Use of Self-Modeling Static-Picture Prompts via a Handheld Computer to Facilitate Self-Monitoring in the General Education Classroom

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Abstract: This study was designed to evaluate the effects of a combined self-monitoring and static self-model prompts procedure on the academic engagement of three students with autism served in general education classrooms. The percentage of intervals engaged academically and the number of teacher prompts was analyzed in the context of a multiple probe across settings design with an embedded A-B-A-B. Results indicated that students all benefitted from use of the handheld computer depicting self-model static-picture prompts. Students also were able to successfully self-monitor and regulate their behavior in multiple settings. Results are discussed relative to the use of self-model prompts, handheld computer, and independence provided by self-monitoring.

If students with disabilities are to access the benefits available in general education settings, appropriate supports that maximize participation in general education classes must be provided (Hunt & Goetz, 1997). Task engagement was identified as an essential ingredient in programs for students with autism (National Research Council, 2001). One of the salient features often displayed by students with autism spectrum disorders is an absence of, or a poorly developed set of self-management skills, such as difficulty directing, controlling, inhibiting, or maintaining and generalizing behaviors required for adjustment both in and outside of the classroom without external support and structure from others (Adeon & Stella, 2001; Myles & Simpson, 2002; Ozonoff, Dawson, & McPartland, 2002; Tantam, 2003). Despite these difficulties, students with autism display significant strengths that when identified appropriately and reliably can lead to enhanced lifestyle outcomes. These strengths include rote memory, concrete thinking, and the ability to efficiently process visuospatial information (Quill, 1995). One method that has been demonstrated to be highly effective in teaching students with autism is the use of visual cues as a primary form of instruction (Mesibov & Shea, 1996). Visual cues can be represented in the form of individualized activity schedules comprised of photographs, pictures, and/or symbols.

Researchers have indicated increased academic and task engagement with the use of photographic activity schedules (Carson, Gast, & Ayres, 2008; Hall, McClannahan, & Krantz, 1995; Krantz, MacDuff, & McClannahan, 1993; MacDuff, Krantz, & McClannahan, 1993; Massey & Wheeler, 2000; Spriggs, Gast, & Ayres, 2007), cooperative group learning (Dugan, Kamps, Leonard, & Watkins, 1995; Kamps, Leonard, Potucek, & Garrison-Harrell, 1995), choral responding (Kamps, Dugan, Leonard, & Daoust, 1994), and self-monitoring (Shearer, 1996). In particular, self-management strategies have gained popularity as an alternative to teacher-managed contingency procedures for students with disabilities (Cole & Bambara, 2000; McDougall, 1998; Rock, 2005; Shapiro & Cole, 1994). Self-management strategies were implemented successfully for students with autism spectrum disorders (e.g., Callahan & Rademacher, 1999; Koegel, Koegel, & Carter, 1999; Koegel, Koegel, Hurley, & Frea, 1992; Odom et al., 2003; Wilkinson, 2005). In most studies, self-management programs typically
involved two or more instructional components containing (a) self-monitoring including self-assessment and self-recording, (b) self-evaluation including decision-making and goal setting, and (c) self-reinforcement for goal attainment.

An important benefit of self-management is the focus on skill building to teach students to be more independent, self-reliant, and responsible for their own classroom behavior. By learning self-management techniques, students can become more self-directed and less dependent on external control and continuous supervision. Further, by teaching students to engage in a positive behavior in place of an undesirable behavior, students can have concurrent benefits of improving academic performance. Self-management also provided students with an opportunity to participate in the development and implementation of their behavior management programs, an important consideration for high-functioning students with autism spectrum disorders (Myles & Simpson, 2003). Shifting the responsibility for managing behavior from teachers and other external sources is well suited for students with autism who value locus of control and structure (Klin & Volkmar, 2000). Self-management has been considered a pivotal skill that can help generalize adaptive behavior, promote autonomy, and produce broad behavioral improvements across various contexts for many children with autism spectrum disorders (Koegel, Harrower, & Koegel, 1999; Lee, Simpson, & Shogren, 2007). In addition, researchers have suggested that self-management can be useful in facilitating the inclusion of students with autism in the general education classroom (McDougall, 1998).

However, in spite of its potential usefulness and current trends in ensuring that students with disabilities have increased access to the general curriculum, there is a lack of research on the effects of self-management in students with autism who are being educated in general education classrooms (McDougall, 1998). Lee et al.’s (2007) meta-analysis regarding the effects of self-management for students with autism, more than half of the studies reviewed were conducted in school settings and none of the studies occurred in a general education classroom. Moreover, no studies used self-management methods to increase academic performance in general education classrooms. Accordingly, there is an obvious need for further research in these areas.

Lee et al. (2007) also noted that self-management intervention materials had included tangible, visual, token systems, and paper recording materials to successfully teach students with autism self-management skills. However, only four studies from 1992 through 2001 incorporated the use of tangibles or visual materials. Picture prompts have been used extensively for students with moderate and severe intellectual disabilities for task acquisition (e.g., Robinson-Wilson, 1977), generalization (e.g., Wacker, Berg, Berrie, & Swatta, 1985) and maintenance (e.g., Cuvo, Jacobi, & Sipko, 1981). Picture prompts also were used to teach students functional (e.g., Thinesen & Bryan, 1981), vocational (e.g., Sowers, Verdi, Bourbeau, & Sheehan, 1985; Wacker, & Berg, 1983), community (e.g., Cihak, Alberto, Taber-Doughty, & Gama, 2006) and domestic skills (e.g., Bates, Cuvo, Miner, & Korbeck, 2001; Sanders & Parr, 1989). However, much of the literature on picture prompts for students with autism have focused on schedules, transitioning, and helping students learn to transition independently between tasks (e.g, Bryan & Gast, 2000; MacDuff et al., 1993; Spriggs et al., 2007). Few studies have examined the use of picture prompts or visual materials to improve behavioral regulation in more academic environments for students with autism.

Adapting some of the successful features of picture activity schedules and self-management techniques to improve student independence and work completion, the current investigation focused on academic engagement in a general education setting. In general education settings there are several key behaviors to which students need to attend in order to be successful. Because of the complexity of multiple concurrent behavioral requirements in an academic setting (e.g. sitting quietly, reading, writing, following instructions), the current investigation incorporated the use of self-modeled picture-prompts, similar to those proposed by MacDuff et al. (1993).

The contemporary self-modeling literature has primarily focused on video self-modeling. Video self-modeling is a specific application of video modeling that allows the student to ob-
serve him or herself performing a behavior successfully (Dowrick, 1999). Some researchers have suggested the utility of a variation of video modeling called video prompting which involves the individual watching a video demonstration of a model performing specific steps of a skill or behavior (Cihak et al., 2006). Unlike video modeling, video prompting involves the student observing only separate steps of a task or behavior rather than watching the demonstration of the entire task. In addition, video prompting incorporates both continuous demonstrations of a behavioral sequence and static-pictures (individual frames of the video) which show close-up images (Alberto, Cihak, & Gama, 2005). Alberto et al. noted that static-pictures allow for a stationary focus of relevant features and the absence of attention diverting motions, which may benefit students who have difficulty maintaining task engagement.

While video self-modeling has proven effective in a variety of contexts, only two studies have specifically evaluated video modeling to improve task engagement (Coyle & Cole, 2004; Hagiwara & Myles, 1999). Coyle and Cole examined the effects of a video self-modeling and self-monitoring intervention program on the off-task classroom behavior of three students with autism. Students watched a video of themselves “working very well” while the teacher paired a picture communication card depicting “working” on a classroom task (p. 8). Hagiwara and Myles also used video modeling to target on-task behavior for one student with autism. The intervention incorporated video self-modeling with an interactive computer-based social story. The student read and listened to the social story and then watched a brief video of them performing on-task behaviors prior to entering the lunchroom and special education classroom. The results indicated the intervention had minimal impact on the student’s on-task performance. It may be possible that the student did not acquire adequately the information from the model through watching and attending to the model. While these previous results are mixed, they suggest a possible way for incorporating self-modeling into behavioral regulation interventions in the form of static picture prompts.

Cihak, Kessler, and Alberto (2007, 2008) pioneered the use of a handheld computer (e.g., personal digital assistant) to display self-modeled static-pictures to prompt students with severe disabilities to complete complex tasks and to transition independently from task-to-task and place-to-place. Because handheld computers have the capacity to display sequences of images, they provide a unique, unobtrusive means for displaying picture prompts to students. Further, since they are about the size of a large cell phone, students can take the handheld computer with them anywhere, which permits a student to view their models as often as needed to facilitate learning.

The purpose of this study was to examine the use of a handheld computer to deliver self-model static-picture prompts to facilitate the acquisition of self-monitoring for students with high-functioning autism in a general education classroom. Specifically, what were the effects self-modeling static-picture prompts via a handheld computer to increase task engagement and reduce teacher prompts for students with high-functioning autism in the general education classroom? In addition, what was the social validity of using a handheld computer to facilitate self-monitoring in the general education classroom?

Method

Participants and Setting

Three middle-school students diagnosed with high-functioning autism participated in this study. Students were diagnosed by their physician. All students demonstrated (a) difficulties initiating and attending to task, (b) participated in all general education classes, (c) no hearing or vision impairments that impeded instruction, (d) agreeing participate in the study, and (e) parental permission.

Adam was an 11-year-old student in the sixth grade. The administration of the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988) placed Adam within the high-functioning autistic range. The Wechsler Intelligence Scale for Children (WISC-III; Wechsler, 1991) indicated a full-scale IQ equivalence score of 108. Jordan also was a 11-years-old in the sixth grade. The Gilliam Autism Rating Scale (GARS; Gilliam,
(1995) placed Jordan within the high-functioning autistic range and the WISC-III (Wechsler) indicated a full-scale IQ equivalence score of 72. Richard was 13-years-old in the seventh grade. The administration of the GARS (Gilliam) placed Richard within the high-functioning autistic range and the WISC-III (Wechsler) indicated a full-scale IQ equivalence score of 105.

In addition, nine general education and two special education teachers participated. Although all students were in the same school system, Adam and Richard both attend the same middle school, whereas Jordan attended a different middle school. All students were fully included and participated in general education classes throughout the entire school day. The average class size was 27 students. All phases of this study occurred in the general education classroom. For each student three courses targeted. Adam’s classes included language arts, reading and math. For Jordan, his three classes were social studies, language arts and math, and Richard’s classes were language arts, science and math.

Materials

Three colored-photos were taken of each student using a Canon PowerShot A580® digital camera. Pictures showed the student self-modeling task engagement. Photos included the student writing, reading, and watching and listening to their teacher. Photos then were downloaded and inserted into a PowerPoint® presentation. Only one photo was used per slide. A different photo showing the student modeling task engagement was displayed every 30 s. Lastly, the presentation was downloaded into the HP iPAQ Mobile Media Companion® handheld computer. A plastic business card holder was used to hold the handheld device upright on the student’s desk to be viewed easily. In addition, a self-recording 3 × 5 in. index card was provided, which included 10 numbered “yes” or “no” responses for students to circle if they were demonstrating task engagement.

Response Measurement and Data Collection

The target behavior for all students was task engagement. Task engagement was defined as (a) being in one’s seat, (b) looking at the materials or teacher as requested, (c) writing numbers or words related to the assigned task, and (d) complying with instructions with 4 s. Task engagement data were collected during the first 15 min of class time. For all sessions, the teacher recorded the occurrences of the student’s task engagement via paper and pencil using a continuous 15 s partial-interval recording technique. The number of task engagement occurrence intervals was then divided by the total number of intervals possible (i.e., 60 intervals) and then multiplied by 100 to calculate a percentage of task engagement occurrence intervals. In addition, event recording was used to record the number of times the teacher either verbally redirected the student on-task or restated an instructional directive throughout the entire class period (50 min).

Experimental Design

A multiple probe across settings with an embedded A-B-A-B (Barlow & Hersen, 1984) design was used to examine the efficacy of the handheld device on a student’s task engagement behavior and the number of teacher directed prompts. This design allowed sequential application, comparison effectiveness, and an opportunity to replicate the effects of the handheld self-modeling picture prompts within students. In the student’s first classroom setting, the study included four phases: baseline, handheld self-modeling picture prompts intervention, no handheld intervention, and a reimplementation of the handheld intervention. In subsequent classroom settings, the two phases were baseline and the implementation of the handheld self-modeling picture prompts intervention. Prior to baseline, a pretraining period occurred during which the students were taught to operate the handheld computer, to press the hardware button, and to view the pictorial PowerPoint® presentation.

Experimental Procedures

Pretraining. Prior to baseline, students participated in a pretraining phase. Students were instructed on how to operate the handheld computer. They were instructed to phys-
ically turn on the device and to select the hardware button to start the pictorial PowerPoint® presentation. A Model-Lead-Test procedure (Adams & Engelmann, 1996) was used to instruct the students on the use of the handheld computer. The teacher modeled the necessary steps for accessing the presentation, led the students as they accessed and viewed the pictorial presentation, and tested the student’s performance on using the handheld computer and accessing the picture presentation independently. Students were considered trained if they could independently access the pictorial presentation for three consecutive trials.

Baseline. During baseline, students were presented with the typical class milieu. The number of task engagement occurrences during the first 15 min of class and the number of teacher prompts throughout the entire class were recorded. During the first 15 min of class, students were expected to complete two tasks: writing lesson information (e.g., lesson objective, homework assignments) in their agenda and complete a warm-up activity. Data were collected until a stable baseline was achieved for a minimum of five sessions. No additional feedback, prompting, or cueing occurred during the first 15 min of class time.

Handheld self-modeling picture prompts. At the beginning of each class period, students were provided with the handheld computer including the self-modeling static-picture prompt presentation. The device was placed in a plastic business card holder in the corner of the student’s desk. Students were prompted to activate the device. After the students activated the handheld computer, the pictorial presentation showed photos of the student self-modeling task engagement behavior. Photos depicted a different self-modeling static-picture every 30 s and the presentation repeated automatically throughout the entire class period. When the self-model picture was displayed, the student self-recorded by circling either “yes” or “no” on a 3 × 5 in. index card if they were demonstrating task engagement. This process continued until the student reached a criterion of 90% occurrence intervals of task engagement for three consecutive sessions.

No handheld pictorial prompting. Similar to the baseline phase, the number of task engagement occurrences and the number of teacher prompts were recorded for each student. Data were collected for a minimum of three sessions. Moreover, no additional feedback, prompting, or cueing occurred during the first 15 min of class time.

Handheld self-modeling picture prompts reinstated. The criterion to reinstate the intervention phase occurred when the mean of the intervention withdrawal phase returned to within close proximity of the mean of the baseline phase and trended in a contra-therapeutic direction. Similar to the previous handheld self-modeling picture prompts phase, students were provided with the handheld computer, instructed to turn on the device at the beginning of class and self-record. Student then pressed the button to play and watch the pictorial PowerPoint presentation of themselves modeling task engagement behaviors, as well as, self-recording every 30 s.

Generalization procedures. The criteria to generalize the intervention across settings occurred when the student reached of 90% occurrence intervals of task engagement for three consecutive sessions in the first classroom during the reinstatement of the handheld self-modeling picture prompts (B₂). Similar to handheld self-modeling picture prompts phase, the student was provided the handheld computer and prompted to activate the device and to watch the pictorial PowerPoint presentation of them self-modeling task engagement in the second classroom. After the student reach criterion, the handheld self-modeling picture prompts intervention was then introduced in the third classroom.

Social Validity

Following the conclusion of the study, all participating teachers completed the Intervention Rating Profile (IRP)-15 (Martens, Witt, Elliot, & Darveaux, 1985) to assess the social validity and acceptability of the use of handheld self-modeling picture prompts to increase task engagement and reduce teacher directed prompts for students. The IRP-15 is a 15-item Likert-type scale that assesses general acceptability of interventions. The Likert scale ranges from one—strongly disagrees to six—strongly agrees. Scores generated by the IRP-15 range from 15 to 90. Higher scores
indicate better acceptance of interventions and ratings above 52.5 were considered to reflect acceptability by the rater (Brock & Elliott, 1987). In addition, the participating students’ social acceptability was assessed using the Student Post-Intervention Acceptability and Importance of Effects Survey for grades four through six (Lane & Beebe-Frankenberger, 2004). The students’ survey consisted of a 14-item Likert-type scale that assesses general acceptability of interventions. The Likert scale ranges from one—strongly disagrees to seven—strongly agrees. Following the 14-items, an open-ended question asked students, “What else do you think?” The Likert scale ranges from one—strongly disagrees to seven—strongly agrees. Scores generated by the student survey range from 7 to 98. Higher scores indicate better acceptance of interventions and ratings above 70 were considered to reflect acceptability by the rater.

Reliability

Interobserver reliability data and procedural reliability data were collected simultaneously by the primary investigator and the classroom teacher. Interobserver and procedural reliability data were collected during 33% of baseline and each concurrent phase. Observers independently and simultaneously recorded task engagement. Interobserver agreement was calculated by dividing the number of intervals of agreements by the number of intervals of agreements plus disagreements and multiplying by 100. Interobserver reliability ranged from 95 to 100%, with a mean of 97% agreement. The mean interobserver reliability agreement for each student across conditions was Adam, 100%; Jordan, 97%; and Richard, 95%.

Procedural reliability measures verified the teachers’ performance of providing the handheld self-modeled picture prompt and across classroom settings. Observers independently and simultaneously recorded task engagement. Interobserver agreement was calculated by dividing the number of intervals of agreements by the number of intervals of agreements plus disagreements and multiplying by 100. Procedural reliability was 100%.

Results

Figures 1, 2, and 3 display the students’ percentage of task engagement and number of teacher-directed verbal prompts with and without the handheld computer and across classroom settings. Overall, the students’ mean percentage of task engagement during baseline was 29% and increased to a mean of 94% intervals of task engagement during the handheld picture prompting phase. The mean number of teacher-directed verbal prompts during baseline was 26.7 and decreased to a mean of 3.3 during the handheld picture prompting phase.

Figure 1 shows Adam’s percentage of task engagement and number of teacher-directed verbal prompts with and without the handheld self-modeled picture prompt and across classroom settings. During baseline, Adam demonstrated a mean of 39% occurrence intervals of task engagement and his teacher verbally prompted him a mean of 33 times in the language arts classroom. During the handheld picture prompting phase, Adam increased task engagement to a mean of 91% (range = 77–100%) and the number of teacher prompts decreased to a mean of 5 occurrences (range = 1–15). When the handheld intervention was withdrawn, Adam’s task engagement decreased to a mean of 29% (range = 23–40%) and teacher prompts increased to a mean of 26 (range = 22–34). However, when the handheld picture prompting intervention was reintroduced, Adam’s task engagement increased to a mean of 97% (range = 95–98%) and the mean number of teacher prompts decreased to 3 (range = 1–4). During reading, Adam’s task engagement was a mean of 35% occurrence intervals and the mean number of teacher prompts was 23 during baseline. When the handheld picture prompt was implemented, Adam’s task engagement increased to a mean of 95% (range = 90–100%) occurrence intervals and the number of teacher prompts decreased to a mean of 2.6 (range = 1–4) occurrences. During math, Adam’s task engagement was a mean of 27% occurrence intervals and the mean number of teacher prompts was 29 during baseline. When the handheld picture prompt was implemented, Adam’s task engagement increased to a mean of 94%
(range = 87–100%) occurrence intervals and the number of teacher prompts decreased to a mean of 3.6 (range = 1–7) occurrences.

Figure 2 shows Jordan’s percentage of task engagement and the number of teacher-directed verbal prompts with and without the handheld self-modeled picture prompt and across classroom settings. During baseline, Jordan demonstrated a mean of 38% occurrence intervals of task engagement and his
teacher verbally prompted him a mean of 26 times in the social studies classroom. During the handheld picture prompting phase, Jordan increased task engagement to a mean of 95% (range = 88–98%) and the number of teacher prompts decreased to a mean of three occurrences (range = 1–12). When the handheld intervention was withdrawn, Jordan’s task engagement decreased to a mean of 26% (range = 20–33%) and teacher prompts increased to a mean of 18 (range = 17–19). However, when the handheld picture prompt-
ing intervention was reimplemented, Jordan’s task engagement increased to a mean of 98% (range = 95–100%) and the mean number of teacher prompts decreased to two (range = 1–3). During language arts, Jordan’s task engagement was a mean of 36% occurrence intervals and the mean number of teacher prompts was 25 during baseline. When the handheld picture prompt was implemented, Jordan’s task engagement increased to a mean of 94% (range = 83–100%) occurrence intervals and the number of teacher prompts decreased to a mean of 3.6 (range = 1–9) occurrences.

During math, Jordan’s task engagement was a mean of 94% (range = 83–100%) occurrence intervals and the number of teacher prompts decreased to a mean of two (range = 1–3). During language arts, Jordan’s task engagement was a mean of 36% occurrence intervals and the mean number of teacher prompts decreased to two (range = 1–3). During math, Jordan’s task engagement was a mean of 94% (range = 83–100%) occurrence intervals and the number of teacher prompts decreased to a mean of 6 (range = 1–13) occurrences.

Figure 3 shows Richard’s percentage of task engagement and the number of teacher-directed verbal prompts with and without the handheld self-modeled picture prompt and across classroom settings. During baseline, Richard demonstrated a mean of 19% occurrence intervals of task engagement and his teacher verbally prompted him a mean of 30 times in the language arts classroom. During the handheld picture prompting phase, Richard increased task engagement to a mean of 84% (range = 67–98%) and the number of teacher prompts decreased to a mean of 6.5 occurrences (range = 1–12). When the handheld intervention was withdrawn, Richard’s task engagement decreased to a mean of 24% (range = 20–28%) and teacher prompts increased to a mean of 19 (range = 16–22). However, when the handheld picture prompting intervention was reimplemented, Richard’s task engagement increased to a mean of 98% (range = 97–100%) and the mean number of teacher prompts decreased to two (range = 1–3). During science, Richard’s task engagement was a mean of 18% occurrence intervals and the mean number of teacher prompts was 27 during baseline. When the handheld picture prompt was implemented, Richard’s task engagement increased to a mean of 89% (range = 77–100%) occurrence intervals and the number of teacher prompts decreased to a mean of 3.6 (range = 1–9) occurrences. During math, Richard’s task engagement was a mean of 16% occurrence intervals and the mean number of teacher prompts was 25 during baseline. When the handheld picture prompt was implemented, Richard’s task engagement increased to a mean of 94% (range = 83–98%) occurrence intervals and the number of teacher prompts decreased to a mean of three (range = 1–8) occurrences.

**Social Validity**

Based on the IRP-15 (Martens et al., 1985), the nine general education and two special education teachers indicated that the use of the handheld self-modeling picture prompts to increase task engagement and reduce teacher directed prompts in the general education classroom was socially acceptably. The teachers’ mean IRP-15 score was 80 (range = 75–90). All teachers indicated that agreed or strongly agreed across all items, specifically the intervention was (a) an acceptable intervention for the student’s problem behavior, (b) most teachers would find the intervention appropriate, (c) I would suggest this intervention to other teachers; (d) this intervention would be appropriate for a variety of students; and (e) this intervention was beneficial to the student. There was no difference in rating scores between special and general education teachers; both found the intervention socially valid.

In addition, the participating students’ also indicated that the use of the handheld self-modeling picture prompts was socially acceptably based on the Student Post-Intervention Acceptability and Importance of Effects Survey for grades four through six (Lane & Beebe-Frankenberger, 2004). The students’ mean score was 83 (range = 79–91); Jamie’s survey score was 91, Jordan’s was 80, and Richard’s was 79. All students rated all items similarly, agreeing to strongly agreeing that the intervention was (a) easy for me to stick with, (b) helped me change in important ways; (c) quickly improved my skills; (d) made a difference in my grades, and (e) is one I would tell other kids about. However, all students disagreed or strongly disagreed that the intervention “helped me make more friend.”
Discussion

The purpose of this study was to examine the use of self-modeling static-picture prompts via a handheld computer and self-modeling to increase task engagement and reduce teacher prompts for students with high-function autism in the general education classroom. Prior to this study all students performed high levels of off-task behaviors and required high levels of teacher prompts to initiate and maintain task engagement. When the intervention was
implemented, all students demonstrated an increase in task engagement and decrease in teacher directed prompts. Moreover, all students generalized the use of the self-monitoring and prompting strategy across other general education classrooms. A functional relation was established since experimental control occurred by demonstration of a co-variation between change in behavior patterns and introduction of the intervention within, at least, three different series at three different points in time (Horner et al., 2005).

This study supports previous self-monitoring studies, which demonstrated improved task engagement (Callahan & Rademacher, 1999; Koegel, Koegel et al., 1999; Koegel et al., 1992; Lee et al., 2007; Odom et al., 2003; Wilkinson, 2005). This study also supports previous studies that have used self-modeling to increase task engagement (Coyle & Cole, 2004; Hagiwara & Myles, 1999). Additionally, this study supports the use of handheld computers to enhance student independent functioning (Cihak et al., 2007, 2008).

This study extends the literature in several ways. First, this study was conducted in general education classrooms. In spite of self-management effectiveness and usefulness, previous self-management studies in school settings have not demonstrated its application in the general education classrooms. With current trends of educating students with disabilities in the general classrooms, this study expands the versatility of self-management techniques for inclusive settings. By learning self-management techniques, students were more self-directed and less dependent on teacher supports and supervision. Moreover, learning to self-manage their task engagement, the students generalize adaptive behavior skill, autonomy, and demonstrated behavioral improvements across various classroom environments.

Secondly, this study expanded the use of video prompting procedures by incorporating the use of self-modeling static-picture prompts. One of the advantages of using static-picture prompts is a stationary display of relevant features and a lack of attention diverting motions, which may occur with video modeling. Since all the students in this study had difficulty initiating and maintaining attention, the students benefited from a prompt that provided extended time for students to focus and obtain the essential information of the pictorial prompt. Moreover, the static-picture only showed relevant stimulus information, so the potential for students to overlook relevant or attend to irrelevant features of a prompt were minimized.

Thirdly, the use of handheld computers was applied in the general education classroom to facilitate positive behavior change. When modeling is used for priming a behavior change (Coyle & Cole, 2004; Hagiwara & Myles, 1999) or watching the model in-vivo, the observer may have only one or limited opportunities to acquire the behavior through observation learning. Since the static pictures were presented on a handheld computer, it increased the opportunities for the learner to retrieve information anytime to guide behavior. With increased opportunities for an observer to watch a model, the opportunity for observational learning is enhanced.

Fourth, this study expanded the social validity of using self-modeling static-picture prompts and a handheld computer as a positive behavioral support in the general education classroom. Both students and teachers reported social acceptability for the intervention use. Moreover, both special and general education teacher suggested that they would recommend its use to other teachers and use self-modeling static-picture prompts and a handheld computer again for students who experience similar behavioral challenges. Although the students noted that the intervention did not help make more friends, they did report that it was easy to use, it helped them quickly and made a difference in their grades, which are critical components in the educational programming for students with autism (National Research Council, 2001).

However, several limitations may have affected the overall interpretations of this study and future research is needed. First, photos of the students reading, writing, or watching and listening to their teachers did not always correspond to the task at hand. That is, a photo of the student writing may have appeared when actually they were expected to be reading. Although the students were instructed to self-record “yes” if they were engaged in the task at hand, future studies are required to examine the displaying of specified picture-
prompts with specified behaviors. Second, as with other single-subject designs a small sample size was examined. In this study, only three students participated. With this mind, conclusions must be interpreted within the context of this study. Future research is needed to verify these results and its external validity across larger samples. Third, a functional assessment or analysis was not conducted prior to intervention implementation, so the student’s function of behavior was not determined. Fourth, the experimental design does not allow evaluation of separate effects resulting from self-management or self-prompting alone. Future investigations could employ multielement or multiple treatment designs in an attempt to distill how each of these components contributes to behavioral change. Moreover, future self-management studies are needed to examine the impact of this intervention on specific functions of behavior (e.g., escape, attention, sensory, multiple functions). Thirdly, all students’ were highly motivated and enjoyed using the handheld computer device, which may have produced intervention novelty effects. Evaluations over longer periods of time are required. Nevertheless, all students acquired the skills necessary to transition independently to different environments, and teachers reported favorable opinions concerning video modeling procedure and outcomes to improve behavioral functioning.

References


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