The Effects of Self-Monitoring and Recruiting Reinforcement on Pre-Vocational Tasks

THESIS

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Abstract

This study examined the effects of a self-monitoring and recruiting reinforcement treatment package on the accuracy of pre-vocational skills for three middle school students diagnosed with Autism Spectrum Disorder (ASD). Total number of steps correct was determined by separate task analyses for each pre-vocational task and was out of 10 steps, while a separate dependent variable measured how many recruiting steps were completed correctly out of 4 steps. A multiple-probe across tasks design was used to evaluate the effectiveness of the intervention. Findings indicated that self monitoring and recruiting reinforcement led to an increase in the number of steps completed correctly for both dependent variables for each of the three participants across all pre-vocational tasks.

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Chapter 1

Introduction

In 2014, the Center for Disease Control and Prevention reported that 1 in 68 children have autism spectrum disorder (ASD). Although autism presents itself uniquely in each case, individuals identified with ASD typically share common characteristics, including social deficits, communication difficulties, and repetitive behaviors (Nicholas et al., 2008). In many instances, additional characteristics (e.g., disruptive behavior, emotional instability) are also displayed (Nicholas et al., 2008). Children with autism range drastically in their severity of symptoms and impairments, meaning the challenges and needs for each individual vary greatly across settings (Jensen & Spannagel, 2011). Symptoms of ASD can range from mild to severe across various cognitive and social domains (Jensen & Spannagel, 2011).

Importance of Teaching Pre-Vocational skills

Pre-vocational skills are the set of skills that individuals should have prior to entering any job field. They are typically pre-requisites for many jobs, and include a broad range of both personal skills and skills related to the specific job demands (Seaman & Malone, 2016). Unfortunately, youth with ASD often have poor postsecondary education and employment outcomes, and 35% of young adults with autism between the ages 19-23 have not had a job or received any kind of post-secondary education after finishing high school (Shattuck et al., 2012). As every job requires at least one or more skills that are a main deficit of ASD, these young adults are faced with more issues when it comes to unemployment due to the characteristics that come with ASD. (Wilczynski et al., 2013, p. 876). As a result of these difficulties, many individuals with autism struggle to gain and retain jobs, and only a small percentage of young adults on the autism spectrum are able to acquire competitive jobs. (Wilczynski et al., 2013).

Competitive employment is defined as "a person with a disability being paid at least a minimum wage and at a rate equivalent to that paid for employees without a disability for the work that they complete in a community based setting" (Wilczynski et al., 2013, p. 877). Findings in relation to unemployment rates have prompted many researchers in the field to attempt to find specific reasons as to why employment outcomes are so low among adults with ASD, as well as how to improve these outcomes and help to improve these individuals' chances of success and an improved quality of life.

In order to improve outcomes for young adults with ASD, effective transition planning is needed. A study conducted by Shattuck et al. (2012) found that there is a strong need for improved transition planning and programming in the United States. Data were taken from the National Longitudinal Transition Study 2 (NLTS-2), which followed youth from all 12 federal special education disability categories (i.e., deaf-blindness, deafness, emotional disturbance, hearing impairment, intellectual disability, multiple disabilities, orthopedic impairment, other health impairments, specific learning disability, speech or language impairment traumatic brain injury, visual impairment) from high school into young adulthood. Using this information, the authors discovered that youth with ASD had a significantly lower rate of employment compared to other disability populations, including learning disabilities, mental retardation, and speech or language impairments. In addition, they determined that young adults with ASD had the largest risk of being disconnected from postsecondary education or employment. The findings made it clear to the authors that there are large gaps in transition planning, specifically for youth who are on the autism spectrum.

Although many adults with autism have the capability and aspiration to work, around half of adults with ASD are unemployed, which is dramatically higher than the national

unemployment rate (Shattuck et al., 2012). A study done by Ohl et al. (2016) used an online survey to obtain data, which was ultimately used to assess predictors of employment. Using this survey, the authors found that amongst the 254 questionnaires completed, 38.58% of individuals were unemployed. In their surveys, most of the participants noted that they received little to no job assistance from job coaches on site. Similar to the study by Ohl et al. (2016), Muller et al. (2003) also found that employees with ASD were not satisfied with the support they were receiving from job coaches. In this study, individuals with ASD reported a multitude of on-the-job difficulties that stemmed from social demands of the environment rather than the actual job. When asked what they needed to be more successful in the workplace, a large number of the participants said that having a job coach to help them on the job, as well as having help from a vocational rehabilitation counselor/coach in finding an appropriate job match would be the most beneficial. It is likely that participants from the study conducted by Ohl et al. would have benefitted from both of these suggestions, since most of them reported that they received minimal assistance and guidance on site.

In addition to not having enough support from employers and job coaches as found by Ohl et al. (2016) and Muller et al. (2003), Seaman and Malone (2016) discovered that very few individuals with ASD have received vocational skills training needed to obtain successful job opportunities. For this reason as well as reports from individuals with ASD who have had trouble adjusting to new workplace environment due to the unique characteristics of the disorder, Seaman and Malone (2016) recommend tailoring vocational interventions specifically to each individual to address concerns that pair with the symptoms of autism (Muller et al., 2003).

Overall, the findings from these studies (Muller et al., 2003; Ohl et al., 2016; Seaman & Malone, 2016) have three main common themes. First, the ASD population is one of the most

unemployed disability categories. Second, many individuals with autism who are employed report that they wish that they had more involved job coaches and more assistance with various job demands in the work environment. Supported employment is an important aspect of both obtaining and maintaining a job, and includes a range of supports such as job coaching, job development, assistance with transportation, and other individualized supports as necessary (Wilczynski et al., 2013). Third, vocational skills training as well as transition planning and programming need to be prioritized and better developed in order to improve employment outcomes amongst the autism community. According to Wilczynski et al. (2013), the goals of both schools and vocational rehabilitation agencies are to aid students in obtaining the maximum level of independence possible, which includes competitive employment as adults, so it is vital for both of these groups of professionals to find strategies that will improve the outcomes of their students. For these reasons, one of the main focuses of the current study is teaching pre-vocational skills to middle school students through evidenced-based methods such as self-management as well as recruiting adult feedback.

Self-Management

As ASD has increased in prevalence through the last several years, so have strategies to improve the lives of those identified with the disorder, a popular one being self-management (Wilkinson, 2008). According to Cooper, Heron, and Heward (2007), people with a wide range of cognitive abilities and ages have used self-management techniques effectively. Individuals with self-management skills are more likely to make meaningful contributions to society, reach their full potential, and feel good about themselves (Cooper et al., 2007). Self-management is broadly defined as a personal application of behavior change tactics that produces a desired change in behavior (Cooper, et al., 2007). Using self-management, students are taught to

independently observe, record, and assess their own behavior (Shulze, 2016), which can help them to increase independence, self-reliance, and responsibility (Wilkinson, 2008). The tactics and strategies used within self-management can vary greatly based on various factors, including the degree of the desired behavior change, the person implementing the intervention, as well as the individual receiving the intervention.

Self-management is an umbrella term that encompasses many different procedures, including but not limited to, self-monitoring, self-graphing, and goal setting (Shulze, 2016). Several self-management procedures have demonstrated successful results in improving academic, social, and other behavioral skills for students with ASD (Shulze, 2016). While many self-management strategies are used to improve behaviors, they can also be successful in decreasing undesirable ones. In 2001, for example, Mancina, Tankersley, Kamps, Kravits, and Parret completed a study that used a self-management program to decrease inappropriate vocalizations for a 12-year-old girl with autism. The self-management program included a digital timer, self-recording sheets, visual prompts, and reinforcers. First, the participant was taught to recognize the target behavior through modeling. The three categories of the target behavior were vocalizations, facial movements, and body movements. Once she had successfully learned to identify the target behavior in different settings, the student was taught to assess the target behavior with her self-recording sheet and watch, with increasingly longer time intervals. The self-recording sheet had boxes labeled noisy or quiet, and when the watch alarm sounded, the student would determine whether she was noisy or quiet during that time and check the appropriate box. A multiple baseline across tasks (leisure, reading, and pre-vocational) was used, and in each task, the participant successfully reduced her vocalizations (although her body movements and facial movements remained frequent and variable).

Similar to Mancina et al., (2001), Hampshire, Butera, and Bellini (2016) also had success in using self-management to improve a targeted behavior. They demonstrated that self-management was successful in improving homework independence with five middle-school students with ASD. The self-management program for each student was a simple homework checklist. On the left side of the checklist were the to-dos, and contained step-by-step tasks listed chronologically. The right side had blank boxes that the student would check off when each subtask was completed. Each of the students' parents monitored their children's use of this system, because an important aspect of increasing independence in this study was also decreasing the student's reliance on their parents to complete their work. The results showed that all 5 students increased task independence, which was defined as the percentage of time the student worked independently on a homework task without parent prompting. Compared with baseline, task independence for each participant increased after the intervention, and even more so during maintenance.

Another common group of behaviors that self-management has been targeted to improve are social skills, which are a common deficit in individuals with ASD. In 2013, Koegel, Park, and Koegel implemented a study to improve social conversations amongst children with autism using self-management. A multiple baseline design was used to assess the effects of self-management intervention on reciprocal social conversation. Participants included two children and one adolescent. There were baseline probes for each participant, where a young adult attempted a conversation with each one of him or her for 10 minutes. Probes took place in natural environments and were recorded. The self-management intervention included a social conversation framework and self-recording sheet. The social conversation framework had three instructions: answer question or make an on topic comment, add information by elaborating on

their response, and ask an on topic question to their conversational partner. The participants would mark boxes under each of these instructions depending on their performance during conversations (checked a box for each conversation point). After the intervention, results showed that each participant had large increases in elaborated responses and reciprocal question asking during conversations, and results from maintenance phases shows that these skills remained in their repertoires even with the termination of the intervention.

Self-management also demonstrated success with improving social skills in a study by Liu, Moore, and Anderson (2015), in which a self-management program was applied to increase social skills for a 9-year-old female with ASD. The researchers used three different videotapes to teach the participant both appropriate and inappropriate behaviors. The three videotapes were related to each targeted social skill: no interruption, asking for opinions, and greeting unfamiliar adults. Each video depicted the behavior appropriately and inappropriately so that the participant could discriminate between the two (each video stated clearly in age-appropriate text whether the video was showing appropriate or inappropriate behavior). Once the discrimination training was completed, self-recording training began. The participant got a self-recording sheet and throughout a 30-minute period, she would color in flowers for every appropriate behavior she displayed. For the intervention phase, the participant's mom implemented the self-management program. Reinforcement was given on an FR-3 schedule. Results showed that for each target behavior percentage of appropriate behavior increased significantly (no interruption increased from a mean of 30% to 72%, asking for opinions increased from a mean of 28% to 78%, and greeting unfamiliar adults increased from 49% to 88%).

Self-management has been proven to both increase desired behaviors and decreased undesired behaviors in a multitude of ways. The present study used self-management techniques

to increase on-task behavior, productivity, and accuracy with pre-vocational tasks which are all positive behaviors that may improve independence in the classroom. The specific self-management strategies used in this study were self-monitoring and recruiting reinforcement from the experimenter (both including picture checklists and other visual supports).

Self-Monitoring

Cooper et al. (2007) define self-monitoring as "a procedure whereby a person observes his behavior systematically and records the occurrence or nonoccurrence of a target behavior" (p. 591). Along with their definition, they explain that self-monitoring is rarely used alone; instead, it is typically combined with other contingencies. Therefore, varying combinations of self-monitoring with other intervention strategies have proved to be effective in changing behavior (Cooper, Heron, & Heward, 2007). Self-monitoring is an ongoing process and allows students to collect and record information about their behavior as it relates to pre-determined standards (Stasolla, Perilli, & Damiani, 2014). As with most other self-management techniques, there are several studies that have also found successful results while using self-monitoring as an intervention.

Within the available literature related to self-monitoring, there are multiple studies that focus on self-monitoring in regards to improving on-task behaviors. On-task behavior is important for increased productivity and learning within the classroom environment. Stasolla, Perilli, and Damiani (2014) implemented a study that used self-monitoring to increase on-task behavior for two students with ASD. Although increasing on-task behavior was the main purpose of the study, the authors also wanted to reduce stereotypical behaviors and examine the effects on the mood of both participants. On task behaviors were defined differently for each participant, but some examples included listening to the teacher's explanation, remained seated at their desk,

gazing on their sheets while reading carefully, and so on. Stereotyped behaviors included body rocking, hand flapping, and vocalizations. Indicators of happiness included smiling, laughing, and singing. Baseline was an hour long with 10-second observation intervals for on task and stereotyped behaviors, and 15-second observation intervals for happiness. Intervention took place over two months, and included materials such as a Walkman, headset, acoustic cues, and a two-column grid for each target behavior. For both of the participants, the self-monitoring procedure had great effects. For the first participant, the mean percentage of on-task behavior increased from 11.5 (baseline) to 86.51, stereotyped behavior decreased from a mean percentage of 93.67 to 28.47, and happiness increased from a mean percentage of 34.83 to 87.01. For the second participant, the mean percentage of on-task behavior increased from 5.5 (baseline) to 94.6, stereotyped behavior decreased from a mean percentage of 98.5 to 11.43, and happiness increased from a mean percentage of 24.58 to 94.75.

Self-monitoring was also demonstrated to be effective in increasing on-task behaviors with two students with autism in a study by Holifield et al. (2010). The researchers used self-monitoring to increase attending to task as well as academic accuracy. Attending to task was recorded when a variety of behaviors took place (both in language arts and in math), including but not limited to, following a direction from a teacher, reading aloud, counting manipulatives, and asking or answering a task-related question. Permanent products were used to assess changes in academic accuracy. The self-monitoring sheet included various tasks such as ‘attending to task’, and under each task was a printed “yes” and a “no” for the participants to circle based on their performance during 5 minute intervals. The self-monitoring session lasted 20 minutes, and the participants made a total of four circles (one for every 5 minute interval). To ensure that the participants were circling the correct answer, teachers and other observers made sure that the

answers matched their actions. For participant one, baseline indicated that his mean attending to task percentage was 32%, while his mean academic accuracy percentage was 72%. For participant two, baseline indicated that his mean attending to task percentage was 32%, while his mean academic accuracy percentage was 51%. When self-monitoring was introduced in both language arts and math, percentages for attending to task and academic accuracy increased greatly for both participants. Participant one increased to a mean of 69% for attending to task, and 90% for academic accuracy, while participant two increased to a mean of 96% for attending to task, and 97% for academic accuracy.

Similar to the studies by Stasolla, Perilli, and Damiani (2014) and Holifield et al. (2010), Soares, Vannest, and Harrison (2009) also implemented a self-monitoring intervention to increase on-task behaviors and academic productivity. They used a computer aided self-monitoring program to increase academic productivity while simultaneously attempting to decrease the frequency of self-injurious behaviors of a 13-year-old boy with autism. Dependent variables included academic completion (not accuracy) and intensity of tantrum (determined by a multi-indicator scale created by the teacher). The self-monitoring sheet was on the computer, and had a chart that listed each day of the week as well as columns for three different activities. When the participant had completed an activity, he would copy and paste a picture of Mickey Mouse into the appropriate box. Using an ABAB design, the researchers implemented a baseline phase, an intervention phase, followed by a second baseline phase and a second intervention phase. The Mickey Mouse symbol reminded the participant to 1) complete the activity, and 2) to follow behavioral expectations during the intervention sessions. The first baseline phase showed that the participant was completing 22% of daily activities, and the average severity of his tantrums was a 3.33. For the first intervention phase, his activity completion increased to 75%

and the average severity of his tantrums decreased to a mean of 1.33. Results from the second baseline phase showed that academic accuracy decreased back down to 25% and severity of tantrums went back up to 3.5, and the second intervention phase showed that academic accuracy increased to 92% while severity of tantrums decreased to 1.5, indicating a very strong functional relation between the intervention and the effects.

In addition to improving on task behaviors, self-monitoring has had positive effects in increasing functional skills. Parker and Kamps (2011) found that written task analyses in combination with self-monitoring successfully increased functional skills and verbal interactions to two individuals with autism in social settings. Peers were incorporated throughout the study to provide a social setting. Materials included social activities, a task analysis sheet for each of the three activities, and social scripts. The social activities included games, cooking, and restaurant activities. The task analyses for each of the activities listed outlined steps needed to complete each one. Next to each step was a blank box for the students to check off once that task was performed. The social scripts included language cards that prompted the students with autism to talk during the activities and gave examples of appropriate things to ask and say. The social scripts were modeled and taught until both the students and peers were able to use them independently and correctly, and once students demonstrated mastery of the social scripts, intervention began. Intervention sessions were 30 minutes long, and both the adults and peers provided prompts to the students with autism to use the task analysis. For both participants, the self-monitoring and task analyses resulted in higher task completion for all three activities, increased activity engagement, and more verbalizations.

There are several different ways to use self-monitoring as an intervention for behavior change. Self-monitoring, alone as well as in combination with other strategies has been proven to

be successful in a wide range of literature for multiple population groups. For individuals identified with ASD, self-monitoring has proven to be effective in increasing productivity, accuracy, desirable behaviors, and more. Most studies utilize self-monitoring in tandem with other strategies rather than it being the sole intervention. For that reason, this study incorporated another self-management strategy in addition to self-monitoring: teaching the participants to recruit reinforcement from the experimenter.

Recruiting Reinforcement

Teacher praise is a powerful and cost-effective reinforcer, and the use of praise with positive attention are among the most powerful tools for motivation and classroom management (Alber & Heward, 1997; Alber & Heward, 2000). Many teachers do not praise their students enough for desired behaviors such as staying on task, following directions, or completing their work (Alber & Heward, 2000). As a result of these desired behaviors going unnoticed or unacknowledged, the behaviors are likely to occur at lower rates since they are not often reinforced (Alber & Heward, 2000). Many classrooms have times that are chaotic and busy, so it is unlikely and unrealistic that teachers can catch all of the times that their students display positive behaviors. However, teaching students to recruit reinforcement takes that responsibility off of the teachers, and provides them with a prompt to positively attend to their student's accomplishments, thus creating a positive and reinforcing interaction for both parties (Alber & Heward, 2000).

In order to assess the effects of training students to recruit positive teacher attention, Alber, Heward, and Hippler (1999) taught four middle school students with learning disabilities to recruit teacher attention while they worked on assignments in a general education setting. The dependent variable included a sequence of three behaviors: 1) raise his or her hand, 2) wait

quietly until the teacher recognized him or her either verbally or by moving to the students desk, and 3) voicing a question or statement to the teacher about his or her work. A recruiting response was not recorded if the student inappropriately attempted to get the teachers attention, including but not limited to, calling out without raising hand, using profanity, making negative comments, or leaving his/her seat. Teacher praise and instructional feedback were recorded within each recruiting episode. The results displayed significant increases in rates of appropriate recruiting amongst the participants, teacher feedback, and instructional feedback. Rate of recruitment for went from 17% (baseline) to 62% (generalization phase) for participant one, 20% to 100% for participant two, 13% to 21% for participant three, and 18% to 100% for participant four. Of the 61 total praise statements by the teacher, 82% of them were student recruited, and of the 147 instructional feedback statements, 54% were student recruited.

Learning to recruit teacher attention has had positive impacts on students' academic achievement in the classroom. Craft, Alber, and Heward (1998) taught four elementary students with developmental disabilities to recruit teacher attention while they worked on spelling assignments in a general education classroom. The dependent variables were comprised of student recruiting (consisted of student walking to the teachers desk or raising hand, waiting quietly until teacher recognized/acknowledged him or her, and voicing a statement or question about his or her academic work), teacher praise, completion of academic work, and accuracy of academic work. After baseline, recruitment training was implemented, which took place in three parts (instruction and role playing, morning prompts, and end of the day check and reward) throughout a two-day period. The last two phases were generalization and maintenance. Results displayed positive effects for each of the dependent variables. For recruiting attention, student 1 had a mean number of .3 in baseline and 2.1 in generalization/maintenance, 0 to 2.1 for student

2, .2 to 1.6 for student 3, and .8 to 2.0 for student 4. Teacher praise was not recorded during baseline, but during generalization and maintenance, every single praise statement was student recruited. For completion of academic work, percent complete increased from 60% to 79% for student 1, 53% to 95%, for student 2, 8% to 72% for student 3, and 59% to 75% for student 4. For accuracy of academic work, percent accurate increased from 67% to 77% for student 1, 56% to 99% for student 2, 25% to 56% for student 3, and 59% to 65% for student 4.

In addition to Craft, Alber, and Heward (1998), Alber, Anderson, Martin, and Moore (2005) also examined the effects of recruiting teacher attention on academic accuracy. They were successful in training four elementary school students with behavior disorders to recruit positive teacher attention. Dependent variables included appropriate recruiting (raise hand, wait for teacher, voice a question/statement about academic work), completion of math assignments, and accuracy of math assignments. The study had four phases: baseline, recruitment training, self-recording, and maintenance. In baseline, students were observed during math class and were reinforced for appropriate recruitments. Recruitment training took place individually with each participant, and included providing a rationale for recruiting appropriately, modeling/role playing the sequence, and self-recording. The self-recording phase included three phases, which were continuous reinforcement, intermittent reinforcement, and no reinforcement. The purpose of this was to program for generalization. During maintenance, the self-recording ended, and the teacher followed the same procedures used in baseline. Results showed that two students made significant gains in percent complete and accuracy of completed items, while the other two didn't increase percent complete but did significantly increase accuracy of completed items. All four students recruited appropriately and met the target criterion of 3 to 5 recruiting responses per session in both the self-recording and maintenance phases.

Overall, ten studies examining the effects of recruiting reinforcement were conducted between 1976 and 2001 (Alber & Heward, 2000). Since 2001, very few studies have examined recruiting reinforcement (e.g., Alber et al., 2004; Rouse et al., 2014; Wallace et al. 2003). Additionally, only a small amount of the available research on recruiting attention has been conducted for students on the autism spectrum. Because of this, the present study has incorporated recruiting positive attention into self-monitoring to address the lack of current research in this area.

Visual Supports for Teaching Chained Tasks

Visual supports are another form of self-management that can be used in a wide variety of ways to teach several skills, including chained skills that require more than one step to complete. Dettmer, Simpson, Myles, and Ganz (2000) used visual supports to facilitate transitions of students with ASD. Using an ABAB design, the researchers assessed the use of various visual supports for two elementary-aged boys with autism in both community and home settings. Visual schedules with picture icons were used to help the boys' transition between activities. Each step of the visual schedules was paired with a verbal prompt. Results indicated that the visual supports led to decreases in the latency between when the students were given an instruction and when they responded to the instruction. Additionally, the visual supports resulted in a decrease of the amount of verbal prompts required from teachers.

Similar to the study by Dettmer et. al (2014), Watson and Dicarlo (2015) used picture activity schedules to increase the completion of classroom routines for a young boy with autism. The visual activity schedule contained picture icons with short phrases below them for the student to follow. There were three different visual schedules for each of the three classroom routines including a morning routine, a mealtime routine, and an afternoon routine. Using a

multiple baseline design, the experimenters found that the picture activity schedules increased the student's completion of each of the three classroom routines, as well as decreasing teacher prompting. For the morning routine, the target child's percentage of completion increased 29%. For the mealtime routine, the target child's percentage of completion increased 23% and for the afternoon routine, the student's percentage of completion increased 15%.

The studies conducted by Dettmer et. al (2000) and Watson & Dicarlo (2015) demonstrate the effectiveness of visual activity schedules, a form of self-management, in improving the completion and accuracy of multi-step sequences for individuals with autism. Self-management tactics are often used to either increase or reduce the frequency of discrete behaviors, but they have been proven to have success in teaching students with ASD to complete more complex, chained tasks.

Self-monitoring and Recruiting

Previous research has examined the effects of self-monitoring combined with recruiting reinforcement. For example, Craft et al. (1998), Alber et al. (1999), and Alber et al. (2005) used an intervention package that required students to self-assess their work and self-monitor the number of times they recruited their teacher's attention in order to limit their number of recruiting responses. More recently, Rouse et al. (2014) utilized self-monitoring with recruiting teacher attention in order to examine the combined effects on the completion and accuracy of pre-vocational tasks. Participants included two sixth grade boys with moderate to severe intellectual disabilities. The classroom teacher implemented the trainings and interventions. Materials included task prompts on job boards, self-monitoring picture prompt checklists, task bins, and photo models. The task prompts on job boards had pictures and words pertaining to each task (3 per participant). The self-monitoring picture prompt checklists were placed on each

of the students desk to help them check for accuracy, and included 6 steps: 1) do your work, 2) look at the picture, 3) check your work and fix, 4) raise your hand, 5) quietly wait for the teacher, and 6) put bin away. The task bins contained materials needed to complete each task, and photo models were taped onto each bin to show what the completed product should look like. The primary dependent measure was total steps completed correctly out of a ten-step task analysis (the first six were task related while the last four were targeted toward recruiting teacher feedback/attention). The number of recruiting steps completed correctly was also measured separately with 4 steps (raise your hand, wait quietly for the teacher, tell/show the teacher your work is complete, listen to feedback and put bin away). A multiple probe across behaviors design was used. Prior to baseline, a pre-baseline training of pre-vocational tasks was implemented where participants were trained and guided through each of their tasks. Next came baseline, followed by a pre-intervention training that focused on the self-monitoring checklist, and then the intervention.

Results for one of the participants were positive, but the other participant had variable results due to regression after winter break. Participant one had a mean of 4.8 steps completed correctly across all three tasks in baseline, but during the intervention that mean increased to 9.5. This improvement remained during the maintenance phase, where the mean number of steps completed correctly increased to 9.7. For participant two, maintenance data were not taken. However, for both students, generalization effects were quite strong. After being trained on the self-monitoring checklist for the first task, they were able to use the checklist with no additional training for the second and third tasks. Based on the results, the authors address several limitations and recommendations for future research. First, they recommend that future research should examine this treatment package for students of different ages and ability levels, learning

different kinds of tasks in different settings. Although generalization was strong for the self-monitoring checklist for the untrained skills, the authors suggest examining generalization effects in novel settings with novel people. As for data collection, Rouse et al. (2014) suggested increasing the length of time for data collection so that maintenance conditions could be more reliable.

The present study is a systematic replication of Rouse et al. (2014). Although there are several similarities between Rouse et al. (2014) and the current study, modifications were made to address the aforementioned limitations. For example, the current study had participants of a younger age group with different ability ranges (3 students aged 8-12 years old identified with ASD). Additionally, this study focused more on generalization of the self-monitoring checklists and tasks to new settings with new people instead of just generalizing the checklist to the other tasks. Instead of the classroom teacher being the trainer and implementer of the intervention, this study used the experimenter for these purposes. For that reason, the participants recruited experimenter attention and feedback rather than teacher attention and feedback. Finally, this study concentrated more heavily on social validity measures to ensure practicality amongst students and teachers.

There is limited research regarding recruiting reinforcement, specifically amongst the autism population. There is also limited research about the use of self-monitoring with recruiting reinforcement as a treatment package. Therefore, the purpose of the present study is to assess the effects of self-monitoring and recruiting adult attention on pre-vocational tasks. More specifically, this study will address the following research questions.

1. What are the effects of a self-monitoring and recruiting adult attention training package on the number of pre-vocational task steps and recruiting steps completed accurately by

three 12-15 year old students diagnosed with autism?

2. Can three 12-15 year old students diagnosed with autism generalize the use of a self-monitoring checklist to other settings and other adults without additional training?

3. Can three 12-15 year old students diagnosed with autism maintain high levels of accuracy on the steps of three pre-vocational tasks after the termination of the intervention?

4. What are the opinions of the students and their teachers about the effectiveness of a self-monitoring and recruiting adult attention training package?

Chapter 2

Method

Participants and Setting

Participants were three 12 to 15 year old students, one female and two males, diagnosed with autism. Each of them had pre-vocational IEP goals. One of the participants was nonverbal and used an assistive communication device, while the other two participants were verbal. All three participants received speech services. Participants attended a school specialized for students identified with ASD.

Data were collected in the student's classroom while they completed 3 individualized pre-vocational tasks specific to their IEP goals: matching and connecting socks, sorting bills and coins, and cleaning a table. The classroom consisted of six students, one lead teacher, two aids, and the experimenter. Participant demographics and school related information can be found in table 1.

Experimenter

The experimenter was a master's student in special education with an emphasis in applied behavior analysis. She received her Bachelor of Science in Education (Early Childhood Special Education) from The Ohio State University. She has had over 6 years of experience working with individuals with various developmental disabilities, ranging from ages 3 to 20.

Materials

Task prompts on job boards

Each student was provided with a job board containing three separate tasks: sorting bills and coins, matching and connecting socks, and cleaning a table. These job boards consisted of horizontal laminated paper strips including Boardmaker® pictures as the task prompts. The

pictures were attached with Velcro in order for the students to be able to remove them when completed. When students completed each task, they received feedback from the experimenter. An example of the job board can be found in Appendix A.

Self-monitoring picture prompt checklist

Throughout the pre-intervention training and intervention conditions, students were given a self-monitoring checklist that consisted of Boardmaker® pictures and words on a strip of paper, similar to the job boards. These checklists were placed on the corner of each student's desk to allow them to self-monitor their accuracy and completion of each task. The checklist included five picture prompts: (1) get your materials, (2) do your work (3) raise your hand, (4) quietly wait for the experimenter, (5) put materials away. The self-monitoring picture prompt checklist can be found in Appendix B.

Task bins

The task bins were located in the back of the student's classroom. They were easily visible and accessible, and were labeled with the same Boardmaker® pictures that were on their job boards. Each student had three tasks that incorporated their IEP goals: 1) matching and connecting socks, 2) sorting bills and coins, and 3) cleaning a table. Tasks were chosen on the basis of each students specific goals as stated in their IEPs, and took into consideration both vocational skills and fine-motor skills to ensure functionality and practicality of the tasks. An image of the task bin can be located in Appendix C.

Definition and Measurement of Dependent Variables

Total steps completed correctly

The primary dependent variable was the total number task analysis steps completed correctly (out of 10) for each task. The first six steps on each task analysis were specific to

completing the task, while the final four steps were specific to recruiting adult attention. An observer was present for all data collection sessions and used a 10-item task-analysis recording sheet to document the completion of each step. If the student completed a step correctly, the observer recorded a plus sign next to that step. If the student skipped a step or didn't complete a step correctly, the observer left that spot blank next to that step on the task-analysis recording sheet. The task analysis recording forms can be found in Appendix D.

Recruiting steps completed correctly

The secondary dependent variable was the number of steps completed correctly (out of 4) for recruiting teacher attention. These four steps were (1) raise your hand, (2), wait quietly for the teacher, (3) tell/show the teacher your work is complete, and (4) listen to feedback and put away the bin. Feedback was provided in the form of standardized praise statements in relation to the task. For example, "great job, you matched and connected the socks correctly!" If the student completes something incorrectly, an error correction procedure was used. For example, for the sorting bills and coins task, if the bills were not sorted correctly or the coins were intermixed, the experimenter verbally prompted the students to fix their mistakes, and students were then given praise afterwards on the basis of the correctly completed task.

IOA

Prior to data collection, the experimenter reviewed each of the task analyses with the second observer and provided definitions and examples of correct responses and incorrect responses for each step. Interobserver agreement (IOA) data were collected across each condition (baseline, intervention, and maintenance). For Pat, the second observer was present for 63% of baseline sessions, 25% of intervention sessions, and 50% of maintenance sessions. For Cameron, the second observer was present for 50% of baseline sessions, 55% of intervention

sessions, and 40% of maintenance sessions. For Barb, the second observer was present for 63% of baseline sessions, 40% of intervention sessions, and 40% of maintenance sessions. The primary and second observers simultaneously and independently recorded the number of tasks and recruiting steps completed accurately for each student for each of their three tasks. Agreements and disagreements were examined for each step on an item-by-item basis. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100.

Treatment Integrity

Treatment integrity data were collected during at least 33% of baseline sessions and at least 90% of intervention sessions and maintenance sessions to determine the extent to which the experimenter implemented the baseline and intervention procedures correctly. For baseline, the second observer used a 2-item checklist and recorded whether or not the experimenter followed each step. The baseline checklist consisted of 2 steps: direct student to begin work, and redirect attention if student was off task for more than two minutes. For intervention, the second observer used a 5 item procedural checklist and recorded whether or not the experimenter implemented each procedural step. The procedures were as follows, 1) give task bin to student and provide him/her with job board and self-monitoring checklist, 2) prompt student to start work, 3) wait for student to notify teacher that work has been completed, 4) prompt student to fix errors if necessary, 5) provide praise. Treatment integrity checklists can be found in Appendix E.

Experimental Design

A multiple probe design across tasks was used to examine the effects of self-monitoring and recruiting attention on number of task steps completed accurately. The following experimental conditions were implemented: baseline, training, intervention, maintenance, and

generalization.

Procedure

Pre-Baseline Training of Pre-Vocational Tasks

During pre-baseline training, the students were asked to complete novel tasks. In order for each student to become familiar with his or her assigned tasks, the experimenter provided pre-baseline training for each student individually. The experimenter used the following steps to teach the student to use the job board. First, the experimenter introduced the job board to the student and showed him the Boardmaker® pictures that matched each task. Next, the experimenter modeled how to complete each task, and finally, guided students through performing each step of the task using verbal prompting and feedback. Once each student was able to complete at least five steps of each task independently, the collection of baseline data began. Each participant needed one day of pre-baseline training.

Baseline

During baseline, the experimenter placed the job boards on each student's desk and directed them to read their boards and complete their work. No additional visual or verbal prompts were provided during task completion. Students were expected to complete all 10 steps for each of the tasks independently within a 45-minute time frame. Student responses were recorded using the task analysis recording form. Error correction was not provided if errors were made during the baseline phase. If students were off task for more than two minutes, the experimenter redirected them with a verbal prompt. Once baseline was stable for each task (at least four data points), pre-intervention training began.

Pre-Intervention Training of Self-Monitoring Checklist

Because the self-monitoring checklist was new for each student, pre-intervention training

of the checklist was necessary for the students to become familiar with using it. Pre-intervention training consisted of the experimenter teaching the checklist to each student for one task. The experimenter pointed to each step on the checklist, modeled it, and had the student engage in the behavior using verbal prompting. Once the participants were able to complete 5 steps correctly for each task, intervention began. Pat needed two days of pre-intervention training, while Cameron and Barb needed one day of pre-intervention training.

Intervention

During intervention, the experimenter placed the job boards and self-monitoring picture prompt checklists on each student's desk and told them to start their work. The students used the self-monitoring picture-prompt checklist to independently complete the tasks. When the second task was introduced, the experimenter prompted the student to use the self-monitoring checklist for both tasks. When the third task was introduced, the experimenter prompted the student to use the self-monitoring checklist for each of the three tasks. Feedback and error correction took place after the completion of each task, during the time that students raised their hands and waited for the experimenter to check their work. Error correction was the same for each task across students. If errors were made, the experimenter modeled the rectification of the mistakes, and then verbally prompted the students through fixing their mistakes until the task was completed correctly. Once their work was fixed and the tasks were completed correctly, verbal praise was given.

Maintenance

The criterion for beginning the maintenance phase was completing at least nine steps correctly across three consecutive intervention sessions. During the maintenance phase, job boards were placed on the student's desks, but the self-monitoring picture prompt checklist was

removed from their desks.

Generalization

To assess generalization, students were directed to complete the same pre-vocational tasks using the same checklists in a separate classroom with a different adult. They were observed and data were recorded to determine whether or not the students were able to generalize their self-monitoring and recruiting skills to another setting without further instruction.

Social Validity

Social validity questionnaires were used to obtain the opinions of the participants and their teachers about the intervention. For the student participants, the following questions were included: 1) Do you think the checklist helped you complete the steps more accurately? 2) Do you think that you will continue to use checklists to help you with other activities? 3) Do you think the checklists helped you to stay on task while working? 4) Did you enjoy using the picture prompt checklists to complete your work?

Prior to the teachers completing the social validity questionnaires, the experimenter showed the teachers the students' data. The questionnaire for the teachers included the following questions: 1) I believe that my students are more productive in the classroom after the intervention. 2) I feel confident that my students will continue to use the self-monitoring and recruiting attention checklists after the intervention has ended. 3) I believe that this was a successful use of my students' time. 4) I believe that my students are likely to use prompt checklists to complete work in the future. 5) I believe that my students are likely to ask for feedback from adults when completing a task in the future. 6) I think that using a checklist can help my students with other generalized tasks in other classrooms. 7) I think that using the self-

monitoring and recruiting attention checklists will help my students complete work tasks faster. These questionnaires were used to analyze the practicality and significance of the intervention methods. The social validity questionnaires can be found in Appendices F and G.

Table 1.

Participant Demographics

	Age	**Ethnicity**	**Grade**
Pat	13	African American	7
Cameron	15	Asian American	9
Barb	13	Caucasian	7

Chapter 3

Results

This chapter will present results and data for each of the three participants. In addition, results related to IOA, social validity, and treatment integrity will be reported.

Figures 1-3 show the number of steps completed correctly in each phase for each student while Table 2 shows the mean percentages of task-specific steps completed correctly for each student, and table 3 shows the mean percentages of recruiting steps completed correctly for each student.

Pat

Figure 1 shows the number of steps completed correctly (out of 10) across pre-vocational tasks for Pat. During baseline for the sorting bills and coins task, Pat performed at a stable level with a mean number of 3.5 steps completed correctly. For the matching and connecting socks task, Pat completed a mean of 4.5 steps correctly at a moderately stable level. For the cleaning table task, data were slightly more variable than the other two tasks with a mean number of 3.6 steps completed correctly with a range of 2 to 5 steps correct.

During intervention for the sorting bills and coins task, Pat performed between 5 and 10 steps correctly with a mean of 7.5 steps correct. Data in this phase showed an upward trend before reaching 9 to 10 steps correct for 3 consecutive sessions, which was the criterion for beginning maintenance. For the matching and connecting socks task, Pat completed 9 steps correctly for each of the 5 sessions in intervention. Finally, for the cleaning table task, Pat performed between 7 and 9 steps correctly with a mean of 8.5 steps completed correctly. For each of the three tasks in intervention, Pat's number of steps correct increased significantly throughout sessions. During the maintenance and generalization phases, Pat continued to perform at high levels of accuracy, with a combined mean of 8.2 for sorting bills and coins, 8.6

for matching and connecting socks, and 9 for cleaning the table.

Table 2 shows the mean percentages of task-specific steps, which were the first 6 steps in each task analysis. Mean percentage of task steps for Pat was 63% in baseline, 94% in intervention, 95% in maintenance, and 93% in generalization.

Table 3 shows the mean percentages of recruiting steps, which were the last 4 steps in each task analysis, as a separate measure from the total number of steps. Mean percentage of recruiting steps for Pat was 0% in baseline, 60% in intervention, 70% in maintenance, and 65% in generalization.

Cameron

Figure 2 displays Cameron's performance across conditions for each task**.** During baseline for the cleaning table task, Cameron performed at a stable level of 5 steps completed correctly with a mean number of 5 steps completed correctly. For the sorting bills and coins task, Cameron completed a mean number of 4.6 steps correctly at a moderately stable level ranging from 3 to 5 steps correct. For the matching and connecting socks task, data were slightly more variable than the other two tasks with a mean of 4.7 steps correct with a range of 2 to 6 steps correct.

During intervention for the cleaning table task, Cameron performed at a stable level between 9 and 10 steps correctly with a mean of 9.33 steps correct. For the sorting bills and coins task, Cameron completed between 8 and 10 steps correctly with a mean of 9.2 steps correct. Finally, for the matching and connecting socks task, Cameron performed between 9 and 10 steps correctly with a mean number of 9.7 steps completed correctly. For each of the three tasks in intervention, Cameron's number of steps correct increased immediately and substantially to levels of mastery by at least the third session. During the maintenance and generalization phases,

Cameron continued to perform at high levels of accuracy, with a combined mean of 9.33 for the cleaning table task, 9.2 for the sorting bills and coins task, and 9.2 for the matching and connecting socks task.

Table 2 shows the mean percentages of task-specific steps, which were the first 6 steps in each task analysis. Mean percentage of task steps for Cameron was 78% in baseline, 96% in intervention, 96% in maintenance, and 98% in generalization.

Table 3 shows the mean percentages of recruiting steps as a separate measure from the total number of steps. Mean percentage of recruiting steps for Cameron was 3% in baseline, 91% in intervention, 86% in maintenance, and 100% in generalization.

Barb

Figure 3 displays Barb's steps completed correctly across each of the three tasks. During baseline for the matching and connecting socks task, Barb performed at a stable level with a mean number of 5.25 steps completed correctly and a range of 5 to 6 steps correct. For the cleaning table task, Barb completed a mean number of 5.2 steps correctly at a stable level with a range of 5 to 6 steps correct. For the sorting bills and coins task, data were slightly more variable than the other two tasks with a mean number of 5 steps completed correctly and a range of 4 to 6 steps correct.

During intervention for the matching and connecting socks task, Barb performed between 9 and 10 steps correctly with a mean of 9.6 steps correct. For the cleaning table task, Barb completed a mean number of 9.5 steps correctly. Finally, for the sorting bills and coins task, Barb completed a mean number of 9.6 steps correctly. For each of the three tasks in intervention, Barb's number of steps correct increased immediately and substantially to levels of mastery by at least the second session. During the maintenance and generalization phases, Barb continued to

perform at high levels of accuracy, with a combined mean of 9.75 for the matching and connecting socks task, 9.6 for the cleaning table task, and 10 for the sorting bills and coins task.

Table 2 shows the mean percentages of task-specific steps, which were the first 6 steps in each task analysis. Mean percentage of task steps for Barb was 83% in baseline, 96% in intervention, 99% in maintenance, and 100% in generalization.

Table 3 shows the mean percentages of recruiting steps as a separate measure from the total number of steps. Mean percentage of recruiting steps for Barb was 5% in baseline, 95% in intervention, 92% in maintenance, and 96% in generalization.

IOA

IOA was calculated using total agreement (agreements divided by agreements plus disagreements, multiplied by 100). Table 4 shows IOA for each condition for each student. IOA ranged from 86% to 100% in baseline, 88% to 100% in intervention, and 98% to 100% in both maintenance and generalization.

Treatment Integrity

Treatment integrity was calculated by dividing the number of steps completed correctly by the total number of steps and multiplying that by 100. Treatment integrity across conditions was found to be 100%. The checklists used to calculate treatment integrity can be found in Appendix E.

Social Validity

Both of the classroom teachers and two out of the three participants completed the social validity questionnaires. The participants answered all four questions positively, selecting the happy face for each. The teachers answered each question with either “strongly agree” or “agree”, with one “unsure” response (I think that using the self-monitoring and recruiting

attention checklists will help my students complete work tasks faster). Their collective responses suggest that both teachers and two of the participants found the intervention to be both enjoyable and useful in the classroom.

Figure 1

Pat's Results

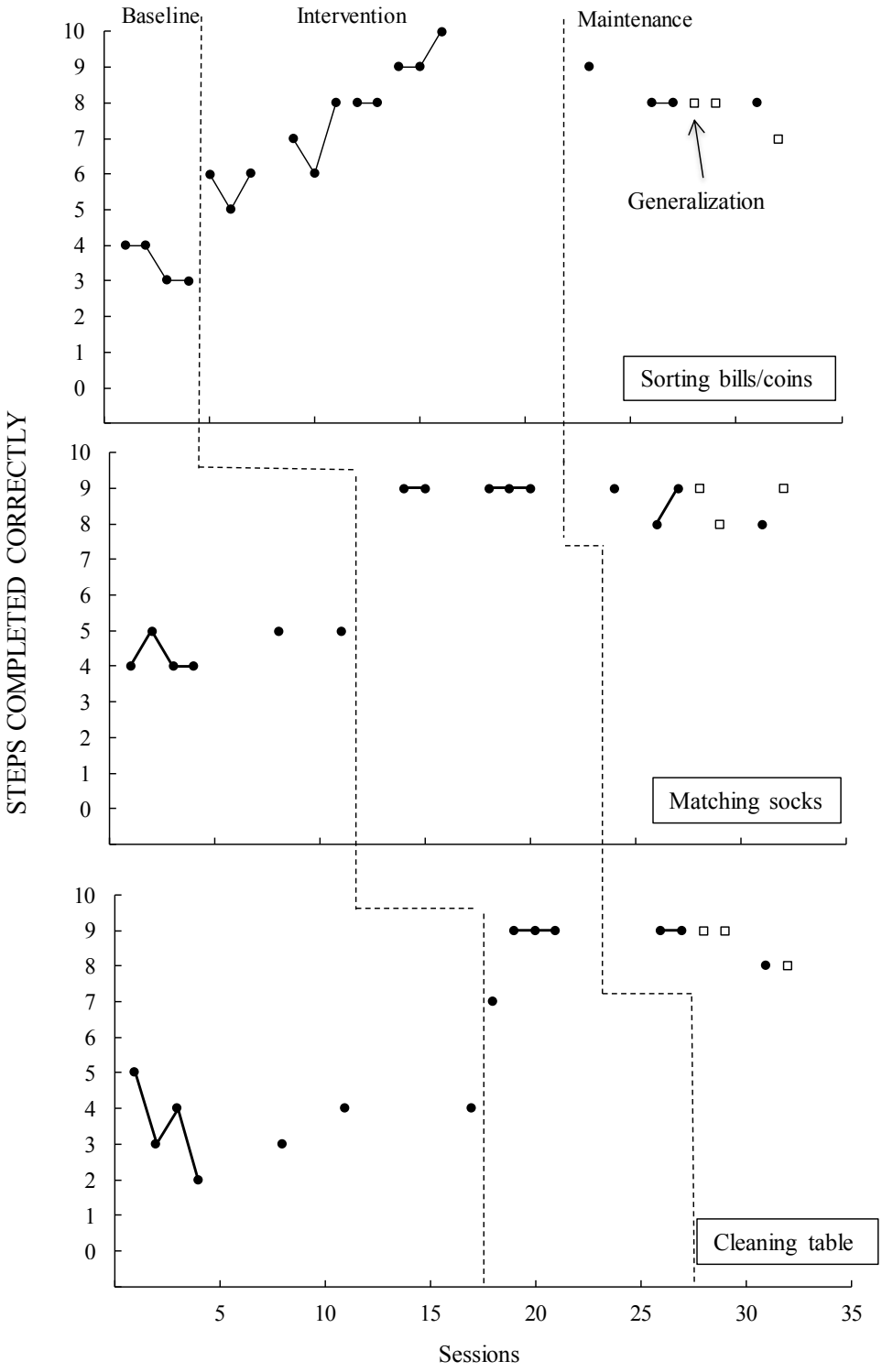

Figure 2

Cameron's Results

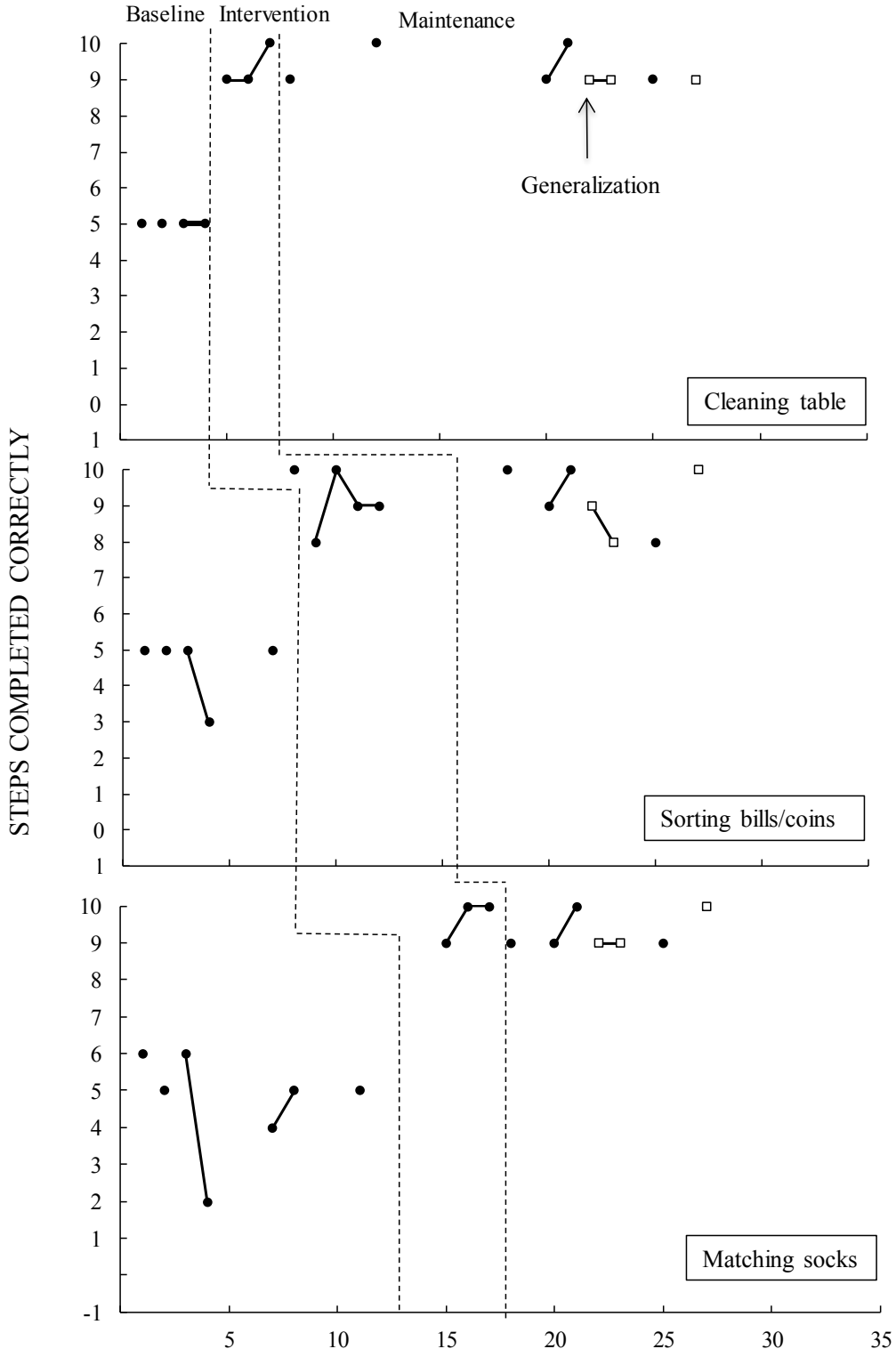

Figure 3

Barb's Results

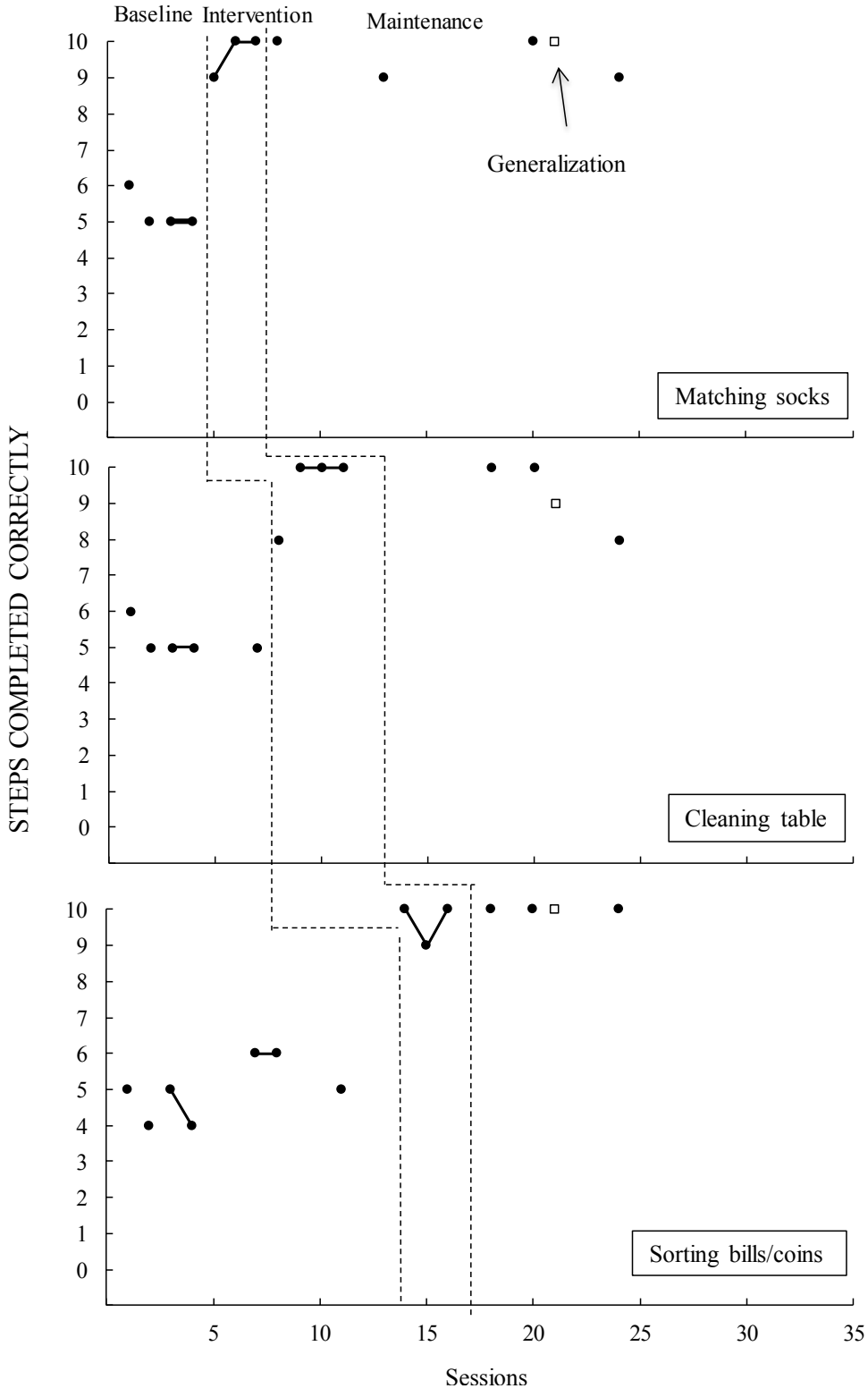

Table 2.

Mean percent of task steps performed correctly

	Baseline	Intervention	Maintenance	Generalization
Pat	63%	94%	95%	93%
Cameron	78%	96%	96%	98%
Barb	83%	96%	99%	100%

Table 3.

Mean percent of recruiting steps performed correctly

	Baseline	Intervention	Maintenance	Generalization
Pat	0%	60%	70%	65%
Cameron	3%	91%	86%	100%
Barb	5%	95%	92%	96%

Table 4.

Mean percent IOA

	Baseline	Intervention	Maintenance	Generalization
Pat	100%	88%	98%	100%
Cameron	90%	100%	98%	100%
Barb	86%	94%	100%	98%

Chapter 4

Discussion

The purpose of this study was to examine the effects of self-monitoring and recruiting reinforcement on the completion and accuracy of pre-vocational tasks by three middle school students identified with ASD. The results demonstrated a functional relation between the independent variable (self-monitoring intervention) and the dependent variable (number of steps completed correctly across each pre-vocational task) for all three students.

During baseline, Pat's data had moderate variability with a range of 2 to 6 steps correct. During intervention, Pat performed at a substantially higher level with a range of 5 to 10 steps correct. Cameron's baseline performance was also slightly variable with a range of 2 to 6 steps correct, but he immediately jumped to a range of 8 to 10 steps correct when the intervention was introduced. Barb performed at a stable level in baseline with a range of 4 to 6 steps correct, and improved significantly in intervention, jumping to a range of 8 to 10 steps correct.

The patterns of responding for each student demonstrated how quickly they were able to improve their accuracy of the pre-vocational tasks once intervention began. Each participant reached criteria in a timely manner, learned to generalize without further instruction, and maintained high levels of accuracy after the termination of the intervention. Additionally, each of the three participants had no prior training on recruiting reinforcement. Throughout baseline, performance of any recruiting steps completed correctly was minimal. However, each participant engaged in the necessary recruiting behaviors quickly and maintained those skills after the intervention ended, validating the usefulness of the self-monitoring checklist.

Results of this study support previous research that both self-monitoring (e.g.,: Holifield et al., 2010; Parker & Kamps, 2011) and recruiting reinforcement (e.g.,: Alber & Heward, 2000;

Craft, Alber, & Heward, 1998) can be useful and successful behavior change tools. This study was a systematic replication of Rouse et al. (2014) and extends the findings to a different population while also focusing more heavily on generalization. In Rouse et al. (2014), the participants were two 12-year-old students diagnosed with moderate to severe multiple disabilities. In the current study, however, the participants each had a diagnosis of ASD and were between 13 and 15 years of age. Assessing these interventions on a different population extends their effectiveness across different disability categories and age ranges. The generalization measures in Rouse et al. (2014) focused on the participants' ability to generalize the self-monitoring checklist to untrained tasks, while this study also measured generalization to untrained tasks as well as generalization to a novel adult in a different setting.

Prior to the implementation of the study, the students had no experience with utilizing task bins or following a job board to complete activities. They were able to familiarize themselves with these new procedures very efficiently as a result of the study. Although the majority of the improvements stemmed from increases in the accuracy of recruiting steps, the skill-specific steps for each task across all students also increased in accuracy due to the feedback that took place at the end of each session of intervention. The experimenter took time modeling and guiding the students through fixing any mistakes in order to learn the correct manner in which the tasks should be completed, which was not conducted in baseline, demonstrating the effectiveness of feedback in increasing the accuracy of task completion as it related specifically to the skill.

Social validity data indicated that both the teachers and students enjoyed the intervention. Students indicated that they found the intervention to be useful and fun, while teachers reported that it was a valuable use of the students' time and that it helped them to be more productive in

the classroom post intervention. The questionnaires validate the social significance of the intervention for both students and teachers.

Limitations and Future Research

Although this study assessed the effects of self-monitoring and recruiting reinforcement on the accuracy of pre-vocational skills, it only did so for middle school students identified with ASD. For that reason, future research may consider assessing the same intervention package for other disability categories and age ranges. Additionally, future research may also consider examining which part of the intervention was most effective. From this research it is impossible to identify which aspect of the intervention package was most successful. Future research could conduct a components analysis to determine which aspects of the treatment package are most effective for behavior change.

In regards to generalization measures, this study only evaluated the effects of the intervention with one other adult in one other classroom. Future research should attempt to assess generalization in several other settings with additional stimuli (e.g., materials, instructional arrangements). In this study, three generalization probes were conducted for two of the three participants. However, the experimenter was only able to conduct one generalization probe for Barb due to attendance issues. Future research should attempt to collect more generalization data across all participants. Furthermore, generalization was not assessed during baseline, which precludes the experimenters from determining whether or not a functional relation exists on the dependent variable of generalization. Future research should attempt to experimentally determine if a functional relation exists for generalization by collecting generalization data prior to intervention. In this study, students demonstrated maintenance for two and a half months after the intervention. However, examining maintenance throughout a

longer timeline including the next school year or on the job could strengthen future research.

Other limitations were related to social validity. The experimenter administered the social validity surveys, so the responses from the teacher and students may have been biased to please the experimenter. Future research should attempt to examine social validity in a more objective way, such as observations on whether or not the strategy was continued after the research ended. Additionally, Barb was not able to complete the social validity questionnaire due to issues related to attendance. Social validity assessment for Barb may have provided additional useful information for determining student acceptability for this intervention.

Another possible limitation of this study was the varying length of time the tasks took the participants to complete. The sorting bills and coins task took approximately twice as long as the other tasks for each of the participants. Even though performance was not affected, some non-compliance and fatigue occurred as a result for two of the three participants (Cameron and Pat). Future research should attempt to identify tasks that are similar in duration to avoid this issue.

This study was conducted with three middle-school students with autism on pre-vocational tasks that were limited to sorting bills and coins, matching and connecting socks, and cleaning a table. Future research might investigate the effects of this intervention, for example, on adults learning vocational skills, on students with emotional behavior disorders learning social skills, and on students with learning disabilities on academic skills. Additionally, future research may also attempt to customize the procedures for each participant to make the intervention more efficient.

Implications for Practice

This study demonstrated that self-monitoring along with recruiting adult attention can be successful for improving task accuracy for students with ASD. Additionally, the teachers in the

study believed that this was a valuable intervention and a positive use of the students' time based on responses from the social validity questionnaires. Teachers can use the self-monitoring checklist for a variety of tasks with a variety of learners. It is also cost efficient, and does not take lengthy amounts of time to gather and create the materials. Teachers can utilize this intervention to teach a plethora of new skills, and also use it as an aid for staying on task and increasing productivity in the classroom.

Teaching students to self-monitor using picture prompt checklists is very versatile. Modifications can easily be made to customize this intervention to other ability and age levels as well as other task areas. Teachers may want to consider adaptations such as flipping the list vertically and adding check boxes for students to self-monitor each step in a task list. In addition, teachers can accommodations for various types of learners. For example, for students who are visually impaired, teachers can add braille or make the images and text larger. For students who have physical disabilities, teachers can incorporate their assistive technology devices into the intervention, and for students who have learning disabilities, teachers can use self-monitoring for academic skills such as reading or math. All in all, the intervention is immensely adaptable which increases its practicality for teachers of all types of learners.

References

Alber, S. R., Anderson, L. L., Martin, C. M., & Moore, K. J. (2005). Teaching elementary students with behavior disorders to recruit positive teacher attention: Effects on math proficiency. *Journal of Early and Intensive Behavior Intervention, 2*(1), 59-73.

Alber, S., Heward, W., & Hippler, B. (1999). Teaching middle school students with learning disabilities to recruit positive teacher attention. *Exceptional Children, 65*(2), 253-270.

Alber, S. R., & Heward, W. L. (1997). Recruit it or lose it! Training students to recruit positive teacher attention. *Intervention in School and Clinic, 32,* 275-282.

Alber, S. R., & Heward, W. L. (2000). Teaching students to recruit positive attention: A review and recommendations. *Journal of Behavioral Education, 10,* 177-204.

Craft, M. A., Alber, S. R., & Heward, W. L. (1998). Training elementary students with developmental disabilities to recruit teacher attention in a general education classroom: Effects on teacher praise and academic productivity. *Journal of Applied Behavior Analysis, 31,* 399-415.

Cooper, John O., Heron, Timothy E.Heward, William L.. (2007) *Applied behavior analysis* /Upper Saddle River, N.J. : Pearson/Merrill-Prentice Hall,

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*(3), 163-169. doi:10.1177/108835760001500307

Hampshire, P. K., Butera, G. D., & Bellini, S. (2015). Self-management and parents as interventionists to improve homework independence in students with autism spectrum disorders. *Preventing School Failure 49(5),* 22-34.

http://dx.doi.org/10.1080/1045988X.2014.954515

Holifield, C., Goodman, J., Hazelkorn, M., & Heflin, L. J. (2010). Using self-monitoring to increase attending to task and academic accuracy in children with autism. *Focus on Autism and Other Developmental Disabilities,25*(4), 230-238. doi:10.1177/1088357610380137

Jensen, V. K., & Spannagel, S. C. (2011). The spectrum of autism spectrum disorder: a spectrum of needs, services, and challenges. *Journal of Contemporary Psychotherapy*, *41* (1), 1-9. doi:10.1007/S10879-010-9161-1

Koegel, L., Park, M. N., & Koegel, R. L. (2015). Using self-management to improve the reciprocal social conversation of children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 44*(5), 1055-1063.

Liu, Y., Moore, D., & Anderson, A. (2015). Improving social skills in a child with autism spectrum disorder through self-management training. *Behaviour Change,32*(4), 273-284. doi: DOI: https://doi.org/10.1017/bec.2015.14

Mancina, C., Tankersley, M., Kamps, D., Kravits, T., & Parrett, J. (2000). Reduction of inappropriate vocalizations for a child with autism using a self-management treatment program. *Journal of Autism and Developmental Disorders*. *30*(6), 599-606

Muller, E., Schuler, A., Burton, B., & G. (2003). Meeting the vocational support needs of individuals with asperger syndrome and other autism spectrum disabilities. *Journal of Vocational Rehabilitation,18*(3), 163-175.

Nicholas, J. S., Charles, J. M., Carpenter, L. A., King, L. B., Jenner, W., & Spratt, E. G. (2008). Prevalence and characteristics of children with autism-spectrum disorders. *Annals of*

Epidemiology,18(2), 130-136. doi:10.1016/j.annepidem.2007.10.013

Ohl, A., Sheff, M. G., Little, S., Nguyen, J., Paskor, K., & Zanjirian, A. (2017). Predictors of employment status among adults with autism spectrum disorder. *Work, 56*(2), 345-355. doi:10.3233/wor-172492

Parker, D., & Kamps, D. (2010). Effects of task analysis and self-monitoring for children with autism in multiple social settings. *Focus on Autism and Other Developmental Disabilities,26*(3), 131-142. doi:10.1177/1088357610376945

Rouse, C. A., Alber-Morgan, S. R., & Everhart-Sherwood, J. M. (2014). Effects of self-monitoring and recruiting teacher attention on pre-vocational skills. *Education and Training in Autism and Developmental Disabilities,49*(2), 313-327.

Schulze, M. A. (2016). Self-management strategies to support students with ASD. *Teaching Exceptional Children,48*(5), 225-231. doi:10.1177/0040059916640759

Seaman, R. L., & Cannella-Malone, H. I. (2016). Vocational skills interventions for adults with autism spectrum disorder: a review of the literature. *Journal of Developmental and Physical Disabilities,28*(3), 479-494. doi:10.1007/s10882-016-9479-z

Shattuck, P. T., Narendorf, S., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. (n.d.). Postsecondary education and employment among youth with an autism spectrum disorder. *Official Journal of the American Academy of Pediatrics,129*(6), 1042-1049.

Soares, D., Vannest, K., & Harrison, J. (2009). Computer aided self-monitoring to increase academic production and reduce self-injurious behavior in a child with autism. *Behavioral Interventions,24*(3), 171-183. doi:10.1002/bin.283

Stasolla, F., Perilli, V., & Damiani, R. (2014). Self monitoring to promote on-task behavior by two high functioning boys with autism spectrum disorders and symptoms of

ADHD. *Research in Autism Spectrum Disorders,8*(5), 472-479. doi:10.1016/j.rasd.2014.01.007

Wallace, M. A., Cox, E. A., & Skinner, C. H. (2003). Increasing independent seatwork: breaking large assignments into smaller assignments and teaching a student with retardation to recruit reinforcement. *School Psychology Review,32*(1), 132-142.

Watson, K. J., & Dicarlo, C. F. (2015). Increasing completion of classroom routines through the use of picture activity schedules. *Early Childhood Education Journal,44*(2), 89-96. doi:10.1007/s10643-015-0697-2

Wilczynski, S. M., Trammell, B., & Clarke, L. S. (2013). Improving employment outcomes among adolescents and adults on the autism spectrum. *Psychology in the Schools,50*(9), 876-887. doi:10.1002/pits.21718

Wilkinson, L. A. (2008). Self-management for children with high-functioning autism spectrum disorders. *Intervention in School and Clinic,43*(3), 150-157. doi:10.1177/1053451207311613

Appendix A

Job Board

Appendix B

Self-Monitoring Checklist

Appendix C

Task Bin

Appendix D

Task Analyses

Matching and connecting socks
1. Look at job board
2. Locate bin
3. Open drawer
4. Retrieve materials from drawer (socks)
5. Match like pairs
6. Fold together to connect
7. Raise your hand
8. Wait quietly for teacher
9. Tell/show the teacher your work is finished
10. Listen to feedback from teacher and put materials away

Sorting bills and coins
1. Look at job board
2. Locate bin
3. Open drawer
4. Retrieve materials from drawer (bills, coins, containers)
5. Place like bills in large slots
6. Place like coins in smaller slots
7. Raise your hand
8. Wait quietly for teacher
9. Tell/show the teacher your work is finished
10. Listen to feedback from teacher and put materials away

Cleaning table
1. Look at job board
2. Locate bin
3. Open drawer
4. Retrieve materials from drawer (spray bottle and rag)
5. Spray down table
6. Use rag to wipe up spray (at least 80% of table using circular motions)
7. Raise your hand
8. Wait quietly for teacher
9. Tell/show the teacher your work is finished
10. Listen to feedback from teacher and put materials away

Appendix E

Treatment Integrity Checklists

Baseline:

- ☐ 1. Direct student to begin work
- ☐ 2. Redirect attention if student becomes off task for more than two minutes

Intervention:

- ☐ 1. Give task bin to student and provide him/her with job board and self-monitoring checklist
- ☐ 2. Prompt student to start work
- ☐ 3. Wait for student to notify teacher that work has been completed
- ☐ 4. Prompt student to fix errors if necessary
- ☐ 5. Provide praise

Appendix F

Social Validity Questionnaire for Teachers

1. I believe that my students are more productive in the classroom after the intervention.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
2. I feel confident that my students will continue to use the self-monitoring and recruiting attention checklists after the intervention has ended.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
3. I believe that this was a successful use of my students' time.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
4. I believe that my students are likely to use prompt checklists to complete work in the future.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
5. I believe that my students are likely to ask for feedback from adults when completing a task in the future.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
6. I think that using a checklist can help my students with other generalized tasks in other classrooms.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree
7. I think that using the self-monitoring and recruiting attention checklists will help my students complete work tasks faster.
    a. Strongly agree
    b. Agree
    c. Unsure
    d. Disagree
    e. Strongly disagree

Appendix G

Social Validity Questionnaire for Students

1. Do you think the checklist helped you complete the steps more accurately?

2. Do you think that you will continue to use checklists to help you with other activities?

3. Do you think the checklist helped you to stay on task while working?

4. Did you enjoy using the picture prompt checklist to complete your work?