomitant decrease in the number of seconds it took a student to retrieve requested items; and d) this effect was replicated across each of the four participants (i.e., inter-subject direct replication) (Kennedy, 2005).

**General Procedure**

To assure students understood what was expected of them, the special education teacher approached each student before first period class, waited for eye contact, and then delivered the prime, “Don’t forget to keep your materials organized today”. Student file folders (baseline condition) and file boxes (intervention condition) were checked 5 days a week at the end of the school day prior to dismissal. The teacher and student spent 5-10 min checking whether study guides, notes, textbooks, handouts, worksheets etc. were filed correctly. No reinforcement system was in place for filing or retrieving items during baseline or intervention conditions.

**Procedure**

**Baseline condition.** During baseline condition, data were collected on students’ filing skills, using manila file folders, and without the use of the file box system intervention. At the beginning of each school day, the special education teacher delivered the verbal prime, “Don’t forget to keep your desk organized today.” At the end of each academic period, students were expected to place unfinished and completed work, notes, handouts etc. into one of two pockets in their file folder for the appropriate curricular area. At the end of the school day, the teacher checked student folders for the number of appropriately filed items, and when incorrect, instructed students to put items “in the correct folder.” No reinforcement was provided for correctly filing items.

**File box system condition.** On the first day of the intervention condition when students were to use the file box system, the special education teacher taught participants how to use the file box system and self-monitoring chart. Individual training was conducted dur-
ing one 10-15 min session in the general education classroom at the beginning of the first school day. The teacher placed curriculum folders in the file box on the floor beside each participant’s desk and arranged them in sequential order following the classroom daily schedule. The student was instructed to remove everything from his desk and to file each paper and textbook in its appropriate folder inside the file box. Once all items in the students’ desk were filed correctly, the student’s desk was turned 180 degrees so that he could not put any work or materials inside the desk. The student was then taught to self-monitor his filing responses on a daily organizational chart by circling “+” if all items were filed correctly, or “−” when misfiled.

During intervention, students were reminded at the beginning of the day “Don’t forget to keep your desk organized today.” They were expected to independently file their curricular materials throughout the day. At the end of each academic period as instructed during training, students looked into their file box, organized their materials, and then and circled + or − if their items for that subject were organized. At the end of the school day, the special education teacher entered the general education classroom, and as the student observed, she recorded the number of correctly and incorrectly filed items in the student’s file box. During intervention, participants were rated on how accurately they placed materials in the filing box, and how long it took them to file specific academic materials.

The percentage of correctly filed items was calculated and the data graphed. Duration per occurrence data on the length of time it took for the student to locate and hand the teacher a specific requested item from his file box were collected on the average of once every three days at a different time of day. As in baseline condition no adult prompts, corrections, or reinforcers were delivered during the intervention condition.

Reliability

The paraprofessional supporting students in the general education classroom collected reliability data 20% of all sessions across both conditions for all students on the number of correctly filed items. A minimum one reliability check was made per condition. Duration per occurrence reliability data was collected on 20% of all sessions and at least once per condition for each student. Interobserver reliability data were calculated using the point-by-point method in which the number of agreements plus disagreements and multiplied by 100 (Cooper, Heron, & Heward, 2007). Overall mean interobserver agreement was 97.3% (92.8%-100%).

Procedural reliability checks on teacher behaviors (delivering the daily prime, “Don’t forget to keep your desk/box organized”; no adult prompting during intervention; no reinforcement for correct filing) occurred in 20% of all sessions across both conditions for all students. Procedural reliability was calculated by dividing the number of correct adult behaviors by the number of planned behaviors and multiplying by 100 (Billingsley, White, & Munson, 1980). The mean accuracy for classroom adults following prescribed procedures was 94.6% (89.2%-100%).

Results

Effectiveness data. Figure 1 presents the percentage of items filed correctly across baseline (file folder) and intervention (file box system plus self monitoring) conditions. As shown for each of the four students, after a stable baseline was established and upon introduction of the intervention, there was an immediate increase in the percentage of daily assignments filed correctly, not before. Figure 2 summarizes the percent of items filed correctly for each participant in baseline and file box conditions, in a bar graph. Summary data show that the four students filed between 45% −71% of items correctly during the baseline condition (Jake M = 72%, 71%–73%; Ben M = 55.7%, 50%–62%; Evan M = 56.7%, 50%–73%; Patrick M = 58.75%, 45%–67%).

While during the intervention condition they filed between 70%–100% of items correctly (Jake M = 97.96%, 80%–100%; Ben M = 95.9%, 80%–100%; Evan M = 94.6%, 75%–100%; Patrick M = 88.75%, 70%–100%). Substantial increases in the percentage of items filed correctly were replicated across students only upon introduction of the intervention.
Figure 1. Percentage of correctly filed items in baseline and file box paired with self-monitoring.
Percentage of Nonoverlapping Data (PND) across baseline trend and intervention condition was 100% for all students, further showing the effectiveness of the file box system plus self-monitoring.

Efficiency data. Figure 3 presents students’ mean number of seconds to retrieve teacher requested items across baseline and intervention conditions. These data show an immediate and sustained decrease in retrieval time duration for all four students upon introduction of the file box organizational system. For individual participants mean duration from baseline to intervention conditions decreased as follows: Jake, $M = 42.3$s ($R = 40s-45s$) to 12.75s ($R = 10s-20s$); Ben, $M = 46.5$s ($R=36s-57s$) to 13.6 ($R = 10s-26s$); Evan, 45.8s ($R = 36s-53s$) to 17.25s ($R = 10s-28s$); Patrick, 54s ($R = 50s-66s$) to 17.31s ($R = 15s-20s$). The net mean improvement in duration retrieval time was 29.55s for Jake, 32.9s for Ben, 28.55s for Evan, and 36.63s for Patrick. The PND for duration retrieval time was 100% for all four participants.

Social validity data. General education teachers rated participants’ organizational skills pre and post intervention, and saw an improvement in classroom performance of the students when they began using the filing system. Students turned their work in on time and did not ask for extra copies of assignments as often as they had before using the filing system. When students were assigned homework in different subject areas, they pulled corresponding file folders from the file box and placed them into their backpack. Parents reported that once the filing system began, their child did not have as many missing assignments that had to be re-done; however, better filing at school did not result in improved organization of school papers at home.

Discussion

Results of this study demonstrate that a simple file box system paired with self-monitoring is a more effective and efficient organizational approach than a traditional file folder approach in which students’ store their academic assignments and materials inside their desks. Students, all of whom were diagnosed with ASD, learned how to use the file box system and self-monitoring chart within one 10-15 min training session on one day. An immediate improvement in a) percentage of items correctly filed and b) number of seconds to retrieve an item requested by their teacher was observed for all four students. Students with HFA and AS, as well as other students (learning disabilities, intellectual disabilities) who have difficulties organizing their school materials may benefit from this simple and affordable organizational system for keeping track of their notes, worksheets, assignments, books, and materials kept at their desks. The file box system allowed students to locate their work more quickly when asked and it decreased the frequency of their comments related to frustration when classroom materials could not be found. Locating assignments so they can be turned in on time can positively impact classroom performance and grades.

Self-monitoring charts in the current study served as visual reminders to keep their file boxes organized. Unlike Bryan and Gast (2000), in which graduated guidance was used to teach students with HFA and AS to use visual activity schedules, the current investigation required only one 10-15 min session to teach students how to use both the file box system and self-monitoring chart. Systematic prompt fading was not required. If systematic and often time consuming prompt fading strategies are not required, they should not be used. Teachers and therapists need to assess students’ need for assistance prior to selecting a teaching strategy. As in the case of participants in this study, all of whom were imitative, a simple adult model plus verbal description teaching approach was effective in teaching how to use the intervention. Prompt depen-
Tendency is not uncommon among children on the autism spectrum and, as described by Giangreco, et al. (1997) and Young et al. (1996) difficult to change once established. As demonstrated in this study a simple visual teaching strategy (modeling) and simple visual organizational system (file box) plus self-monitoring immediately eliminated the need for adult assistance to help students organize their class materials.

A strength of this investigation is that it the intervention was designed and implemented...
by a special education teacher, in a public school, serving nine children with ASD in a collaborative arrangement within general education classrooms. Because of this the ecological validity of the findings is increased. As previously mentioned the intervention was low cost both in teacher time expenditure and material costs. There were, however, limitations to the study to which we recommend procedural changes. First, reliability data were not collected on the number of seconds it took students to retrieve items requested by the teacher. This was an unfortunate oversight that requires that retrieval time duration findings be viewed as tentative. These data should be taken a minimum of 20% of all sessions in which data were collected and reported and at least once in each condition. Second, social data were not collected from student participants. Although effective, the use of a plastic file box may have been embarrassing for students to use since they are not commonly used by “typical” peers in general education classrooms. Finally, it remains to be determined whether or not students would continue to use the file box system over a prolonged period without prompting.

Future research should address generalization of findings to other settings (home, vocational etc.) and other populations who exhibit executive functioning deficits that impede their academic performance. Students with AS have been shown to benefit from visual supports to understand auditory-based instruction (Griswold, Barnhill, Myles, Hagiwara, & Simpson, 2002). The file box system could decrease the amount of time required to complete homework assignments if it were used at home as well as at school. If parents were to use a similar file system at home to help organize their child’s home routines, their reliance on auditory prompts to get their son to complete assigned chores may be decreased. It would be useful to determine if the file box system plus self-monitoring would be effective for students on the spectrum when completing long term school projects. Also, studies investigating whether the file box system could be modified to assist students with locker and book bag organization are warranted. Although the current study targeted elementary age students, older students with HFA and AS who attend middle and high schools may benefit from a similar organizational system, taking into consideration the age appropriateness of materials, due to the complexity, variety and quantity of their assignments.

In spite of study limitations, this investigation adds to the applied research literature related to the remediation of executive functioning skill deficits exhibited by children with ASD. The intervention was effective and efficient, as well as affordable, and warrants consideration by teachers and others working with individuals special needs.

References


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Academic Achievement Profiles of Children with High Functioning Autism and Asperger Syndrome: A Review of the Literature

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Abstract: High functioning autism (HFA) and Asperger syndrome (AS) are foremost social disorders (Church, Alisanski, & Amanullah, 2000; Myles & Simpson, 2001) yet many students with HFA/AS experience difficulties with academic functioning. Educators report difficulties in teaching and identifying appropriate educational interventions for children with HFA/AS. Research in the area of academic achievement of children with HFA/AS is in the stage of infancy and more research is needed (Prior, 2003). To address the need for development of appropriate academic interventions, several research studies have been conducted to determine the academic achievement profile of children with AS/HFA (Barnhill, Hagiwara, Smith Myles, & Simpson, 2000; Mayes & Calhoun, 2003a, 2003b, 2008; Goldstein, Minshew, & Siegel, 1994; Griswold, Barnhill, Smith Myles, Hagiwara, & Simpson, 2002; Minshew, Goldstein, Taylor, & Siegel, 1994). This article provides a synthesis of the literature on the academic achievement of students with HFA/AS from 1981 to the present to help determine if an academic profile for students with HFA/AS emerges.

While there is no exact population study, in the United States of America, there are an estimated 560,000 of children between the ages of 0-21 with an autism spectrum disorder (Center for Disease Control, 2007). This number is expected to increase as approximately 1 in 150 children are being diagnosed with an autism spectrum disorder (ASD). One of the reasons for the increase in children with an autism spectrum disorder is due to better assessment and broadening of the diagnostic criteria (Rutter, 2005). It is estimated that between 48% of individuals diagnosed with autism spectrum disorders have IQs below 70 (Bertrand, Mars, & Boyle, 2001) leaving the other 52% of people diagnosed with autism spectrum disorders in the high functioning range. Further, as early intervention methods are identified and successfully impact the lives of children with autism spectrum disorders, academic goals are attainable (O'Connor & Klein, 2004).

Children with autism in the high-functioning range are often referred to as having high functioning autism (HFA) or Asperger syndrome (AS). AS was re-introduced by Wing in 1981 (Wing, 1981). Wing’s 1981 definition of AS was the same as autistic disorder as defined by the DSM-IV TR, except Wing described individuals with AS as having better social language skills (Prior, 2003). AS is listed as one of the five pervasive developmental disorders in the DSM-IV TR (2000). The criteria listed in the DSM-IV TR is different than previous conceptualizations in research (Prior, 2003). Because of the discrepancy in the AS diagnostic criteria, many authors use their own definition of AS in research studies, making it very difficult to determine a useable definition and compare data across research studies (Schoplar, 1998). Furthermore, the validity of AS as a distinct disorder according to the DSM-IV TR is questionable as many research studies indicate that individuals with AS meet criteria for both AS and autism (Prior, 2003).

As a result of the discrepancies, there has been much debate regarding the diagnostic differences between HFA and AS. Many experts now suggest that AS is high functioning autism (Ozonoff, South & Miller, 2000; Prior...
et al., 1998; Wing, 1998). While studies have documented differences between HFA and AS, these studies did not control for differences in intelligence quotients and cognitive functioning levels (Prior, 2003). Studies controlling for IQ have documented no significant difference in HFA and AS (Prior, 2003). Thus, for purposes of this literature review, subjects will include both individuals with HFA and/or AS as defined by an IQ of 70 or greater.

Academic achievement becomes increasingly important as the number of children on the autism spectrum served in the general education setting increases. According to the Twenty-seventh Annual Report to Congress, 27% of children with autism spend less than 21% of the day outside of the general education setting. Fifty-one percent of children with autism graduated with a standard diploma, twenty three percent of children with autism plan to attend college, and 17.6% dropped out of school (Wagner, Newman, Cameto, & Levine, 2006). As more children are diagnosed with autism and expected to meet the same academic standards of their neuro-typical peers, there is a demand for intervention strategies that will enable children with HFA/AS to perform academically.

Academic performance will enable individuals with HFA/AS to attend college and obtain meaningful employment. Although individuals with HFA/AS have the intelligence as measured by IQ, to compete they need appropriate interventions and accommodations to reach their full potential (Smith Myles, 2005). This is critical as Temple Grandin suggests that individuals with HFA/AS need to become specialized in a field so that people are willing to pay for their unique skill and overlook the social skill deficits (Grandin, Duffy, & Atwood, 2004). Grandin’s comment suggests that academic functioning and specialized skill development may be as important as social skills training for individuals with HFA/AS. If individuals with HFA/AS lose the opportunity to attend college because of poor academic performance in school, they may not obtain meaningful employment. Meaningful employment also may provide individuals with HFA/AS access to people who have similar interests and allow social interactions to develop. The lack of meaningful employment, therefore, may cause further isolation for individuals with HFA/AS.

To accomplish these academic goals, information on academic functioning is needed to develop a foundation for understanding the academic achievement strengths and weaknesses of students with HFA/AS (Griswold et al., 2002). Once a foundation of academic functioning is established, educational interventions and best practices can be identified. To address the need for development of appropriate academic interventions, several research studies have been conducted to determine the academic achievement profile of children with AS or HFA (Dickerson Mayes, & Calhoun, 2003a, 2003b, 2008; Barnhill et al., 2000; Goldstein et al., 1994; Griswold et al., 2002; Minshew et al., 1994). Thus, the purpose of this review is to provide a synthesis of the literature on the academic achievement of students with high functioning autism and Asperger syndrome to determine if an overall academic achievement profile emerges. First, analysis of the characteristics of the participants, the research design and the major findings across studies is provided. Second, an overall summary of an academic achievement profile for individuals with HFA/AS based upon the articles is presented. Finally, implications for practitioners and researchers are provided.

Method

The literature review consisted of searches of academic search premier, ERIC, Middle Search Premier, Primary Search, PsychARTICLES, PsychINFO and Pubmed using various combinations of the following terms: Asperger syndrome, autism, high functioning autism, education, and academic achievement. Then a hand search was conducted of the following journals covering the time span from 1981 to present: The Journal of Autism and Other Developmental Disorders, Focus on Autism and Developmental Disabilities, and The Journal of Clinical and Experimental Neuropsychology. The year 1981 was chosen because Wing reintroduced AS in that year and the debate over HFA/AS subtype differentiation began. Finally, after reviewing the retrieved articles an archival
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>CA</th>
<th>ASD Subtypes</th>
<th>Gender</th>
<th>Diagnostician and Assessment Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003a</td>
<td>n = 116</td>
<td>3 to 15 years old</td>
<td>Autism</td>
<td>82% male</td>
<td>DSM-IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean 6.7</td>
<td>Low IQ &lt; 80</td>
<td></td>
<td>Psychologist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High IQ &gt; 80</td>
<td></td>
<td>Child Psychiatrist</td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003b</td>
<td>n = 164</td>
<td>3 to 15 years old</td>
<td>Autism</td>
<td>77% male</td>
<td>DSM-IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean 5.9</td>
<td>Low IQ &lt; 80</td>
<td></td>
<td>Psychologist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High IQ &gt; 80</td>
<td></td>
<td>Child Psychiatrist</td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2008</td>
<td>n = 54</td>
<td>6 to 14 years old</td>
<td>HFA</td>
<td>89% male</td>
<td>DSM-IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean 8.2</td>
<td>IQ &gt; 70</td>
<td></td>
<td>Psychologist, confirmatory diagnosis by psychiatrist, psychologist, pediatric neurologist, or pediatrician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two groups:</td>
<td></td>
<td></td>
<td>Checklist for Autism in Young Children Pediatric Behavior Scale Clinical Observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;13 or &gt; 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goldstein, Minshew, &amp; Siegel, 1994</td>
<td>n = 64</td>
<td>years old</td>
<td>Autism</td>
<td>100 % male</td>
<td>DSM-IV</td>
</tr>
<tr>
<td></td>
<td>n = 46</td>
<td>Mean 16.11</td>
<td>IQ &gt; 80</td>
<td>0% females</td>
<td>ADI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>matched controls</td>
<td></td>
<td>ADOS</td>
</tr>
<tr>
<td>Griswold, Barnhill, Smith Myles, Hagiwara, &amp; Simpson, 2002</td>
<td>n = 21</td>
<td>6 to 17 years old</td>
<td>AS/HFA</td>
<td>100 % male</td>
<td>DSM-IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean: 10.0</td>
<td>IQ Full Scale</td>
<td></td>
<td>Physician, Psychiatrist, or psychologist</td>
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<td></td>
<td></td>
<td>66-144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 54</td>
<td>Median age:14</td>
<td>Autism</td>
<td>100% male</td>
<td>ADI</td>
</tr>
<tr>
<td>Minshew, Goldstein, Taylor, &amp; Siegel, 1994</td>
<td>n = 41 matched</td>
<td>years old</td>
<td>IQ &gt; 70</td>
<td>0% female</td>
<td>ADOS</td>
</tr>
</tbody>
</table>

*Note.* DSM-IV=Diagnostic and Statistical Manual Fourth Edition; ADI=Autism Diagnostic Inventory; ADOS=Autism Diagnostic Observation Scale
search was conducted. This search resulted in five research studies where academic achievement profiles of individuals with AS were the primary area assessed. Criteria for inclusion in the review were: subjects were diagnosed with HFA/AS, an experimental or quasi-experimental design was employed, and the study used a norm referenced achievement battery to determine achievement level. For each study, characteristics of subjects, research design and major findings were identified. The data is presented in Tables 1, 2, and 3.

<table>
<thead>
<tr>
<th>Study</th>
<th>Research Question</th>
<th>Type of Assessment Instrument</th>
<th>Tests</th>
<th>Statistical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003a</td>
<td>Delineate strengths &amp; weaknesses to determine a difference as a function of age and IQ.</td>
<td>Intelligence Academic Achievement</td>
<td>Stanford Binet IV, WISC –III, Developmental Test of Visual Motor Integration, WIAT, WJ Tests of Achievement</td>
<td>t tests with a Bonferroni correction, Pearson Correlation Coefficients</td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003b</td>
<td>To understand the differences in ability based upon age and IQ.</td>
<td>Intelligence Nonverbal intelligence Visual Motor Achievement</td>
<td>Bayley Mental Scale, Stanford Binet Test of Visual motor Integration, Leiter International performance scale, Test of Nonverbal Intelligence, WIAT WJ Tests of Achievement</td>
<td>Pearson Correlation Coefficients, t tests</td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2008</td>
<td>To determine if neuropsychological and learning profiles emerge and to compare findings from the WISC III and WIAT in previous research.</td>
<td>Intelligence Academic Achievement</td>
<td>WISC-IV, WIAT-H</td>
<td>t Tests, Cohen’s d effect size ANOVA, Bonferroni t tests, Pearson Correlation, Stepwise Linear Regression</td>
</tr>
<tr>
<td>Goldstein, Minshew, &amp; Siegel, 1994</td>
<td>To investigate age differences in the academic profile of people with HFA as compared to neurotypical controls.</td>
<td>Academic Achievement</td>
<td>Detroit Tests of Learning-2, Woodcock Johnson Reading Mastery tests-R, Kaufman Test of Educational Achievement</td>
<td>ANOVA</td>
</tr>
<tr>
<td>Griswold, Barnhill, Smith Myles, Hagiwara, &amp; Simpson, 2002</td>
<td>What are the academic characteristics of youth with AS?</td>
<td>Achievement Problem Solving</td>
<td>WIAT, TOPS-R, TOPS-A</td>
<td>Friedman Two Way analysis of Variance, Post Hoc Comparisons, Independent Group t tests</td>
</tr>
<tr>
<td>Minshew, Goldstein, Taylor, &amp; Siegel, 1994</td>
<td>To investigate the differences in academic ability between HFA and controls.</td>
<td>Achievement</td>
<td>Detroit Tests of Learning-2, Woodcock Johnson Reading Mastery tests-R, Kaufman Test of Educational Achievement</td>
<td></td>
</tr>
</tbody>
</table>

Note. WISC-III=Weschler Intelligence Scale for Children; WIAT=Weschler Individual Achievement Tests; TOPS-R=Test of Oral Problem Solving Revised; TOPS-A=Test of Oral Problem Solving for Adolescents.
### TABLE 3

<table>
<thead>
<tr>
<th>Study</th>
<th>Profile strengths</th>
<th>Profile Weaknesses</th>
<th>Academic Implications</th>
<th>Research Question Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003a</td>
<td>Reading, math &amp; writing were in average range and commensurate with IQ</td>
<td>Graphomotor Writing Attention Comprehension: social language &amp; reasoning</td>
<td>7% qualified for reading SLD 22% qualified for math SLD 63% qualified for writing SLD</td>
<td>The research delineates the strengths and weakness of children with HFA. The research suggests that there is a difference based on IQ and age.</td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2003b</td>
<td>Math reading and spelling correlated with IQ</td>
<td>Written expression</td>
<td>IQ increased up to the age of eight</td>
<td></td>
</tr>
<tr>
<td>Dickerson Mayes &amp; Calhoun, 2008</td>
<td>Reading and Math were commensurate with IQ Verbal and Visual Reasoning</td>
<td>Written Expression Attention Processing Speed Language comprehension and social reasoning</td>
<td>17% qualified for math learning disability 63% qualified for a writing learning disability 37% qualified for a reading learning disability</td>
<td>Teach to the child’s verbal and visual reasoning skills while compensating for the writing, attention, processing speed, language and social reasoning weaknesses</td>
</tr>
<tr>
<td>Goldstein, Minshew, &amp; Siegel, 1994</td>
<td>Young Group: Decoding, Rote Mechanical Functioning, Normal performance in early years</td>
<td>Complex processing across domains Comprehension Oral directions Linguistically Complex material</td>
<td>People with HFA may perform as well or better than peers on many age-normed tasks until a certain grade level, beyond which they do substantially less well</td>
<td>Three longitudinal age patterns emerged: 1. Some academic skills remain at or above average levels 2. Understanding and performing linguistically complex materials were deficit in both age groups 3. Normal performance in early years but does not maintain over time</td>
</tr>
</tbody>
</table>
Results

Characteristics of Study Participants

The majority of the researchers presented gender, chronological age, autism spectrum disorder diagnosis subtype with intellectual functioning level, and diagnostic instrument (See Table 1). Eighty eight percent of the subjects were male, which is a slightly higher representation of males than the population as ASD is four times more likely to occur in males than females (Center for Disease Control, 2007).

For most studies, participants ranged from 3–17 years old with a mean of 10.5 years in chronological age. Two studies reported a median age of 14 and divide the group into two categories: studies with participants under 14 years old or above 14 years old. The purpose of the division of the group was to determine if age differences appeared to impact academic achievement.

ASD diagnosis and level of intellectual functioning was reported for every study. Most studies included persons with HFA/AS and had an IQ of greater than 80. Several studies included persons with ASD who had IQ’s of less than 80, however, the data was used for comparison to the group of persons with IQs above 80. One study classified persons with HFA as having IQ levels above 70. In the study that included persons with AS only, it was interesting to note that after the Weschler Intelligence Scale for Children was administered, it was revealed that the subjects IQ ranged from 66 to 144.

Research Design

While the research question for each study varied slightly, the majority of the research studies focused on understanding the achieve-
ment or ability of students with HFA/AS or understanding the underlying achievement or ability so that interventions could be developed (See Table 2). One study investigated the relationship between age and IQ with academic achievement in order to gain a better understanding of the intervention needs of students as the progress through school. Two of the studies used age and IQ matched controls groups, two research studies compared scores based upon discrepancy from IQ and between age groups and two research studies compared subtests with verbal, performance or full scale IQ.

The main focus of each study was academic achievement. However, some studies included instruments other than academic achievement assessments to help ascertain ability profiles or strengths and deficits as it relates to school. Each study, except one, included an IQ test in the data collection process. Many of the additional assessment instruments measured areas that are considered weaknesses in HFA/AS, such as visual motor processing, motor coordination and problem solving.

Data analysis varied for the studies. Several studies used independent t tests for group comparisons as well as dependent t tests to compare discrepancy between IQ and various subtests. Correlation coefficients were used in two studies to determine the relationship between two variables. Two-way analysis of variance also was used to determine the differences between two or more variables.

Major Findings

Overall findings indicate that reading, math and writing were commensurate with IQ (Dickerson Mayes & Calhoun, 2003a; Dickerson Mayes & Calhoun, 2008) and that basic reading, encoding, rote skills and information was intact (See Table 3) (Mayes & Calhoun, 2003a; Dickerson Mayes & Calhoun, 2008). Reading ability is commensurate with IQ up to around age 8. During the early years, students perform at or above their peers on reading tasks. After age eight, reading instruction focuses more on comprehension including abstract concepts such as main ideas, inferences and causes/effect. Material becomes less explicit which may explain the decrease in reading ability when com-

Furthermore, it appears that IQ increases up to the age of eight (Mayes & Calhoun, 2003b). Children below the age of eight had weaker verbal skills. The non-verbal and verbal intelligence gap closed between the age of 9-10, suggesting that interventions prior to the age of eight focus on verbal skill acquisition. Individuals with HFA/AS may perform as well or better than peers on many age-normed tasks until a certain grade level, beyond which they do substantially less well (Goldstein et al., 1994). The use of global scores to assess academic functioning in reading and mathematics may fail to identify deficits (Minshew et al., 1994).

Discussion

Overall, the review of the literature suggests that individuals with HFA/AS present with a general profile of academic functioning. Individuals with HFA/AS have deficits in the areas of comprehension, written expression, graphomotor skills, linguistically complex materials, complex processing across all domains and problem solving. The deficits in academic functioning may not become apparent until learning moves from rote tasks to abstract, conceptual learning (Goldstein et al., 1994). Deficits may result in academic difficulties in reading, writing and mathematics. Proper assessment and analysis of subtest domains is needed to determine the strengths and weaknesses of a student with HFA/AS as the disorder present a range of functioning.

Reading

The academic profile in reading suggests that basic reading and decoding skills are intact for students with HFA/AS. Reading ability is commensurate with IQ up to around age 8. During the early years, students perform at or above their peers on reading tasks. After age eight, reading instruction focuses more on comprehension including abstract concepts such as main ideas, inferences and causes/effect. Material becomes less explicit which may explain the decrease in reading ability when com-

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pared to neuro-typical peers. Comprehension deficits are an area identified as part of the academic profile in HFA/AS. Reading comprehension due to the critical thinking and verbal reasoning components also may be impacted by the theory of mind and attention deficits (Griswold et al., 2002).

**Writing**

Both written expression and graphomotor skills are identified as weaknesses for students with HFA/AS. Graphomotor skill deficits may be caused by motor coordination difficulties. Written expression may be impacted by the organization and attention deficits. Sixty percent of individuals with HFA/AS also have writing learning disabilities (Mayes & Calhoun, 2003a, 2008).

**Mathematics**

Review of the literature suggests that children with HFA/AS have average mathematical abilities. Computational skills appear to be intact for this population. However, complex problem solving within this domain impacts applied mathematical ability. Organizational and attention skills may also impact multiple step problem solving. Reading comprehension deficits may also impact grade level word problems. Deficit areas other than mathematical computation may account for the significant difference between average to above average IQ and average mathematical ability findings. Dickerson Mayes and Calhoun (2003a, 2008) report that 23% of the students with HFA/AS meet criteria for a mathematics learning disability.

**Implications for Practitioners**

The review of the literature suggests that there is an academic profile of students with HFA/AS (Mayes & Calhoun, 2003a, 2003b; Barnhill et al., 2000; Goldstein et al., 1994; Griswold et al., 2002; Minshew et al., 1994). The value of knowing the profile allows for a basic understanding of how to teach children with HFA/AS (Griswold et al.). However, what is true for the group may not be true for each individual (Mayes & Calhoun, 2003a). Given the heterogeneous nature of the disorder, a huge range of functioning across students may exist. Knowing that a child has HFA/AS may be little value to the teacher. The use of global scores to assess academic functioning in reading and mathematics may fail to identify deficits (Minshew et al.) Therefore, it is important to look at the whole child as well as item analysis of subtest performances to guide individual interventions (Griswold et al.). Teachers need the individual subtest analysis of assessments to build individual education plans. For example, knowing that a student with HFA/AS scores in the 95th percentile on overall academic skills on the Woodcock Johnson Tests of Achievement is less important then knowing that the student scored in the 47th percentile ranking on reading comprehension and the 76th percentile ranking in applied problems. The subtest scores allow a teacher to create an educational plan based upon the support needs of the student as well as the strengths of the student that a teacher can build upon. Building student portfolios and pairing the information with formal assessment may give a teacher the best indication of academic functioning (Griswold et al.). Once a teacher has developed an understanding of the specific needs of the student, then he/she must have access to research-based practices to address the student’s academic needs.

In addition, practitioners can educate parents so they do not become frustrated with a perceived decline in academic functioning when tasks become more conceptual. During this process, it is important for teachers to communicate effectively. This will involve teaching the parents about the new areas in the academics and strategies that may be beneficial. Further, the teachers should explain the tests to the parents in terms that are understandable (i.e., minus the professional jargon).

**Implications for Researchers**

As aforementioned, researched-based academic interventions for this population of students are sparse (Simpson, 2005). Since teachers typically are not trained in research-based interventions for their students with HFA/AS (Smith Myles, 2005), they often rely on strategies researched with children with learning...
disabilities yet children with HFA/AS may need further accommodations (Adreon & Durocher, 2007). The effectiveness of the learning disability interventions, when used for children with HFA/AS, has not been adequately assessed. Researchers could begin to explore the effectiveness of these interventions with the HFA/AS population. When doing this, research could test learning strategies and meta-cognitive strategies that have proved successful for learning disabilities and determine the necessary adaptations to meet the unique cognitive and academic needs of children with HFA/AS. By developing strategies that remediate or support the conceptual learning of individuals with HFA/AS as their needs change during adolescences, quality of life outcomes may be improved by successful performance school that may lead to successful post-secondary education and meaningful employment. In addition, researchers should begin extending the researched based practices that have proved successful in remediating the social and communicative deficits to the classroom setting.

Conclusions

In summary, children with HFA/AS have the potential to become highly productive, contributing members of society and can develop their specific skills so they are admired and hired for their talent (Grandin, Duffy, & Atwood, 2004). Students with HFA/AS need to gain skill in all academic areas in order to graduate with a standard diploma, obtain satisfactory SAT or ACT scores and become admitted to college. However, research in the area of academic achievement of children with HFA/AS is in the stage of infancy; resulting in teachers often having to use strategies researched with individuals with learning disabilities. Future research teams should evaluate the effectiveness and efficiency of these strategies with individuals with HFA/AS.

References


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A Method to Assess Work Task Preferences

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Abstract: Persons with intellectual disability may encounter difficulties in making choices and expressing preferences because of restricted communication skills or a tendency to acquiesce. In addition, many studies provide evidence that these persons have less opportunity to make choices and express their preferences. The aim of this study was to conduct a field test of an innovative method to assess vocational preferences using choice and task completion observations. Sixteen educators were trained to use this method. They were recruited through local developmental disability agencies specializing in services for persons with intellectual disability in the Province of Quebec (Canada). Nineteen persons with intellectual disability were assessed. Occurrences of four types of behaviors (choice, refusal, positive emotional and off-task behaviors), as well as length of time spent working on the task, were computed to determine levels of preferences. Interviews were conducted with the educators to collect their perceptions regarding the effectiveness and usefulness of the method as a measure of its value in use. Results suggest that this method is useful to assess vocational preferences with persons with intellectual disability. Interviews conducted with educators reveal a high satisfaction with the method. Vocational preferences assessment should rely on frequency of choices, as other behaviors previously considered as expressing preferences are not reliable. This study also provides further evidence that proxy opinions may differ from one’s actual preferences.

The aim of supporting persons with intellectual disability is to provide them with a good quality of life, as well as self-determined life outcomes. Current legislation and policies uphold these major objectives and recommend that professionals and caregivers take the preferences and personal goals of these persons into account when making decisions concerning their lives. Recently, assessing choices and preferences, which are defined as repeated choices of a same option, was highlighted as one of the main relevant research domains (Emerson, Hatton, Thompson, & Parmenter, 2004). Direct measures of preferences are necessary since preferences expressed by the person him- or herself may differ from those hypothesized by proxies, especially if the latter rely on subjective information (Perry & Felce, 2002; Reid, Everson, & Green, 1999; Stancliffe, 1995). However, all direct measures may not be suitable for every person with intellectual disability. Questionnaires and interviews may be ineffective with persons with intellectual disability because of limitations in their receptive or expressive communication skills (Cameron & Murphy, 2002). Persons with intellectual disability also have a tendency to acquiesce on yes-saying questions or to choose the second of two parallel either/or questions (Finlay & Lyons, 2002; Perry & Felce, 2002). Cognitive limitations are other important barriers to expression of preferences, particularly on complex abstract issues (Perry, 2004). Consequently, persons with intellectual disability
may benefit from direct observation while they are manipulating or consuming options presented during a valid preference assessment procedure. Pictorial presentations using still pictures or videos are likely to compromise preferences assessment as they may be too abstract, given an individual’s cognitive skills. Most of the studies on direct observation assessment methods describe assessment of preferences for tangible stimuli (edibles, sensory activity, etc). Further research is needed to implement direct observation methods for assessing more symbolic objects that represent important life outcomes, such as vocational activities (Cobigo, Morin, & Lachapelle, 2007; Hatton, 2004; Hughes, Pitkin, & Lorden, 1998; Lohrmann-O’Rourke & Browder, 1998). This study aims to present field test results of a method to assess vocational preferences using direct observation while a person selects an option and works on the corresponding task. Furthermore, it assesses the value in use of the assessment method by interviewing the 16 job coaches who conducted assessment on 19 persons with intellectual disability.

**Method**

**Participants**

Sixteen job coaches (all women) were recruited through four local developmental disability agencies that provide public services to persons with intellectual disability in the Province of Quebec (Canada). Fourteen had a college or university degree. Fourteen of them had worked with persons with intellectual disability for at least 10 years. They assessed work task preferences for nineteen persons with intellectual disability (8 women, 11 men) who encountered difficulties expressing their preferences verbally. The evaluated persons were between 23 to 58 years old (mean = 35). Their levels of adaptive behaviors were assessed using the Échelle québécoise des comportements adaptatifs (Quebec Adaptive Behavior Scale; Maurice, Morin, Tassé, Garcin, & Vaillant, 1997) which is a reliable French instrument to assess adaptive behaviors of persons with intellectual disability aged 3 years and older. It gives reliable and comparable descriptions of the participants, using a global score which describes the general adaptive skills of each participant.

It also provides seven partial scores, including communication and vocational skills levels. These two scores provided interesting information on the participants’ functioning in terms of the research goals. The computed global scores indicated that all the evaluated persons had a severe to profound deficit in their adaptive skills, except for one who had a mild deficit (participant 14). Their deficits in communication skills were severe to profound, except for one who was reported as having a mild deficit (participant 16). All were assessed as having important limitations in expressing or understanding complex language. One had no deficit in his vocational skills (participant 14), five had a mild deficit (participants 3, 4, 6, 7, 15), seven a moderate deficit, and six a severe to profound deficit in their vocational skills. Most of them received constant supervision, and had held the same job for more than a year. Work settings were diverse: participants worked in schools, stores or community centers. Consequently, work tasks presented during the assessment were different from one participant to another (for example, sorting clothes, counting 100 screws with a caliber, putting price stickers on products, shredding paper, etc.). Three of them were in an assessment period to determine which job best suited them. Twelve had known the evaluator for at least a year, and six had got to know her within the last six months. They all had weekly contact with the evaluators, except for one who saw his or her evaluator once a month.

**Research Design**

A work task preference assessment method was designed following an integrative review (Jackson, 1989) of studies assessing vocational preferences in persons with intellectual disability or evaluating the reliability of such assessment methods (Cobigo, Morin et al., 2007). This review allowed the researcher to make decisions on stimuli presented, assessment context and procedure, as well as behaviors to observe and to design a valid and reliable method to assess vocational preferences with persons with intellectual disability. The designed method was then validated by five experts in the intellectual disability field, and pre-experimentation was conducted with two job coaches (Cobigo, Lachapelle, & Morin,
The 16 job coaches who agreed to participate were trained to conduct work task preference assessment using the method designed by the researcher. They chose one or two persons they wished to assess. Job coaches chose four tasks that existed at each person’s work setting. If necessary, the person was trained beforehand to know which behaviors were needed to complete a task.

During the assessment, two choices were presented simultaneously using tangible objects normally required to complete the tasks. Pictograms were used with two participants (participants 6 and 14) as they already communicate using images at the job site. Objects or pictograms were presented at an equal distance from the person, so he could reach both of them. The evaluator asked the person to pick one of the objects, without naming the corresponding activities. The evaluator recorded selections and refusals on an observation grid. Selection was defined as pointing to an object, touching it or naming the activity it represented. The person being evaluated was allowed to change his choice within a five-second period, in which case the second choice was considered as selected. Refusals were defined as throwing an object away, pushing it away, or refusing to choose one of the options. If both options were refused, the pair of objects was removed and the next pair was presented. Once a choice was recorded, the person being evaluated was prompted to work on the selected task within a three-minute period. The evaluator used a chronometer to assess the length of time spent working on the task in the three-minute period. The evaluator also recorded off-task behaviors which were what the person did when the chronometer was off (off-task behaviors). The evaluator also observed positive emotional behaviors such as smiling and laughing, as well as idiosyncratic vocalizations or gestures expressing pleasure. A timer rang when the three minutes were up. The task was removed and the second pair of choices was presented following the same procedure. The sequences of the pairs were predetermined randomly, as well as alternating object presentation side (right and left). In a session, all possible pairs had to be presented. In this study, four tasks were presented, so six pairs were possible. Evaluators were provided with observation grids that included information about sequences in pair presentations and alternating right-left positions. Seven sessions were conducted in an eight-week maximum period. Research assistants observed 30% of the assessment sessions in order to conduct reliability checks. The first two sessions were not included in the assessment results, as they were designed for making any necessary adjustments to the set-up, and for acquainting both the evaluator and the person being evaluated with the assessment procedure. For the behaviors recorded during sessions three to seven, the evaluator computed percentages of choice and refusal for each task. Percentages of off-task and positive emotional behaviors were calculated on the number of choices for each task. The evaluator also calculated the mean duration of on-task behavior in a three-minute period. This provided a profile of the most and least preferred activities among the four tasks presented. In concordance with previous research (Lancioni, O’Reilly, Campodonico, & Mantini, 1998a; Lancioni, O’Reilly, Campodonico, & Mantini, 1998b; Parsons, Reid, & Green, 1998; Reid, Parsons, & Green, 1998), we expected that the most preferred activities were chosen over 70% of the time they were presented, they had the longest duration of on-task behaviors, the highest frequency of positive emotional behaviors, and the lowest frequency of off-task behaviors. In contrast, a least-preferred activity is expected to be chosen less than 50% of the time it was presented; to have the highest frequency of off-task behaviors, the lowest duration of on-task behaviors and lowest frequency of positive emotional behaviors. For each participant, tasks were classified from most to least preferred using frequencies of choice. We analyzed if levels of preferences have an impact on emotional and off-task behavior frequencies, using repeated measures ANOVA.

Once the assessment was finished, a research assistant conducted a semi-structured interview with each job coach to collect data on her perceptions of the assessment method. Interviews were designed following the utilization-focused assessment approach (Patton, 1997) to assess the method’s value in use. It could be defined as the value of an instrument or a product in relation to its users’ needs and use conditions. Thus, interviewers were trained...
to follow an interview guide that listed specific questions and topics to be covered. Interview themes were: 1. general perceptions of the method used; 2. facilitating factors observed; 3. barriers encountered; 4. assessment outcomes; 5. assessment of the expected and unexpected outcomes; and 6. perceptions of the advantages of the method. Interviews lasted about 30 to 60 minutes. Research assistants transcribed audio-taped interviews, and an independent assistant checked all the transcripts.

Qualitative data were analyzed in six recommended steps to prevent bias in interpretation (L’Écuyer, 1990; Miles & Huberman, 1994; 2003). First, the experimenter read transcripts twice to get an overall understanding of the material. Transcripts were cut into meaningful segments. Each passage was categorized using a grid of codes. This grid was developed according to interview themes and study goals. Two assistants tried this grid with 30% of the transcripts and made comments to enhance its reliability. The experimenter then analyzed the material and assigned a code to each section following the modified grid. Two other assistants independently analyzed 30% of the transcripts using the same grid to check inter-coder agreement. The grid contained 29 codes in six categories (general perceptions, facilitating factors, barriers encountered, assessment outcomes, other instruments to assess preferences and how to enhance the assessment method) and these are described in Table 1. Descriptive analyses were conducted to describe the experience and perceptions of participants in terms of the above-mentioned themes.

Results

Preference Assessment

The percentage of inter-observer agreement was estimated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Inter-observer agreement ranged between 73% and 100%, depending on the participants, with overall inter-observer agreement being 85%. Inter-observer agreement also varied depending on the kind of behaviors recorded. Agreement was lower for positive emotional behaviors (71%) which are discrete and sometimes idiosyncratic. Furthermore, evaluators may have wrongly recorded participant characteristics, such as attentiveness or degree of concentration, as positive emotional behaviors. These observation errors were corrected before calculating frequencies of emotional behaviors. Other agreements ranged from 82% (off-task behaviors) to 98% (selection). However, the off-task behavior category was misunderstood by several observers who recorded off-task behaviors even if the person being evaluated did not stop working on the task. Once these errors were corrected, inter-observer agreement on off-task behaviors was 88%.

Overall, results show that most preferred work tasks could be evaluated for 12 participants out of 19. Figures 1 and 2 show assessment results for each participant. Results vary considerably among participants. The percentages of choices clearly demonstrate the most-preferred and less-preferred work tasks for the majority of participants. However, no obvious preference profile could be demonstrated for participants 2, 6, 14 and 18 as frequencies of choice were equivalent for all the four tasks (around 40% and 60%). Participants 11 and 12 demonstrated no most-preferred activity, but frequencies of choice for moderately-preferred and non-preferred activities vary between 27% and 67%. The percentages of choices were not reliable for participant 10. Throughout the assessment, he chose the left-positioned stimulus. Experimenters were careful not to present the same stimulus always on the right or left side, but did not equally balance right and left positions for each task. Task 1 was presented 80% of the time on the left side.

Only four participants exhibited refusals during the assessment. Frequency of refusals for participant 12 should be interpreted with caution since refusals were hard to distinguish from his epileptic symptoms. Participant 5 exhibited refusals with two tasks that he selected at least 80% of the time they were presented. However, each task was only refused once. It is interesting to note that participant 5 is diagnosed with a pervasive developmental disorder. Participants 7 and 14 exhibited refusals with moderately-preferred tasks. No refusal was exhibited with non-preferred activities.

Only four participants did not exhibit off-task behaviors during the assessment. Nonetheless, no concordance was observed be-
between the frequency of choices and the frequency of off-task behaviors. Repeated measures ANOVA were non significant ($p < 0.05$), suggesting that there is no impact of the level of preference on the frequency of off-task behaviors. Off-task behaviors were exhibited with most-preferred as well as less-preferred activities. For example, participant 9 exhibited off-task behaviors while completing his two most-preferred tasks, but none with his less-preferred ones. Participant 13 exhibited off-task behaviors in almost 100% of the observation periods. The length of time spent working on the task was also recorded but is not reported in this article because no significant difference between tasks and participants is clearly demonstrated. All the computed means are above two minutes on a three-minute period and are not congruent with other behaviors recorded.

Most of the time, positive emotional behaviors were exhibited while completing a task that was selected over 70% of the time it was presented. However, positive emotional behaviors were also exhibited with less-preferred and non-preferred tasks. Repeated measures ANOVA were not significant ($p < 0.05$). Fre-

### TABLE 1

<table>
<thead>
<tr>
<th>Categories</th>
<th>Codes</th>
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<tbody>
<tr>
<td>General perceptions</td>
<td>a) Satisfaction</td>
</tr>
<tr>
<td></td>
<td>b) Dissatisfaction</td>
</tr>
<tr>
<td></td>
<td>c) Reluctance</td>
</tr>
<tr>
<td></td>
<td>d) Persons who could benefit from the assessment</td>
</tr>
<tr>
<td></td>
<td>e) Professionals who could use the method.</td>
</tr>
<tr>
<td>Facilitating factors</td>
<td>a) Related to the assessment context</td>
</tr>
<tr>
<td></td>
<td>b) Related to the evaluated person’s characteristics</td>
</tr>
<tr>
<td></td>
<td>c) Related to the assessment method itself</td>
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<tr>
<td></td>
<td>d) Related to the training received on the assessment method</td>
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<td></td>
<td>e) Related to the evaluator’s professional training and experience</td>
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<tr>
<td></td>
<td>f) Other facilitating factors.</td>
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<tr>
<td>Barriers encountered</td>
<td>a) Related to the assessment context</td>
</tr>
<tr>
<td></td>
<td>b) Related to the evaluated person’s characteristics</td>
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<td>c) Related to the assessment method itself</td>
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<td></td>
<td>d) Related to the training received on the assessment method</td>
</tr>
<tr>
<td></td>
<td>e) Related to the evaluator’s professional training and experience</td>
</tr>
<tr>
<td></td>
<td>f) Other barriers encountered.</td>
</tr>
<tr>
<td>Assessment outcomes</td>
<td>a) Knowledge of the evaluated person’s preferences</td>
</tr>
<tr>
<td></td>
<td>b) Agreement between assessed preferences and preferences assumed by the evaluator before the assessment</td>
</tr>
<tr>
<td></td>
<td>c) Lack of agreement between assessed and assumed preferences</td>
</tr>
<tr>
<td></td>
<td>d) Knowledge of working condition preferences</td>
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<tr>
<td></td>
<td>e) Planning vocational activities</td>
</tr>
<tr>
<td></td>
<td>f) Other outcomes.</td>
</tr>
<tr>
<td>Other instruments to assess preferences</td>
<td>a) Validated instrument</td>
</tr>
<tr>
<td></td>
<td>b) Informal tool</td>
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<tr>
<td></td>
<td>c) No other tool known</td>
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<tr>
<td>How to enhance the assessment method</td>
<td>a) Suggestions for enhancing the assessment method</td>
</tr>
<tr>
<td></td>
<td>b) Expression of no possible improvements</td>
</tr>
<tr>
<td></td>
<td>c) Expression of no known improvements</td>
</tr>
</tbody>
</table>
Frequency of positive emotional behaviors did not vary proportionally to frequency of choices.

Utilization-focused Assessment

Codes utilized to analyze transcripts of interviews with the job coaches were divided in 6 categories: 1. general perceptions of interviewees concerning the assessment method, 2. facilitating factors in the implementation of the method, 3. barriers encountered, 4. appreciation of the assessment outcomes, 5. other tools to assess vocational preferences known by interviewees, 6. recommendations to enhance the assessment method. To facilitate readers’
comprehension, results for both category 2 and 3 will be presented in the same paragraph.

General Perceptions

All interviewees expressed their appreciation of the method and recommended its use since they need such assessment methods to enhance observation and understanding of their clients. They found the method pleasant and easy to use. However, three of them were dissatisfied with the assessment results which they qualified as insufficient or unclear. These three job coaches respectively assessed participants 10, 12 and 13, and 17. Participant 10 is the person who chose all objects presented on his left. Results for participants 12, 13 and 17 are ambiguous because of a lack of congruence among behaviors observed. Only one job coach declared that she was not interested in using the assessment method since she was already aware of her clients’ preferences before the assessment. However, she thought that young job coaches could find the method useful. According to the interviewees, the method could be used by various types of professionals, irrespective of their academic background, since it is easy to implement. Job coaches and psychologists were the most common professional categories cited. Two interviewees also recommended that school professionals use this method to help students discover their vocational orientation. Furthermore, some interviewees thought that the method could be useful for assessing interests for leisure and home tasks. Interviewees highlighted the usefulness of this method for assessing the preferences of persons who have limited communication skills, especially those who have not been trained to communicate using alternative communication means (signs, pictograms, etc.). Most of the interviewees added that persons with intellectual disabilities may have difficulty expressing their preferences because of a tendency to acquiesce with or to please their caregivers, even if they have no major communication limitations. Persons with or without intellectual disability may benefit from this method if they have language, auditory or visual difficulties. Several interviewees said that the method is useful for quickly identifying a new client’s preferences in order to plan his vocational orientation. Twelve interviewees were reluctant to use the assessment method. They feared that they would not have enough time to conduct the assessment, they would be disturbed by other clients, the person being evaluated would not cooperate, or the method would be too complicated. All of their fears disappeared when they used the method.

Facilitating Factors and Barriers Encountered

More than 80% of the interviewees identified contextual factors as conditions that would facilitate implementation of the method, and 75% found that contextual factors could be barriers to its use (see Figure 3). The assessment context seems to be an important issue to consider when evaluating the effectiveness of the method. Job coaches could choose to either conduct the assessment in the natural work setting or in a separate room in a one-on-one situation with the person being evaluated. Those who chose to conduct the assessment in a separate room identified this factor as a facilitator. Natural work conditions make the assessment more difficult since other clients may need attention or someone could interrupt a session. The person being evaluated is also more distracted because of interactions with peers. If the assessment is conducted in a natural work setting, interviewees recommended that a colleague take over from them and that tasks be assigned to the other clients so they will not disturb the assessment. They also recommended choosing an appropriate time for conducting a session. Most of them chose times when some clients were absent, or when there was no rush in the production schedule, etc. Other contextual factors identified as facilitators or barriers had an impact on the client’s motivation to complete the task. For example, it is necessary to prepare enough material to last the entire session. When material was insufficient and the evaluated person completed the task before the three minutes were over, the evaluator had to undo the work already completed and then prompt the client to redo the same task. Interviewees observed a lack of interest in their clients for redoing a task they had already done. A solution could be having separate work stations for each task and prompting the client to walk toward the corresponding work station after his choice. This would also reduce the time needed to pre-
pare the material during a session. A similar impact on the client’s motivation to choose and complete a task could be the sequence of work tasks he had completed before the assessment. He could be prone to choosing different tasks from those he had already done.

More than 80% of interviewees listed characteristics of the person being evaluated as facilitating conditions: his cooperation during the assessment and his concentration and attention skills. On the other hand, 56% of interviewees described personal characteris-

Figure 2. Assessment results by participant.
tics as barriers, especially dual diagnoses that could interfere with the assessment, such as pervasive developmental disorders or mental health disorders.

In accordance with the general positive perception expressed by interviewees, most of the factors related to the method were considered to be facilitating conditions. Ninety-four percent of the interviewees appreciated the flexibility of the method which allowed for interruptions and provided choice of an appropriate time to conduct a session, the length of time needed, and the first two training sessions. Seventy-five percent of interviewees identified barriers related to the method itself. Some behaviors to be observed were too ambiguous or difficult to observe. Calculating the results was also considered to be difficult. Some job coaches thought that the method restricted the choice of tasks to be assessed. For example, they would have liked to include in the assessment tasks that were unknown to the client.

Training in the method seems to be an important facilitating factor. Interviewees highlighted the importance of the supervision given by a research assistant and the experimenter in choosing the tasks and preparing

Figure 3. Facilitating factors and barriers encountered by job coaches.
the material during the first two sessions. They also found the document describing the method, which they received during the training, to be very useful. However, some clients were distracted by the presence of the research assistant during the assessment. Professional experience and academic background, as well as an ongoing relationship with the client, were considered to be assets in observing and interpreting behavior. They facilitate the recognition of undesirable variables that could interfere with the assessment.

Assessment Outcomes

Twelve job coaches reported a lack of concordance between preferences assessed and the preferences they had hypothesized before the assessment. Eleven interviewees found preference assessment useful for planning vocational activities best suited to clients. Twelve interviewees reported unexpected outcomes. The assessment allowed them to stop and think about their clients, the number of tasks they were able to do, and the concordance between client preferences and task planning. Another important outcome was the significant impact on the quality of life of clients as the method helps job coaches introduce choices on a daily basis and plan preferred vocational activities. Furthermore, some job coaches felt that this experience enhanced their competencies in observing and understanding their clients.

Other Preference Assessment Tools

Forty-four percent of interviewees did not know of other tools for assessing work task preferences. Forty-four percent cited the Inventaire visuel des intérêts professionnels (Dupont, Gingras, & Tétrault, 2000) which is an instrument for assessing vocational interests using 80 pictures of work areas. They described its inadequacies for assessing the work task preferences of persons with intellectual disability since it is not concrete enough for some of them. Some persons with intellectual disability lack the necessary language and insight skills that are required for assessments which use pictures. One interviewee also mentioned a computerized assessment tool. Consequently, job coaches tend to assess vocational preferences by giving choices that are embedded in the client’s routine.

How Can the Assessment Method Be Enhanced?

Thirteen interviewees suggested enhancements to the method. They recommended more concrete and detailed definitions of behaviors to observe since some were ambiguous. They also suggested decreasing the time needed for the evaluation, for example, by holding 4 to 5 sessions instead of 7. They asked that a way be found to make calculation of the results easier. Furthermore, they suggested integrating the assessment into a more complete assessment program that would include more tasks, including tasks unknown to the client. The assessment should help to estimate performance on the tasks and the influence of variables such as diversity versus repetition of the tasks or interactions with peers on the expressed preferences. A more detailed assessment would be helpful in planning a client’s vocational orientation, which is more useful than just knowing which tasks are preferred.

Discussion

This study provides further evidence of the behaviors which should be considered when assessing or defining choices and preferences. It is also a first attempt to assess the value in use of a work task preference assessment. Its important findings will help to provide job coaches with an effective tool for assessing preferences. This kind of program evaluation is of particular interest as it assesses the adequacy between a product and its users’ needs. It also provides important information on how to enhance the product to best suited its users’ competencies and work habits. As a consequence, this approach is a useful link between research and practice as it could help to transfer research results into practice. Results from this study suggest that the assessment method responds to diverse needs expressed by job coaches, especially considering the lack of instrument to assess vocational preferences. In addition, an important difference between existing instruments and this assessment method is that it assesses preferences for tasks available in the person’s work environment. Existing.
instruments rely on a standard set of tasks that captures important dimensions of vocational tasks. However, some of these predetermined tasks are not always available for the person being assessed and, consequently, are not useful for vocational planning.

Most of the participants expressed preferences by selecting objects or pictograms representing work tasks. This study supports previous studies which indicate that selection behaviors are reliable indicators for assessing preferences (Mithaug & Hanawalt, 1978; Mithaug & Mar, 1980; Parsons et al., 1998; Reid et al., 1998). Few refusals were observed during the assessment, and they were not consistent with frequency of choice. We could wonder if the tendency to acquiescence and social desirability had an impact on the frequency of refusals. On-task and off-task behaviors appeared to be unreliable indicators for assessing preferences. Contradictory results have been published with regards to these behaviors (Hatton, 2004; Worsdell, Iwata, & Wallace, 2002), but we could hypothesize that task engagement increases in conditions where there is choice, but not necessarily with preferred tasks. Positive emotional behaviors are also inconsistent in assessment sessions. Previous research argues that persons with greater communication limitations are likely to exhibit more emotional behaviors in order to communicate their preferences (Campbell & Fletcher, 1993). In this study, all participants had important communication limitations but they did not all exhibit emotional behavior. Furthermore, evaluators observed the impact of contextual variables (for example, interactions with a peer) on the occurrence of positive emotional behaviors. Consequently, preference assessment should rely on frequency of choices defined as physical selection of an option. Task engagement and positive emotional behaviors are useful for gathering information on the influence of contextual factors which are important variables to consider when planning vocational tasks that best suit the person. Further research is needed to determine which personal or contextual factors have an impact on the reliability and efficiency of the assessment method. Experimental or quasi-experimental designs should be used to accurately assess the impact of contextual and personal variables.

Interviewees gave useful suggestions on how to identify the variables to target. Their comments also highlighted the importance of training. Evaluators should be trained to observe relevant behaviors in order to assess preferences. This training should include operational definitions of behaviors to avoid confusion with personal characteristics or personal judgment, such as attentiveness or degree of concentration. Supervision in the first sessions also seems to be appreciated by the evaluators and could increase reliability of the method. Interviewees insisted on the need to make the assessment easier and quicker. Multiple stimuli without replacement method (MSWO) is currently considered to be the easiest and quickest assessment procedure (Hagopian, Long, & Rush, 2004). It consists on the simultaneous presentation of all possible pairs as opposed to the pair presentation. Once a stimulus chosen, it is not presented again to the person being assessed. However, no research has assessed reliability of MSWO for assessing work tasks preferences. Further research is still needed to extend findings from previous studies on the assessment of tangible stimuli preferences to vocational activity preferences. The results of this study support the idea that the preference assessment method could be embedded into routine staff practice. Future research will help to identify conditions for its use and its reliability and validity. To conclude, this study provides additional evidence that proxies are not always reliable when determining a person’s preferences, since the preferences attributed by proxies may differ from those assessed using direct measures.

References


Cobigo, V., Lachapelle, Y., & Morin, D. (2007). Élaboration d’une méthode d’évaluation des préférences liées à des activités socioprofession-


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Fourth Grade Outcomes of Children with a Preschool History of Developmental Disability

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Abstract: Special education outcomes were evaluated for 3,608 children (2,513 males) with a preschool history of developmental disability. Sixty-six percent of the children had an identified disability in fourth grade. The percentage of children with a disability at outcome varied across preschool disability categories from 54% to 96%. The consistency of classification at preschool and outcome was relatively high for children with trainable mental handicap/profound mental handicap (TMH/PMH), emotional handicap/severe emotional disturbance (EH/SED), specific learning disability (SLD), and autism (AT) and lower for children with educable mental handicap (EMH), speech and/or language impairment (SI/LI), and developmental delay (DD). Understanding the nature and course of developmental disabilities can inform early intervention services, service planning, and resource management.

Understanding the nature and course of developmental disabilities over time is both theoretically and clinically important. One way to improve our knowledge of developmental disabilities is to longitudinally monitor special education placement. Awareness of the future special education placement of preschoolers with disabilities can inform early intervention services, service planning, and resource management. Research in this area, however, has been largely limited to preschoolers with developmental delay and speech-language impairments.

Developmental delay is an eligibility category that is only applicable to young children. As children mature, they must be identified with a more traditional disability to remain eligible for special education services. The majority of preschool children identified with developmental delay enter special education programs in elementary school (Bernheimer, Keogh, & Coots, 1993; Dale, Jenkins, Mills, & Cole, 2005; Delgado, Vagi, & Scott, 2006; Keogh, Coots, & Bernheimer, 1996; Mills, Dale, Cole, & Jenkins, 1995). The most common disability reclassifications for children with DD are learning handicaps, speech and language handicaps, and mild mental retardation (Bernheimer et al.; Delgado et al.; Keogh et al.).

Preschool speech-language disorders are associated with language and academic difficulties that persist throughout childhood and adolescence (Aram, Ekelman, & Nation, 1984; Beitchman, Wilson, Brownlie, Walters, & Lancee, 1996b; Johnson et al., 1999; Silva, McGee, & Williams, 1983; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998; Young et al., 2002). A link between early speech-language impairments and later learning and reading disabilities has been well established (Catts, 1993; Leitão & Fletcher, 2004; Paul, 2000;
Preschool speech-language impairments are also associated with later behavior problems (Beitchman et al., 1996a; Silva et al., 1987). The long-term monitoring of preschool children with speech-language impairments has "helped speech-language pathologists to evaluate long-term prognoses, set realistic goals, develop suitable service models, and advocate appropriate social policies" (Johnson et al., 1999, p. 744). Similar benefits would be expected for the tracking of special education placements for young children with other disabilities. This study utilizes extant statewide datasets to expand our knowledge of the subsequent educational outcomes of preschool children with developmental disabilities.

Method

Database Integration

Data from the Children’s Registry and Information System (CHRIS) database were integrated with Florida Department of Education public school records. Preschool disability status was obtained from CHRIS. CHRIS is a statewide database developed at the University of Miami in 1990 in response to the need to track children who receive services under IDEA, Part B. The CHRIS database contains referral, screening, evaluation, and eligibility information for preschool children throughout Florida. The data contained in CHRIS provide the Florida Department of Education with a means of documenting Child Find efforts to locate, evaluate, and provide necessary services to at-risk preschool-aged children. Outcome disability status was obtained from the Florida Department of Education public school record database. This database contains educational information (including primary exceptionality) for all children attending a Florida public school.

Database integration was accomplished using automated data linkage techniques whereby a child’s unique record was identified in each database and joined across datasets to establish one record. This data linkage method was based on previously established techniques (Boussy & Scott, 1993; Newcombe, 1988; Redden, Mulvihill, Wallander, & Hovinga, 2000). Records were linked based on an exact match of a child’s last name, first name, gender, and date of birth. If any of the matching variables differed, the pair was considered a non-match and was not included in the linked sample. All identifying information was removed immediately following the automated data linkage process and prior to data analysis to maintain confidentiality.

Diagnostic Criteria

Preschool disability status was defined as the primary exceptionality listed in the CHRIS database. Outcome disability status was defined as the primary exceptionality listed in the Florida public school record database. Primary exceptionality determination at both time points was based on the criteria specified in the Florida Statutes and State Board of Education Rules (2001). Criteria for eligibility vary by disability but typically involve the review of standardized assessments and other information (e.g., parent report or observations). All eligibility determinations were made at an eligibility staffing meeting and were based on Florida Statute.

Sample

The sample consisted of 3,608 children (2,513 males). The racial/ethnic distribution of the children was 59% White, 27% Black, 12% Hispanic, and 2% Other. The children were identified with one of the following developmental disabilities as a preschooler: autism (AT), developmental delay (DD), emotional handicap or severe emotional disturbance (EH/SED), educable mental handicap (EMH), speech and/or language impairment (SI/LI), specific learning disability (SLD), trainable mental handicap or profound mental handicap (TMH/PMH). All children were between the ages of 2 years, 6 months and 5 years at preschool diagnosis (average age 3 years, 11 months).

The children also attended fourth grade at a Florida public school. Outcome disability classification options were identical to those for preschool children with the exception of DD. Per Florida law, to remain eligible for special education services, all children with a DD classification must be reclassified with a
traditional disability category by the age of 6 years (Florida Statutes, 2001). Preschool children with all other disability classifications studied could maintain the same classification in elementary school. At outcome, some children had primary exceptionality classifications that were not included in the preschool sample. These disabilities included orthopedically impaired, deaf or hard of hearing, visually impaired, gifted, hospital/homebound, traumatic brain injured, and other health impaired and were considered “Other” for analysis purposes.

Results

Overall results are presented in Table 1. Results which follow represent a prospective look at outcomes for preschoolers with developmental disabilities. It is also possible to examine the results retrospectively, looking from outcome back to preschool. These results will not be discussed but can be interpreted from Table 1.

Sixty-six percent of children with a preschool history of developmental disability were identified with a disability in fourth grade. The percentage of children with a disability at both the preschool and fourth grade time points varied across preschool disability categories: 54% for SI/LI, 77% for DD, 84% for EH/SED, 85% for SLD, 93% for EMH, 95% for TMH/PMH, and 96% for AT.

The distribution of outcome disability classifications by preschool disability classification are displayed in Figure 1. Children without an identified disability at outcome were not included in this figure to improve visual clarity. Therefore, the denominator for the percentages provided in the figure and referenced below was the number of children with a disability in preschool who also had a disability at outcome. The highest rates of consistency of classification were identified for children with AT. Eighty-seven percent of children identified with AT in preschool were also classified as AT in fourth grade. Consistency of classification rates for the other disabilities studied were 70% for SLD, 69% for EH/SED, 64% for TMH/PMH, 54% for EMH, and 40% for SI/LI. In Florida, DD is not available as a disability classification for children over the age of 5, and therefore, children with a preschool diagnosis of DD could not maintain the same disability classification at outcome.

The nature of changes in classification from preschool to fourth grade outcome are presented in Figure 1. Preschool children with DD, SI/LI, and EMH were the most likely to have been reclassified with another disability. For preschool children with DD who had a disability at outcome, SLD (35%) and EMH (20%) were the most common outcome classifications. Over one-third (34%) of preschool children with SI/LI who had a disability at outcome were reclassified as SLD. Preschool children with EMH who had a disability at outcome were most commonly reclassified as TMH/PMH (16%) or SLD (15%).

### TABLE 1

Preschool disability classification by fourth grade disability classification (number of children)

<table>
<thead>
<tr>
<th>Preschool Disability</th>
<th>SI/LI</th>
<th>SLD</th>
<th>EMH</th>
<th>EH/SED</th>
<th>TMH/PMH</th>
<th>AT</th>
<th>Other</th>
<th>None</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI/LI</td>
<td>437</td>
<td>371</td>
<td>46</td>
<td>82</td>
<td>9</td>
<td>18</td>
<td>134</td>
<td>948</td>
<td>2,045</td>
</tr>
<tr>
<td>SLD</td>
<td>12</td>
<td>132</td>
<td>12</td>
<td>16</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>34</td>
<td>226</td>
</tr>
<tr>
<td>EMH</td>
<td>5</td>
<td>24</td>
<td>89</td>
<td>5</td>
<td>26</td>
<td>8</td>
<td>7</td>
<td>12</td>
<td>176</td>
</tr>
<tr>
<td>EH/SED</td>
<td>3</td>
<td>17</td>
<td>0</td>
<td>66</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>18</td>
<td>114</td>
</tr>
<tr>
<td>TMH/PMH</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>0</td>
<td>60</td>
<td>14</td>
<td>7</td>
<td>5</td>
<td>99</td>
</tr>
<tr>
<td>AT</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>81</td>
<td>2</td>
<td>4</td>
<td>98</td>
</tr>
<tr>
<td>DD</td>
<td>83</td>
<td>233</td>
<td>133</td>
<td>69</td>
<td>36</td>
<td>48</td>
<td>52</td>
<td>196</td>
<td>850</td>
</tr>
<tr>
<td>Total</td>
<td>542</td>
<td>781</td>
<td>294</td>
<td>238</td>
<td>141</td>
<td>179</td>
<td>216</td>
<td>1217</td>
<td>3,608</td>
</tr>
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</table>
Figure 1. Distribution of outcome disabilities by preschool disability classification. For visual clarity, only children with an outcome disability are included in the pie charts. Children identified with a disability in preschool who were not identified with a disability in 4th grade are not included in this figure. AT = autism, SLD = specific learning disability, EH/SED = emotional handicap/severe emotional disturbance, TMH/PMH = trainable mental handicap/profound mental handicap, EMH = educable mental handicap, SI/LI = speech and/or language impairment, DD = developmental delay.
Discussion

The use of extant datasets enabled the longitudinal tracking of over 3,600 children with a preschool history of developmental disability. Results of the study concur with existing research in DD and SI/LI and expand our understanding of the long-term special education outcomes of children with AT, EH/SED, EMH, SLD, and TMH/PMH.

Early identification efforts are, for the most part, identifying children who will continue to meet criteria for special education services. The majority of children identified with a disability in preschool were also identified with a disability at outcome. With the exception of preschool children with SI/LI, over three-fourths of preschool children with a disability continued to have a disability at outcome. The greatest percentages were seen for the more severe disabilities, AT (96%) and TMH/PMH (95%); however, the rate for EMH (93%) was also high. Although the reason some children with a disability at preschool were not identified with a disability at outcome cannot be identified in this study, the potential role of early intervention efforts should be the focus of future research.

Although the majority of children continued to meet criteria for special education services, specific disability classifications often changed. Consistency of classification varied quite a bit across preschool disability categories.

DD is unique in that preschool children identified as DD were not able to maintain that classification at outcome. Per Florida law, all children with a preschool diagnosis of DD who continued in special education were reclassified with a traditional disability by 4th grade. The majority (77%) of children identified with DD in preschool remained in special education at outcome. The most common outcome disability classifications for preschool children with DD were SLD (35%), EMH (20%), and SI/LI (13%). These findings are consistent with previous research (Bernheimer et al., 1993; Dale et al., 2005; Delgado et al., 2006; Keogh et al., 1996; Mills et al., 1995).

Preschool classifications of SI/LI and EMH were associated with the greatest inconsistencies in disability classification at outcome. Children identified with SI/LI as preschoolers showed the lowest rates of continued special education in fourth grade (54%). Of those children identified with SI/LI in preschool who had a disability at outcome, 40% maintained the SI/LI classification and 34% were classified as SLD at outcome. The change in classification from SI/LI to SLD is consistent with previous research indicating that many children with SI/LI in preschool or kindergarten demonstrate learning and/or reading disabilities at later ages (Catts, 1993; Stothard et al., 1998). Preschool speech and language impairments have also been associated with later behavior problems and mild mental retardation (Aram et al., 1984; Beitchman et al., 1996a; Silva et al., 1987). These associations were identified in the present study with 7% of children with SI/LI in preschool who had a disability at outcome identified with EH/SED and 4% identified with EMH at outcome.

Interestingly, preschool children with EMH had one of the highest rates of continued special education in fourth grade (93%); however, only a little over half of the children who had a disability at outcome maintained the EMH classification. The remaining children were reclassified as TMH/PMH (16%), SLD (15%), AT (5%), Other (4%), EH/SED (3%), and SI/LI (3%). Although these children were identified early, changes in classification were common. Additional research is required to more fully understand the nature of the deficits of preschool children identified with EMH and the reasons for reclassification. Such research would inform and potentially improve early identification practices for EMH.

For the remainder of the disabilities studied, consistency between preschool and outcome classifications was quite high, 64% for TMH/PMH, 69% for EH/SED, 70% for SLD, and 87% for AT. The high consistency in classification for children with AT is not surprising as expression of autism symptoms is considered to be very stable (Eaves & Ho, 1996).

Although this study provides a foundation from which to build, it is important that future work examine changes in classification status in more detail to better determine which children will leave special education and which will stay as well as to determine the factors that result in changes in disability classifications.
Although the use of large, extant databases enables the tracking of large numbers of children, this method of research lacks important detail. Primary exceptionality information was available, but other information that undoubtedly plays a key role in outcomes for children with disabilities was unavailable. Additional research is needed to examine other factors important to disability outcome such as severity of impairment, exact nature of the impairment, IQ, secondary impairments, and the wide range of parent, family, and child factors that could influence child outcomes (Beitchman et al., 1996b; Catts, 1993; Eaves & Ho, 1996; O’Brien, 2001).

A better understanding of the future disabilities that children are likely to be assigned has numerous benefits. This information can assist school systems with planning and managing resources in order to provide services to these children. It can also inform early identification practices, prognostic accuracy, and the nature of the interventions provided to these children, further improving outcomes. In addition, such information can assist clinicians in making realistic plans, anticipating probable or possible difficulties, developing balanced expectations, and relaying information to parents.

References


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