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Review article

Use of activity schedule to promote independent performance of individuals with autism and other intellectual disabilities: A review

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ABSTRACT

A literature review was conducted on the effectiveness of activity schedules. Twenty three studies that a) were peer-reviewed, b) were experimental, c) implemented activity schedule as a primary intervention, d) incorporated multiple activities, and e) aimed to teach learners to self-manage individual schedules were included in the review. The results demonstrated the effectiveness of activity schedules for promoting independence and self-management skills for a broad range of individuals with intellectual disabilities. An increase in engagement and on-task behavior was the most frequently cited outcome, followed by independent task initiation or transition and self-scheduling. Failure to include social validity measures and caregivers as interventionists were discussed. A corpus of the reviewed studies supports applications of activity schedule in school and (group) home settings.

Contents

1. Introduction

Promoting independent performance of individuals with intellectual disabilities is one of the main themes in educational as well as vocational settings. Independent functioning and reduction of dependency on supervising adults is essential for

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the successful inclusion of students with disabilities (Servatius, Fellows, & Kelly, 1992). In early childhood education settings, children's independent performance might result in increased instructional time, efficient and effective learning, increased opportunities for peer interaction, and decreased teacher supervision (Dunlap, Dunlap, Koegel, & Koegel, 1991; Miles, Cole, Jenkins, & Dale, 1998; Schmit, Alper, Raschke, & Ryndak, 2000). In a vocational setting, the ability to perform job tasks in the absence of supervising personnel increases the chance for people with disabilities to secure employment (Wehmeyer, Agran, & Hughes, 1998).

Unfortunately, individuals with intellectual disabilities may learn to depend on caregivers, teachers, and supervising adults to initiate a task or activity (Copeland & Hughes, 2000). They may fail to respond to the natural cues that prompt them to perform a task and instead rely on external cues. Such external cues are typically provided through verbal instructions, modeling, and gestures from adults. Of these adult-delivered prompts, verbal cues are most difficult to fade, thereby impeding independent performance of learners. Prompt dependency is a concern because many intervention packages rely heavily on adults' cues when instructing students with disabilities (MacDuff, Krantz, & McClannahan, 1993), thus running the risk of failing students to respond to natural stimuli. Reliance on adult-directed, external cues needs to be minimized in instruction, if individuals with intellectual disabilities are to function in less restrictive environments (Mechling & Gast, 1997).

Another issue reported among individual with disabilities, children with autism spectrum disorder (ASD) in particular, is procedural learning. Mostofsky, Goldberg, Landa, and Denckla (2000) found that the ability to learn sequential tasks is impaired in high-functioning individuals with ASD. Although many children with ASD demonstrate cognitive strengths in rote memory and nonverbal tasks, they may have difficulty performing a complex task that involves multiple steps. In addition, children with autism have been reported to exhibit problems in independent transitioning between activities (Clarke, Dunlap, & Vaughn, 1999). They may get fixated on one activity and be unwilling to transition. Problems in transitions may be manifested by aggressive, noncompliant, and self-injurious behaviors.

One instructional strategy to promote independent behavior and curtail prompt dependency is *activity schedule*. McClannahan and Krantz (1999) defined activity schedule as a visual support strategy that uses visual cues such as photographs and written words and teaches a learner to follow a sequence of tasks or activities independently. A potential benefit of activity schedule is that stimulus control can be transferred from a supervising adult to a picture (Copeland & Hughes, 2000). Once individuals with disabilities learn to respond to picture cues, picture cues can guide their behavior in the absence of a supervisor. Supervising adults do not need to repeat verbal directions or provide physical guidance, thereby avoiding the issue of prompt dependency. Researchers have investigated the use of multiple picture prompts as a way to teach a sequence of behaviors, and found that people with disabilities can learn to use picture prompts in order to perform not just a simple action but also a complex behavior chain.

There have been three activity schedule related review studies. Stromer, Kimball, Kinney, and Taylor (2006) provided a descriptive summary of activity schedule studies with and without multimedia computer supports for children with autism. Bopp, Brown, and Mirenda (2004) summarized the research on visual schedules (i.e., activity schedules) and discussed the role of speech-language pathologists in the delivery of positive behavior support (PBS) for individuals with developmental disabilities. Banda and Grimmett (2008) conducted the most comprehensive review, focusing on the effectiveness of activity schedules on individuals with autism spectrum disorder. There is no theoretical ground, however, to limit the use of activity schedules to individuals with this diagnostic category. Indeed, activity schedule may be a useful tool beyond its popular application for any individual who is in need of greater independence. The present study aimed to conduct a comprehensive review on activity schedule for individuals with autism and other developmental disabilities in an attempt to summarize the outcomes of the existing research. More specifically, the purpose of the present study was to derive implications on: a) populations for whom activity schedules could be effective (e.g., age, diagnosis, intellectual functioning), b) symbol types, activities, and settings that could be incorporated into the schedule, and c) major behavior changes that may reasonably be expected as a result of activity schedule intervention.

2. Method

A literature search was conducted using *PsycInfo* and *Google Scholar*. The search key words included *activity schedule, visual schedule,* and *picture schedule*. In addition, an ancestral search from selected studies was conducted.

To be included in the present study, publications had to: a) be from peer-reviewed journals, b) be experimental studies, c) implement activity schedule as a primary intervention strategy alone or in combination with other instructional strategies such as video modeling (e.g., Dauphin, Kinney, & Stromer, 2004) and correspondence training (e.g., Morrison, Sainato, Benchaaban, & Endo, 2002), d) use a schedule to represent multiple activities (studies that used multiple picture cues to represent tasks within a single activity, such as cooking, were excluded), e) aim to teach learners to self-manage individual schedules (studies were not included, if pictures were merely presented to learners as a means to increase behavior compliance (e.g., Dettmer, Simpson, Myles, & Ganz, 2000), and f) be studies whose participants were unfamiliar with activity schedules at the beginning of the interventions [which excluded studies such as Krantz and McClannahan (1998) and Miguel and Yang (2009)].

Twenty three studies that met the above criteria were analyzed independently by the two authors with the following 11 categories, which created 253 cells: age, number of participants, diagnosis, IQ, symbol, setting, activity, behavior change, generalization, maintenance, and social validity (Table 1). The discrepancies were discussed and corrected to ensure the accuracy of the results.

Table 1
Summary of results.

	Age (year)	*N*	Diagnosis	IQ	Symbol	Setting	Activities	Behavior change	G	S V	M
Anderson et al., 1997	22/21/37	3	MR	moderate, severe, severe	L,P	group home	various	+ engagement, self-scehduling			
Bambara and Ager, 1992	31/43/57	3	DD		W,L	home	leisure or play	+ engagement, self-scheduling - disruptive behavior			
Betz, Higbee, and Reagon, 2008	4/5	6	A		P	school	leisure or play	+ engagement, self-scheduling	V		V
Bevill et al., 2001	4/5	4	2DD/A/lg	mild ($n = 1$)	P	school	leisure play	+ engagement, self-scehduling - prompt			
Browder and Minarovic, 2000	27/30/31	3	MR	mild, moderate, mild	W	job site	vocational tasks	+ task initiation		V	
Bryan and Gast, 2000	7-8	4	A		L	school	academic	+ on-task, % of steps completed	V	V	
Carson, Gast, and Ayres, 2008	18/20/20	3	3MR(one had ADHD)	2moderate, mild	P	school/job site	vocational tasks	+ independent transition	V	V	
Cihak, 2011	13/11/12/13	4	A		P	school	various	+ transition			
Clarke et al., 1999	10	1	A	average	W,L	home	self-help	+ engagement - disruptive behavior, time completing routine			
Dauphin et al., 2004	3	1	A&ADHD		W,P	home	leisrue or play	+ on-task, self-scheduling			
Dooley et al., 2001	3	1	A		L	school	various	+ transitions - disruptive behavior			
Flannery and Horner, 1994	17	1	A	moderate	W	school	academic	+ correct response - disruptive behavior			
Irvine, Singer, Erickson, 0and Stahlberg, 1992	15/16/17/18	4	2 Down, 2 no specific	moderate, mild, moderate, moderate	L	school/home	self-help	+ task initiation	V		
Krantz, MacDuff, and McClannahan (1993)	6/7/8	3	A		P	home	various	+ engagement, social initiations - disruptive behavior			V
MacDuff et al., 1993	9/9/11/14	4	A		P	group home	various	+ engagement	V		
Machalicek et al., 2009	6/7/12	3	A		P	school	leisure or play	+ engagement - disruptive behavior			
Martin et al., 1987	16-19	5	MR	moderate	W,L	school	vocational tasks	+ transition			
Massey and Wheeler, 2000	4	1	A		L,P	school	various	+ engagement - disruptive behavior, prompt	V	V	V
Morrison et al., 2002	3/5/5/4	4	A		P	school	leisure or play	+ engagement, self-scheduling - prompt		V	
Newman et al., 1995	14/16/17	3	A	mild	W	other	various	+ transition			V
Spriggs et al., 2007	13/13/12/13	4	Williams, ADHD, 2 no specific	moderate	L	school	academic	+ engagement	V	V	
Watanabe and Sturmey, 2003	22/40/30	3	A		W	other	various	+ engagement, self-scheduling - disruptive behavior			V
Wheeler and Carter, 1998	6	1	A		P	school	various	+ engagement - disruptive behavior	V	V	V
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MR, mental retardation; DD, developmental disability; A, autism; lg, language delay; AD, articulation disorder.
L, line drawing; P, photographs; W, words.
G, generalization; SV, social validity; M, maintenance.

3. Results

The two authors yielded reliability of 95.7%. All results were reconfirmed and described as following.

The corpus of the literature search based on the criteria above yielded 23 studies with 69 participants. Table 2 lists participant characteristics by age, diagnosis, and intellectual functioning by IQ. Decision rules were as following: (A) When participants' age was not specified, but an age range was given, the average of the age range was used for age category; (B) Down syndrome and Williams' syndrome were included in the "Others" category instead of Cognitive Impairment; (C) Asperger's syndrome was included in the "Autism" category; (D) One participant with dual diagnoses, autism and attention deficit hyperactivity disorders (ADHD), was included in the Autism category; (E) Intellectual functioning was determined only based on the reported IQ classification from the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) and scores from autism rating scales (e.g., Gilliam Autism Rating Scale, GARS; Childhood Autism Rating Scale, CARS) were not considered; (F) If there were inconsistent descriptions on the level of intellectual functioning within the same article or only a range was given, a milder functioning level was chosen.

Table 3 summarizes types of symbols, settings, and activities used in activity schedule studies. *Symbols* refer to types of symbols used to represent activities. *Settings* indicate where the studies took place. *Activities* show types of activities that the participants engaged in while using an activity schedule. Multiple entries were allowed when studies used more than one teaching format. If "pictures" were used to represent activities, there were considered as "line-drawings" instead of

Table 2
Participant characteristics.

	$n = 69$ participants
Age of participants	
Preschool (0–5 y)	17 (24.6%)
Elementary (6–11 y)	15 (21.7%)
Middle school (12–17 y)	21 (30.4%)
Adults (18 y+)	16 (23.2%)
Diagnosis	
Cognitive impairment	14 (20.3%)
Autism	41 (59.4%)
Developmental disability	5 (7.2%)
Others	5 (7.2%)
Not specified	4 (5.8%)
Intellectual functioning	
Average (IQ above 70)	1 (1.4%)
Mild (IQ 50–69)	8 (11.6%)
Moderate (IQ 35–49)	17 (24.6%)
Severe (IQ 20–34)	2 (2.9%)
Not specified	41 (59.4%)

*Numerals represet the number of participants.

Table 3
Teaching formats.

	$n = 23$ studies
Symbols	
Objects	0 (0%)
Photographs	12 (52.2%)
Lind drawings	9 (39.1%)
Words	8 (34.8%)
Setting	
Home	4 (17.4%)
Group home	2 (8.7%)
School	14 (60.9%)
Job site	1 (4.3%)
Other (after school programs)	2 (8.7%)
Activities	
Academic	3 (13.0%)
Leisure or play	6 (26.1%)
Self-help	2 (8.7%)
Vocational tasks	3 (13.0%)
Various (more than two above activities)	9 (39.1%)

*Numerals represent the number of studies. Multiple entries were allowed, when studies used more than one teaching format.

Table 4
Behavior change.

	n = 23 studies
Engagement, on-task behavior	15 (65.2%)
Disruptive, self-injurious behavior	8 (34.8%)
Task initation or transition	7 (30.4%)
Learning to self-schedule	7 (30.4%)

*The number of studies that exmined each behavior outcome. Multiple entries were allowed, when studies reported more than one outcome measures.

"photographs." Activities from the same activity category (e.g., vacuuming, washing dishes, wiping table) were considered as one type of activities rather than "various" activities.

Table 4 describes major behavior outcomes of the activity schedule studies. Multiple entries from the same study were allowed, as most studies reported several outcomes.

4. Discussion

4.1. Participant characteristics

The present study revealed that activity schedules have successfully been applied with a variety of individuals. The participants ranged from preschool students (17 participants; 24.6%) in an early intervention program, to middle school students (21 participants; 30.4%) learning vocational skills, and to adults (16 participants; 23.2%) living in a group home. Although more than half of the participants had a diagnosis of autism or related disorder (41 participants; 59.4%), autism was not the only category to which activity schedule has shown successful applications. That is, representing a series of activities in a visual format can promote independent performance of not only individuals with autism diagnosis but also with other types of intellectual disabilities (e.g., intellectual impairment, Down syndrome). Notably, two studies (Anderson, Sherman, Sheldon, & McAdam, 1997; Wheeler & Carter, 1998) taught children and adults with severe intellectual disabilities to follow schedule. Furthermore, Anderson et al. (1997) taught adults living in a group home to choose and engage in recreational activities independently. The implication is that activity schedules can be a useful tool in promoting independence and, possibly, self-determination of individuals with significant cognitive challenges. Activity schedule does not limit its use to a specific age range, diagnosis, or intellectual functioning, but can be adapted to accommodate a variety of types of individuals.

4.2. Teaching formats

Teaching formats and scheduled activities were as diverse as characteristics of the participants. Empirical studies on activity schedule have used three types of symbols to represent activities: photographs, line drawings, and written words. Interestingly, no study used objects to represent activities. This absence may be explained in respect of a hierarchy of symbols (Mirenda & Locke, 1989). Generally speaking, written words have the weakest association with their referents – an object or idea to which a symbol, such as a written word, refers – among two-dimensional symbols (i.e., photographs, line drawing, and written words). On the other hand, research on a hierarchy of symbols implies that object symbols (e.g., *shoes* referring to the meaning of *going outside*) are the easiest to understand. The reason that no activity schedule study used object symbols may be due to researchers' presumption that mastery of activity schedule requires a minimum level of symbol understanding. In other words, individuals may need to have cognitive ability to understand the association between a (two-dimensional) symbol and its referent in order to learn activity schedule.

School was the most popular site in which the studies on activity schedule were conducted (14 studies; 60.9%). Cumulative results imply that activity schedule may be a useful instructional tactic to promote student independence in a school setting. Bryan and Gast (2000), for example, taught elementary school students in a resource room to rotate between four literacy centers independently using an activity schedule. Activity schedules were also examined in group homes as well as participants' own homes, and they have been shown to increase the level of engagement and independence. Activities schedule can improve the quality of lives of individuals with disabilities, given the state that many group home residents with intellectual disabilities have a low level of engagement and participation in daily activities (Anderson et al., 1997), or that children may struggle to get through daily routines (e.g., changing clothes, brushing teeth) in the home (e.g., Clarke et al., 1999).

The review of literature also found that a wide range of activities have been incorporated into the schedule. When activity schedules were used in school, activities tended to be play choices (6 studies; 26.1%) for preschool children, academic tasks (3 studies; 13.0%) such as language arts and spelling for school-age children, and vocational tasks (3 studies; 13.0%) for older students. Activity schedules, when used in a group home, can promote independent performance of adults with intellectual disabilities on recreational activities and self-help tasks (2 studies; 8.7%) (e.g., housekeeping, personal care). Furthermore, many studies incorporated activities for the entire day or school day, which consisted of activities from more than one category (9 studies; 39.1%) (e.g., from work time to leisure activity to lunch). One important caveat is that these studies did not use activity schedules to teach *how to do* activities but used them to help individuals with disabilities *transition between*

activities independently. In other words, the participants knew how to conduct activities prior to the beginning of the studies but needed help with transitioning.

4.3. Behavior change

Four major categories of behavior outcomes have been reported: a) an increase in the rate of engagement or on-task behavior (15 studies; 65.2%), b) a decrease in disruptive or self-injurious behavior (8 studies; 34.8%), c) learning to self-schedule (7 studies; 30.4%), and d) independent task initiations and transitions (7 studies; 30.4%). The most frequently examined behavior change was *engagement* and *on-task behavior*. Engagement and on-task behavior are similarly defined in the activity schedule literature, which refer to the state that a participant is engaged in a planned activity or task as described on the schedule. An increased rate of engagement in targeted activities may be of particular importance, because research suggests that children's level of engagement is correlated with development in communication and social skills as well as reduction of stereotypic behavior (Libby, Powell, Messer, & Jordan, 1997; Thorp, Stahmer, & Schreibman, 1995). One interesting caveat from Bryan and Gast (2000), Martin, Elias-Burger, and Mithaug (1987) and Spriggs, Gast, and Ayres (2007), however, was that their participants' rates of on-task behavior dropped to the baseline (pre-treatment) level, when activity schedules were removed. Reinstitution of activity schedules immediately raised performance back to the post-treatment level. In other words, the participants were able to maintain on-task behavior only with the presence of an activity schedule.

A decrease in self-injurious and disruptive behavior may be a collateral effect of activity schedule. Five out of seven studies that examined a change in self-injurious or disruptive behavior reported a reduction (e.g., Machalicek et al., 2009), whereas two studies reported either no change or an increase (e.g., Anderson et al., 1997). Although the results were mixed, one could conclude that the more time spent on on-task behavior is likely to lead to less time engaging in maladaptive behavior.

The effects of activity schedule on independent task initiations and smooth transitions between activities were reported in seven studies. Issues with transitions, or resistance to environmental changes, are well known among individuals with autism spectrum disorder (American Psychiatric Association, 2000). The results indicated that activity schedule may be an effective tool to support smooth transitions. A 3-year-old boy with a diagnosis of PDD in Dooley, Wilczenski, and Torem (2001), for instance, exhibited disruptive behaviors in his preschool class. Functional assessment by the first author showed that his tantrums occurred during transition times. His disruptive behaviors showed immediate reduction and his compliance increased, after the child was taught to use a schedule for activity transitions.

The authors of seven studies successfully taught the participants to make their own schedules (e.g., Watanabe & Sturmey, 2003). The participants' tasks in those studies involved not only following a schedule but also creating one for themselves by making activity choices. Teaching self-scheduling is important in respect of promoting autonomy and self-determination of individuals with intellectual disabilities. Merely following a schedule made by another person is a form of behavioral compliance, whereas true independence is achieved when individuals with intellectual disabilities can plan and follow activities on their own. Another benefit of teaching self-scheduling is that incorporating choices may increase the effectiveness of an activity schedule. Watanabe and Sturmey (2003), indeed, examined the effects of choice-making opportunities when creating a schedule. They found that providing choices increased the participants' engagement in various activities in an adult service program.

4.4. Reduction of prompt dependency

Another important implication, although not mentioned explicitly in most studies, is that many participants learned to use activity schedules in the absence of supervisors. Supervising adults typically begin with providing physical guidance for learners to follow schedules, but the prompts are gradually faded so that individuals with disabilities learn to manage activity schedules on their own. Self-managing an activity schedule means that an individual is able to engage in a sequence of activities as depicted on the schedule, go back to the schedule when the previous activity is completed, and move onto the next activity, all without supervision. Bevill, Gast, Maguire, and Vail (2001) and Morrison et al. (2002), for example, reported that preschool children with autism and other developmental disabilities initially required physical prompts to master schedule-following but decreased the amount of prompts over time.

4.5. Maintenance and generalization

Only six studies (26.1%) examined maintenance and eight studies (39.1%) examined generalization of schedule-following behavior. When generalization was examined, however, the participants demonstrated the ability to maintain on-task behavior with new activities or in novel settings without requiring additional training. For example, the students in Spriggs et al. (2007) maintained the same level of on-task and on-schedule behavior (engagement in academic tasks) in novel settings (at a different time of the day and in a different classroom) and activities (a different set of academic tasks). The results from a small number of studies indicate that individuals who learn to use an activity schedule may apply it in different situations.

4.6. Social validity

Whether supervising adults think that the treatment is effective, valuable, and easy to implement is an important measure of success (Baer & Schwartz, 1991). In activity schedule literature, socially valid intervention means that supervising adults – caregivers, teachers in classroom, and job coaches in vocational settings – need to believe that activity schedules promote independent performance of learners. Seven of the 23 studies (30.4%) examined social validity of activity schedules and all reported positive results. Some of the reported outcomes included that classroom teachers noticed positive behavior change and that employers perceived activity schedules to decrease the amount of supervision. Activity schedule interventions appear to be well accepted by practitioners.

5. Implications for future research

The present study also drew several implications for future research. Given the significance of user (e.g., teachers, parents) acceptance in determining the effectiveness of activity schedules (as well as all other instructional tools), future studies should involve a measure of social validity. Only 30.4% of the previous studies reported social validity (feasibility and acceptability) of their interventions; however, inclusion of a social validity measure is requirement for quality studies. It is also important from a practical perspective, because evidence-based instructional strategies remain ineffective, unless practitioners perceive them as effective and useful.

In addition, most participants in the reviewed studies were taught to use an activity schedule by researchers, teachers in school, or supervising adults in a group home. In fact, Clarke et al. (1999) was the only study in which schedule-following was taught by a parent instead of researchers or teachers. In the future, it will be interesting to see if activity schedules are equally effective for increasing engagement and reducing challenging behavior in a home environment when taught by caregivers. This question is important in order to bridge a gap between research and practice.

Finally, the effects of incorporating technology may be worth investigating further. Davies, Stock, and Wehmeyer (2002), for instance, tested a palmtop technology device with individuals with intellectual disabilities in a vocational setting. The use of the device resulted in improvement in task accuracy and reduction in the amount of dependency on others. With fast advancement in technology innovation in 21st century, creating a schedule on a high-tech device like iPhone and iPad may enhance acceptance of individuals with disabilities in their communities and promote their self-management skills.

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References[1]

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*. Washington, DC: American Psychiatric Association.

*Anderson, M. D., Sherman, J. A., Sheldon, J. B., & McAdam, D. (1997). Picture activity schedules and engagement of adults with mental retardation in a group home. *Research in Developmental Disabilities, 18*, 231–250.

Baer, D. M., & Schwartz, I. S. (1991). If reliance on epidemiology were to become epidemic, we would need to assess its social validity. *Journal of Applied Behavior Analysis, 24*(2), 231–234.

*Bambara, L. M., & Ager, C. (1992). Using self-scheduling to promote self-directed leisure activity in home and community settings. *Journal of the Association for Persons with Severe Handicaps, 17*, 67–76.

Banda, D. R., & Grimmett, E. (2008). Enhancing social and transition behaviors of persons with autism through activity schedules: A review. *Education and Training in Developmental Disabilities, 43*(3), 324–333.

*Betz, A., Higbee, T. S., & Reagon, K. A. (2008). Using joint activity schedules to promote peer engagement in preschoolers with autism. *Journal of Applied Behavior Analysis, 41*(2), 237–241.

*Bevill, A. R., Gast, D. L., Maguire, A. M., & Vail, C. O. (2001). Increasing engagement of preschoolers with disabilities through correspondence training and picture cues. *Journal of Early Intervention, 24*, 129–145.

Bopp, K. D., Brown, K. E., & Mirenda, P. (2004). Speech-language pathologists' roles in the delivery of positive behavior support for individuals with developmental disabilities. *American Journal of Speech-Language Pathology, 13*, 5–19.

*Browder, D. M., & Minarovic, T. (2000). Utilizing sight words in self-instruction training for employees with moderate mental retardation in competitive jobs. *Education and Training in Mental Retardation and Developmental Disabilities, 35*, 78–89.

*Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-functioning children with autism via picture activity schedules. *Journal of Autism and Developmental Disorders, 30*, 553–567.

*Carson, K. D., Gast, D. L., & Ayres, K. M. (2008). Effects of a photo activity schedule book on independent task changes by students with intellectual disabilities in community and school job sites. *European Journal of Special Needs Education, 23*(3), 269–279.

*Cihak, D. F. (2011). Comparing pictorial and video modeling activity schedules during transitions for students with autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*(1), 433–441.

*Clarke, S., Dunlap, G., & Vaughn, B. (1999). Family-centered, assessment-based intervention to improve behavior during an early morning routine. *Journal of Positive Behavior Interventions, 1*, 235–241.

Copeland, S. R, & Hughes, C. (2000). Acquisition of a picture prompt strategy to increase independent performance. *Education and Training in Mental Retardation and Developmental Disabilities, 35*, 294–305.

*Dauphin, M., Kinney, E. M., & Stromer, R. (2004). Using video-enhanced activity schedules and matrix training to teach sociodramatic play to a child with autism. *Journal of Positive Behavior Interventions, 6*, 238–250.

[1] References preceded by an asterisk (*) indicate the studies included in the review.

Davies, D. K., Stock, S. E., & Wehmeyer, M. L. (2002). Enhancing independent task performance for individuals with mental retardation through use of a handheld self-directed visual and audio prompting system. *Education and Training in Mental Retardation and Developmental Disabilities, 37*, 209–218.

Dettmer, S., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2000). The use of visual supports to facilitate transitions of students with autism. *Focus on Autism and Other Developmental Disabilities, 15*, 163–169.

*Dooley, P., Wilczenski, F. L., & Torem, C. (2001). Using an activity schedule to smooth school transitions. *Journal of Positive Behavior Interventions, 3*, 57–61.

Dunlap, L. K., Dunlap, G., Koegel, L. K., & Koegel, R. L. (1991). Using self-monitoring to increase independence. *Teaching Exceptional Children, 24*, 17–22.

*Flannery, K. B., & Horner, R. H. (1994). The relationship between predictability and problem behavior for students with severe disabilities. *Journal of Behavior Education, 4*, 157–176.

*Irvine, A. B., Singer, G. H., Erickson, A. M., & Stahlberg, D. (1992). A coordinated program to transfer self-management skills from school to home. *Education and Training in Mental Retardation, 27*, 241–254.

*Krantz, P. J., MacDuff, M. T., & McClannahan, L. E. (1993). Programming participation in family activities for children with autism: Parents' use of photographic activity schedules. *Journal of Applied Behavior Analysis, 26*, 137–138.

Krantz, P. J., & McClannahan, L. E. (1998). Social interaction skills for children with autism: A script-fading procedure for beginning readers. *Journal of Applied Behavior Analysis, 31*, 191–202.

Libby, S., Powell, S., Messer, D., & Jordan, R. (1997). Imitation of pretend play acts by children with autism and down syndrome. *Journal of Autism and Developmental Disorders, 27*, 365–381.

*MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to use photographic activity schedules: Maintenance and generalization of complex response chains. *Journal of Applied Behavior Analysis, 26*, 89–97.

*Machalicek, W., Shogren, K., Lang, R., Rispoli, M., O'Reilly, M. F., Franco, J. H., et al. (2009). Increasing play and decreasing the challenging behavior of children with autism during recess with activity schedules and task correspondence training. *Research in Autism Spectrum Disorders, 3*(2), 547–555.

*Martin, J. E., Elias-Burger, S., & Mithaug, D. E. (1987). Acquisition and maintenance of time-based task change sequence. *Education and Training in Mental Retardation, 22*, 250–255.

*Massey, N. G., & Wheeler, J. J. (2000). Acquisition and generalization of activity schedules and their effects on task engagement in a young child with autism in an inclusive pre-school classroom. *Education & Training in Mental Retardation & Developmental Disabilities, 35*, 326–335.

McClannahan, L. E., & Krantz, P. J. (1999). *Activity schedules for children with autism: Teaching independent behavior*. Bethesda, MD: Woodbine House.

Mechling, L. C., & Gast, D. L. (1997). Combination audio/visual self-prompting system for teaching chained tasks to students with intellectual disabilities. *Education and Training in Mental Retardation and Developmental Disabilities, 32*, 138–153.

Miguel, C. F., & Yang, H. G. (2009). Establishing derived textual control in activity schedules with children with autism. *Journal of Applied Behavior Analysis, 42*(3), 703–709.

Miles, P. E., Cole, K., Jenkins, J. R., & Dale, P. S. (1998). Effects of differing levels of inclusion on preschoolers with disabilities. *Exceptional Children, 65*, 79–90.

Mirenda, P., & Locke, P. (1989). A comparison of symbol transparency in nonspeaking persons with intellectual disabilities. *Journal of Speech and Hearing Disorders, 54*, 131–140.

*Morrison, R. S., Sainato, D. M., Benchaaban, D., & Endo, S. (2002). Increasing play skills of children with autism using activity schedules and correspondence training. *Journal of Early Intervention, 25*, 58–72.

Mostofsky, S. H., Goldberg, M. C., Landa, R. J., & Denckla, M. B. (2000). Evidence for a deficit in procedural learning in children and adolescents with autism: Implications for cerebellar contribu tion. *Journal of the International Neuropsychological Society, 6*, 752–759.

*Newman, B., Buffington, D. M., O'Grady, M. A., McDonald, M. E., Poulson, C. L., & Hemmes, N. S. (1995). Self-management of schedule following in three teenagers with autism. *Behavioral Disorders, 20*, 190–196.

Schmit, J., Alper, S., Raschke, D., & Ryndak, D. (2000). Effects of using a photographic cueing package during routine school transitions with a child who has autism. *Mental Retardation, 38*, 131–137.

Servatius, J. D., Fellows, M., & Kelly, D. (1992). Preparing leaders for inclusive schools. In R. A. Villa, J. S. Thousand, W. Stainback, & S. Stainback (Eds.), *Restructuring for caring and effective education* (pp. 267–283). Sydney: Paul H. Brookes.

*Spriggs, A. D., Gast, D. L., & Ayres, K. M. (2007). Using picture activity schedule books to increase on-schedule and on-task behaviors. *Education and Training in Developmental Disabilities, 42*, 209–223.

Stromer, R., Kimball, J. W., Kinney, E. M., & Taylor, B. A. (2006). Activity schedules, computer technology, and teaching children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 21*(1), 14–24.

Thorp, D. M., Stahmer, A. C., & Schreibman, L. (1995). Effects of sociodramatic play training on children with autism. *Journal of Autism and Developmental Disorders, 25*, 265–281.

*Watanabe, M., & Sturmey, P. (2003). The effect of choice-making opportunities during activity schedules on task engagement of adults with autism. *Journal of Autism and Developmental Disorders, 33*, 535–538.

Wehmeyer, M. L., Agran, M., & Hughes, C. (1998). *Teaching self-determination to students with disabilities: Basic skills for successful transition*. Baltimore: Paul H Brookes.

*Wheeler, J. J., & Carter, S. L. (1998). Using visual cues in the classroom for learners with autism as a method for promoting positive behavior. *C. Journal of Special Education, 21*, 64–73.