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

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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, Shacksnai, & 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, Manners, 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 (Messebov, 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 (Wehmeyer, Yeager, Bolding, Agran, & Hughes, 2003). Shimabukuro, Prater, Jenkins, and Edelen-Smith (1999) investigated the effects of self-monitoring on the academic performance 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 students learned the self-monitoring procedure (Shimabukuro et al., 1999).

Self-evaluation in the form of goal setting, and self-graphing the number of daily homework 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 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 organize 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 requested item when using a file box organizational 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 participation 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 eligibility can apply to students with other DSM-IV spectrum disorders including Asperger’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 general 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 affected 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 organizing his school materials. Due to a deficit in fluency, he did not finish work in the time allotted and was expected to complete it at a later time. He often put unfinished assign-
TABLE 1
Description of Participants

<table>
<thead>
<tr>
<th>Participants</th>
<th>Grade</th>
<th>Age</th>
<th>Autism Eligibility</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 months</td>
<td>Asperger Syndrome</td>
<td>5 hrs autism per day</td>
<td>Full Scale: 120 Verbal: 102 Perceptual Reasoning: 135</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 hrs gifted per wk</td>
<td></td>
<td>WJ-III** : Oral Expression: 108 Broad Reading: 114 Academic Skills: 122 Academic Knowledge: 110</td>
</tr>
<tr>
<td>Ben</td>
<td>fifth</td>
<td>10 years 3 months</td>
<td>Asperger Syndrome</td>
<td>2.5 hrs autism per day</td>
<td>Full Scale: 100 Verbal: 119 Perceptual Reasoning: 100</td>
<td></td>
</tr>
<tr>
<td>Jake</td>
<td>fourth</td>
<td>9 years 10 months</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></td>
<td></td>
<td></td>
<td></td>
<td>WJ-III** : Broad reading: 99 Basic reading skills: 110 Academic skills: 100 Academic fluency: 102</td>
</tr>
<tr>
<td>Patrick</td>
<td>fourth</td>
<td>9 years 11 months</td>
<td>Asperger Syndrome</td>
<td>5.5 hrs. autism per day</td>
<td>Full Scale: 86 Verbal: 110 Perceptual Reasoning: 84</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K-TEA***; Reading Decoding: 98 Reading Comprehension: 88</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 were divided by 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.
condition. 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, $M = 42.3s$ ($R = 40s-45s$) to $12.75s$ ($R = 10s-20s$); Ben, $M = 46.5s$ ($R=36s-57s$) 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-
dency 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

Figure 3. Number of seconds it took students to locate specific items.
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.

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