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Using Social Stories to Improve Socially Appropriate Behaviors in Children with Autism

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USING SOCIAL STORIES TO IMPROVE SOCIALLY APPROPRIATE BEHAVIORS IN CHILDREN WITH AUTISM

By

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This thesis is dedicated to Dr. Karen Arnell. Dr. Arnell was my first research advisor in Psychology and one of my first statistics instructors. She had the unique ability to make research understandable and entertaining. She was a mentor and friend.

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ABSTRACT

Few studies have been conducted to evaluate the effectiveness of social stories. Studies conducted to date have combined social stories with other intervention tactics, such as behavioral supports, picture prompts, and video modeling. They have found these social stories therapy packages effective in teaching alternatives to challenging behaviors. This experiment investigated the effects of social stories written according to Gray (1998) to address problem behaviors that are not being addressed by other interventions for three children with autism. On-task behavior increased following implementation of the social story intervention. Providing a pictorial version of the social story resulted in further improvement in on-task behavior for one participant and may have facilitated maintenance for the second participant.

USING SOCIAL STORIES TO IMPROVE SOCIALLY APPROPRIATE BEHAVIORS IN CHILDREN WITH AUTISM

Autism affects approximately 2-6 people per 1,000 and is 4-5 times more common in males than females (Center for Disease Control, 2005). In general, children with autism begin developing normally until 1 or 2 years of age (Camaioni, 1997). Abnormalities in communication and emotional responses are often the first signs of autism.

In the area of social interaction, children with autism show an obvious difference. The principal social characteristic in children with autism is a failure to show affection or build personal relationships or attachments with peers and family (Owens, 1998; Rutter & Schopler, 1978). According to the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*), individuals may also be socially isolated, prefer solitude, and act inappropriately in social situations (American Psychiatric Association, 1994). Deficits in non-verbal social behaviors (e.g., eye contact and facial expressions) and looking through a person instead of looking at them also are characteristics (*DSM-IV*; Nietzel et al., 1998; Pelphrey, Sasson, Reznick, Paul, Goldman, & Piven, 2002).

The second area of impairment in this developmental disorder is in behavior regulation. The most recognized characteristics in this area include adhering to a routine schedule and demonstrating stereotyped or repetitive behavior (*DSM-IV*, 1994). Individuals with autism may insist upon a strict routine, such as getting dressed in a particular order, and can become distressed when something changes. The *DSM-IV* also characterizes individuals with autism to having a set of unspoken, unbreakable rules of how everything should be done (Nietzel et al., 1998). Individuals with autism may be obsessed with objects and their associated movements, become preoccupied with a sequence of particular body movements, such as clapping or flapping their fingers, or become hyper- or hyposensitive to certain stimuli (Owens, 1998). A decline in imaginative play (Minshew, Meyer, & Goldstein, 2002) or development of an expertise in a specific area, such as math, also may be characteristics.

The third, and possibly primary, area of impairment in autism is a delay in communication development. Extensive research has been conducted in this domain

and impairments include an inability to speak or gesture, improper communication, and echolalia (Berger, 1998; Cohen & Donnellan, 1987; Owens, 1998). Severe impairments of joint-attention and the development of gestures also have been demonstrated (Baron-Cohen, 1989; Camaioni, 1997; Mundy, Sigman, Ungerer, & Sherman, 1986). Although children with autism may be able to request objects or social routines, these are primarily contact gestures (i.e., physically bringing someone to the object) and not distal gestures (i.e., pointing to the object). A complete absence of speech may appear in severe cases of this disorder (Minshew, Goldstein, & Siegel, 1995). Individuals with autism perform less well on a number of speech and language tests, including verbal learning, reading, pragmatics, and oral language fluency (Minshew et al., 1995).

Individuals with autism have strengths in memory and the ability to use visual information. Individuals are able to remember information for a long period of time. Instead of relying on auditory processing or attention, individuals have the ability to use visual information in a meaningful way. When learning a routine, if the steps are presented in a meaningful sequence with a clear start and finish, individuals are better able to complete the routine.

Visual Support Systems

Researchers have demonstrated the effectiveness of visual support systems to remediate the three areas affected by autism (Charlop & Milstein, 1989; Grandin, 1995; Gray & Garand, 1993; Haring, Kennedy, Adams, & Pitts-Conway, 1987; Krantz, MacDuff, McClannahan, 1993; MacDuff, Krantz, & McClannahan, 1993; Pierce & Schreibman, 1994). The studies implemented visual supports such as picture prompts, photographic activity schedules, visual schedules, checklists, and videotape modeling. Numerous books addressing possible visual intervention strategies and ideas for school and home settings also have been written (Gray, 1994a, 1994b, 1995, 1998; Hodgdon, 1995; Koegel & Koegel, 1995; Moyes, 2001; Quill, 1995; Savner, & Myles, 2000).

Carol Gray (Gray & Garand, 1993) developed social stories, a visual strategy, to address social skills in children with autism. Social stories are short stories written by parents, teachers, or professionals to describe a situation or behavior that may be ambiguous, confusing, or problematic for the individual. Specifically, Gray (1998) stated the following:

> A social story is a short story that adheres to a specific format and guidelines to objectively describe a person, skill, event, concept, or social situation. . . . The goal of a social story is to share relevant information. This information often includes (but is not limited to) *where* and *when* a situation takes place, *who* is involved, *what* is occurring, and *why.* (p. 171)

The stories are applicable to a variety of settings – home, school, daycare, community, etc. Although the stories initially were written for children with high-functioning autism, they also have been used with children with Asperger Syndrome and other pervasive developmental disabilities (Bledsoe, Myles, & Simpson, 2003; Rogers & Myles, 2001; Rowe, 1999; Swaggart et al., 1995). The story identifies the situation or behavior and describes appropriate social cues and preferred responses (Gray, 1995). Social stories are thought to be effective because they address particular behaviors that individuals with autism lack, such as initiating and responding to conversation, changing a routine, understanding how other people may feel or think, and how to respond appropriately in a social situation.

Prior to writing a social story, the caregiver or teacher should follow a set of guidelines previously outlined (Gray & Garand, 1993; Swaggart et al., 1995). First, the caregiver or teacher needs to identify the problem behavior and situation (e.g., a child may need to learn to wash their hands between recess and lunch). Next, the child's target behavior needs to be defined (e.g., the child will wash hands following appropriate steps) and baseline data collected.

The social story is then written. Gray (1998) outlines four types of sentences that are utilized when writing a social story: *descriptive*, *perspective*, *directive*, and *control*. *Descriptive sentences* define who is involved, where the situation takes place, what is happening, what is expected, and why. *Perspective sentences* describe what others may be feeling or thinking. These sentences address the theory of mind that the child with autism may lack. *Directive sentences* explain to the child what is expected of and how to respond to the situation, by using "I will try…" or "I will work on…" statements. *Control sentences* are used to help the child define or remember the story better. Finally, Gray suggests using 0-1 directive or control sentences for every 2-5 descriptive and/or perspective sentences to avoid the rigidity of being required to respond in the

specified way (Gray). Additionally, Gray suggests writing the story at or slightly below the child's comprehension level, in the first person, and usually in present tense, although future tense is appropriate in some situations. The author should place one to three sentences on a page. Depending on the individual and their abilities, pictures may be added to aid in comprehension, especially for young children or children who are low-functioning. An example of a hand washing social story follows:

> Sometimes my hands get dirty when I play at recess. I wash my hands when they get dirty. Sometimes my hands get dirty when I go to the bathroom. Sometimes my hands get dirty when I play with my dog. I will try to wash my hands before I eat. My teacher is happy when I wash my hands.

The social story is then read to the child and the targeted behavior is modeled. The story typically is read immediately prior to the situation where the behavior occurs (e.g., between recess and lunch). The behavior may be modeled to demonstrate the appropriate behavior and to define confusing terms. Intervention data are then collected. If the targeted behavior does not change within two weeks, systematically changing different elements of the intervention can help identify what needs to be modified to make the intervention successful (e.g., the reader of the story, the story content, the time the story is read, etc.). Finally, once the targeted behavior change has been established, the caregiver and/or parent may want to fade out the social story or make the child responsible for reading the story daily. If the targeted behavior has become routine, eliminating the reading may be successful. As the story is faded, the caregiver should look for instances when the child generalizes the learned behavior to other situations (e.g., washing hands after playing, after using the bathroom, after coughing, etc.).

Experimental Research

Social stories are relatively new and few experimental research studies have been completed on this type of visual intervention (see Table 1). The first experimental study to implement social stories was conducted by Swaggart et al. (1995). The experimenters applied a social story intervention in a school setting to three children diagnosed with autism or a pervasive developmental disorder, ranging in age from 7 to 11 years. The authors used a pre-experimental AB design. It should be noted that prior

to and throughout the study a behavior social skills intervention model was in place (e.g., picture schedules). Therefore, the following results are the combined effect of both interventions. The targeted behaviors were greeting people appropriately and reducing aggression in Participant 1 and sharing, increasing parallel play, decreasing aggression, screaming, and grabbing in Participants 2 and 3. After the intervention addressing greetings, Participant 1's appropriate greeting behavior increased from 7% to 74%, inappropriate touches decreased from 82% to 26%, and aggressiveness decreased from 9% to 0%. Following intervention addressing general aggression, Participant 1's aggressions decreased from about 6.1 to 1.8 occurrences of aggressive contacts. After intervention, Participant 2's incidence of aggression decreased from 30% to 6%, parallel play increased from 80% to 94%, sharing increased from 0% to 22%, and screaming decreased from 100% to 56%. Further, Participant 3's occurrence of aggression decreased from 20% to 0%, parallel play increased from 80% to 94%, sharing increased from 0% to 35%, and grabbing decreased from 100% to 35%.

The results clearly showed a decrease in inappropriate behaviors and an increase in appropriate behaviors immediately after the social story was implemented. However, it is unclear if the results are due to the combination of social stories and the previous training model or if they are solely due to social story intervention. Unfortunately, most other researchers using this intervention model also implemented other behavioral and/or visual supports or strategies to modify behavior (Bledsoe et al., 2003; Hagiwara, 1998; Hagiwara & Myles, 1999; Kuttler, Myles, & Carlson, 1998; Norris & Dattilo, 1999; Rogers & Myles, 2001; Rowe, 1999; Swaggart et al., 1995; Thiemann & Goldstein, 2001).

Brownell (2002) studied the use of social stories combined with music therapy and found effects similar to those attributed to social story books. Hagiwara and Myles (1999) used multimedia combining social stories, visual symbols, and computer-based instruction. The social stories were presented to the children on a computer using a book-like format with the capability of the computer reading the story out loud. The results of the multimedia approach were positive, but inconsistent and unstable when compared to the traditional method. This novel approach increased the skills of some participants in particular settings. Thiemann and Goldstein (2001) measured the

effectiveness of pictorial and written cues in conjunction with video feedback. In the study, participants with autism were paired with two peers who did not have a disability during 30-minute intervention sessions. The sessions included systematic instruction, which included social stories as well as other strategies, social activity participation, and self-evaluation via video feedback. Again, the results indicated the intervention was successful, but it is unclear if the results were due to the unique combination of treatments or to the social story component in particular.

Table 1. Overview of Studies on Social Stories for Children with Autism and Asperger Syndrome

Authors	Year	*N*	Ages	Design	Target behaviors	Results	Dx	Setting
Swaggart et al.	1995	3	7, 7, 11	AB	Greeting, aggression, sharing	+	ASD, PDD	School
Kuttler et al.	1998	1	12	ABAB	Tantrum	+	ASD, Fragile X	School
Hagiwara & Myles	1999	3	8, 10, 10	Multiple baseline	Hand washing, on-task	+	ASD	School
Norris & Datillo	1999	1	8	AB	Social interaction	+	ASD	School
Rowe	1999	1	Year 2	AB	Shouting, eating	+	AS	School
Thiemann & Goldstein	2001	5	6, 7, 8, 11, 12	Multiple baseline	Social language development	+	ASD	School
Rogers & Myles	2001	1	14	AB	Redirections, tardy	+	AS	School
Lorimer et al.	2002	1	5	ABAB	Interrupting, tantrum	+	ASD	Home
Scattone et al.	2002	3	7, 7, 15	Multiple baseline	Sitting, staring, shouting	+	ASD	School
Brownell	2002	4	6-9	ABAC ACAB	Echolalia, following directions, talking	+	ASD	School
Bledsoe et al.	2003	1	13	ABAB	Spilling food, wiping mouth	+	AS	School
Kouch & Mirenda	2003	3	3.5, 5, 6	ABA ACABA	Aggression, crying, yelling, eating, playing	+	ASD	Home, School
Adams et al.	2004	1	7	ABAB	Crying, falling, hitting, screaming	+	ASD	Home
Barry & Burlew	2004	2	7, 8	ABCD mult. base.	Choice making, appropriate play	+	ASD	School
Ivey, Heflin, & Alberto	2004	3	5, 5, 7	ABAB	Preparation for novel event	+	PDD-NOS	Children's Hospital

Note. Dx - Diagnosis; ASD = Autism Spectrum Disorder; AS = Asperger Syndrome; PDD = Pervasive Developmental Disorder; PDD-NOS = Pervasive Developmental Disorder - Not Otherwise Specified; Year 2 = Year Two pupil at primary school.

A recent study by Scattone, Wilczynski, Edwards, and Rabian (2002) implemented social story intervention when no other interventions were in place (except one participant who had been receiving an on-task behavior intervention which had been implemented a period of time prior to the targeted intervention). The researchers used the social story intervention in a school setting on three children diagnosed with autism, ranging in age from 7 to 15. The authors used a multiple baseline design across participants. The targeted behaviors were tipping his chair for Participant 1, staring inappropriately at girls for Participant 2, and shouting during class for Participant 3. After the social story intervention, Participant 1's chair tipping decreased from 50% to 4.6%; Participant 2's inappropriate staring decreased from 66.9% to 18.3%; and Participant 3's shouting decreased from 16% to 5.1%. Again, the results were positive showing a decrease in disruptive behavior indicating the effectiveness of social story intervention even when other behavioral interventions are not in place.

In summary, individuals with autism respond well to visual support systems that have addressed numerous challenging behaviors. Social stories developed by Gray (Gray & Garand, 1993), appear to be effective when addressing challenging behavior in children with autism. However, most of the experimental research combined social story intervention with another mode of intervention (e.g., picture prompts, video modeling, music therapy). It is unclear if the positive behavior change is due solely to the social story intervention or to the unique intervention combinations. In the proposed experiment, social stories will be read to children with autism to address a particular problem behavior that is not being addressed by another type of intervention. The specific question addressed will be: What are the relations between social story intervention and problem behaviors? We predict that social stories alone will have an effect: the children who read social stories will demonstrate increases in adaptive behaviors targeted and an associated reduction in problem behavior.

Method

Participants

Written consent was obtained from the parents of the participants. Verbal assent was obtained from each participant prior to the intervention. These procedures were in

compliance with Florida State University's Institutional Review Board guidelines (see Appendix A). Three kindergarten to fifth grade students participated. All participants were diagnosed with autism. At the start of the study, each student received services in a self-contained classroom. About midway through the study, Participants 2 and 3 were moved to mainstream classrooms. The move occurred during the social story condition for Participant 1 and the baseline condition for Participant 3 (see Figure 1). The move did not affect the percentage of on-task behavior for either participant. The following selection criteria were applied. Participants: 1) had been diagnosed with a developmental delay, 2) demonstrated problem behaviors and impaired verbal and/or social communication, 3) did not receive services or intervention for the targeted problem behavior. Each of the participants' scores on the subsequent assessments were obtained to substantiate the presence of autism-related characteristics and the participants' present communication and social skills status: the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Rochen-Renner, 1988), Oral and Written Language Scales (OWLS; Carrow-Woolfolk, 1995), and the Social Skills Rating System (SSRS; Gresham & Elliott, 1990).

Participant 1. Participant 1 was a Black male, 10 years 3 months of age when the study commenced. He was in the fifth grade but was in a self-contained classroom for the entire day. The self-contained classroom had children from third to fifth grade. He scored just below the severely autistic range of autism on the CARS. On the OWLS, he attained a standard score of 52 and an age-equivalent of 7 years 4 months. According to teacher report on the SSRS, he received a standard score of 81, indicating his social skills were delayed. He received 1 hour of language therapy each week.

Participant 2. Participant 2 was a White male, 6 years 1 month of age. He was in kindergarten in a self-contained classroom for all but 1hour each day when he went to a mainstream kindergarten room. The self-contained classroom had children from kindergarten to second grade. Part way through the study, he moved to the mainstream kindergarten room full-time. He scored in the non-autistic range on the CARS. On the OWLS, he attained a standard score of 65 and an age-equivalent of 3 years 4 months. According to teacher report on the SSRS, his received a standard score of 88,

indicating his social skills were at the lower end of the average range. He received 1 hour of language therapy each week.

Participant 3. Participant 3 was a Hispanic male, 5 years 2 months of age. He was in kindergarten in a self-contained classroom for all but 1hour each day when he went to a mainstream kindergarten room. He was in the same self-contained classroom as Participant 2. Part way through the study, he moved to the mainstream kindergarten room full-time and was assigned a full-time paraprofessional. He scored in the mildly-moderately autistic range on the CARS. On the OWLS, he attained a standard score of 73 and an age-equivalent of 3 years 2 months. According to teacher report on the SSRS, his received a standard score of 96, indicating his social skills were at the lower end of the average range. He received 1 hour of language therapy each week.

Setting

All of the intervention sessions took place in the child's classroom or computer room. During treatment, the social story was read to Participant 1 each day in a quiet corner of the classroom a few minutes prior to the activity of interest. The social story was read to Participants 2 and 3 each day in the outdoor hallway outside the child's classroom. The child then participated in the activity in the classroom with the other children.

Procedures

The classroom teacher, parents, and author identified behaviors that were targeted. The targeted behaviors selected were distracting to the participant or other children in the classroom, impeded social involvement, and were well suited for a social story. During baseline, each participant engaged in the regular classroom routine. Direct interactions with the author did not occur during baseline.

One social story was written for each child according to Gray and Garand's (1993) outlines. The social story included information about the targeted behavior (e.g., listening to the classroom teacher, sitting in circle) and where the routine occurred. During treatment, the author read the social story to the participant each day immediately before the routine that was targeted (e.g., circle time, morning bell). The child was then asked questions regarding what they would do next (e.g., What will you do when it is time for circle?) to aid in comprehension. The child did not take the social

story with him to the routine. The author then observed the targeted routine but direct interactions with the child did not occur.

Each social story was printed on 5.5 by 8.5 inch white paper. The title was 36-point Times New Roman and the story was 20-point. All text and pictures were centered on the page. Pictures were taken from The Picture Communication Symbols Book (Mayer-Johnson, 1981).

The pages of the book were laminated and bound with a black binder on the left side. Participant 1's on-task behavior increased following the social story intervention but there was still room for improvement as he was on-task about 50% of the time. The social story for Participant 1 was then modified into a pictorial version of the social story. Participant 1's pictorial version was placed on 6 by 9 inch black foam board. Pictures taken from the social story were reduced to 1.25 by 1.25 inch cards, laminated, and Velcroed to the board. A 3.5 by 5.5 inch clear, plastic envelope was placed in the upper right-hand corner of the board to hold the cards when he completed a task. The author introduced Participant 1 to the pictorial board over four sessions and data were not collected. Following the introduction, the author or the paraprofessional assigned to the computer room placed the pictorial board on the table next to Participant 1 and interactions did not occur. He was able to use the pictorial board during his entire routine.

The social story for Participant 2 was modified into a pictorial strip. Participant 2's pictorial strip was placed on 1.5 by 7.75 inch white paper and laminated. Pictures taken from the social story were reduced to 1.25 by 1.25 inches. The pictorial strip was taped to the floor in front of Participant 2's spot during circle time. Following one session when the author introduced Participant 2 to the pictorial strip, direct interactions no longer occurred. The social story, comprehension questions, and pictorials for each participant appear in the Appendix B.

Data Collection and Analysis

Before the morning bell rang, Participant 1 was allowed to go to the computer room to play games. The primary dependent variable for Participant 1 was preparing to leave the computer room to transition to the regular classroom in an appropriate way. On-task behavior was defined as getting his jacket and bag, moving away from his

computer and walking toward the line at the door, and standing quietly in line without touching another computer or leaning next to/over another student who is seated at a computer. While standing in line he could look at nearby computers as long as he did not lean toward the screen or touch it. Off-task behavior was defined as wandering around the room in any direction other than the direction of the door, working at a computer including the computer he was working at once the bell rang, standing next to a student at a computer and leaning over to look at the screen, and while standing in line, touching a computer or leaning over to look at a computer. In addition, the time it took for Participant 1 to initially leave his computer was measured during every session. This was defined as the first time Participant 1's behavior was scored '+.'

At the start of the study, Participants 2 and 3 were in a self-contained classroom. They each participated in the morning circle and reading curriculum of different mainstream kindergarten classrooms for about an hour each day. Participant 2 was a mainstream classroom full-time at session 32. Participant 3 was moved to a mainstream classroom full-time with a full-time paraprofessional at session 29. Data were collected for Participant 2 during morning circle which included lunch count, calendar, counting, and part of the reading curriculum instruction. Data were collected for Participant 3 only during the reading curriculum instruction when the regular teacher or reading resource teacher was present. The assigned paraprofessional was usually sitting next to Participant 3. She was occasionally across the classroom, but was generally in the same locale as the Participant.

The primary dependent variable for Participants 2 and 3 was behaving appropriately during circle time. On-task behavior was defined as being quiet in circle (e.g., verbalizing only when asked individually by the teacher or asked to respond as a group; raising hand and asked to be called on by the teacher before speaking), sitting in circle, attending to the teacher by looking at the teacher or toward/at the object or person the teacher was attending to, and following directions (e.g., depending on comprehension, following directions using key words - teacher says "put your hands on your head" and student puts hands in front of their head). Off-task behavior was defined as vocalizing during circle without being asked by the teacher (i.e., speaking without raising hand or raising hand but not waiting to be called on), rolling or laying on the

ground, leaving the group situation without being asked by the teacher, looking away from the teacher but not to the object or person the teacher was attending to, and not following directions (e.g., teacher says “put your hands on your head” and student picks at carpet, looks at ceiling, plays with shoe laces, etc.). In addition, the number of times Participant 2 spoke out-of-turn during the 5-minute routine were collected approximately every fourth session (totaling 27% of sessions).

Participant 2’s original on-task behaviors did not include following directions which was added at session 12. His mean percentage for on-task behavior from sessions 1-11 was 73%. Because there was little room for improvement in his on-task behavior, his target behavior was changed adding the requirement that he follow directions. Consequently, data collected prior to session 12 were not included in Figure 1.

Targeted behaviors were coded every 10 seconds for Participant 1 since his routine varied in length and every 15 seconds during the 5-minute routine for Participants 2 and 3. If the participant demonstrated every targeted behavior in an appropriate manner (on-task) during the interval, a “+” was recorded. If the participant demonstrated any targeted behavior in an inappropriate manner (off-task) during the interval, a “-” was recorded. If the circle routine for Participants 2 and 3 was reduced (e.g., child was asked to bring attendance to office and left circle), the targeted behaviors were recorded for the time the child participated prior to leaving. The mean length of the computer room routine for Participant 1 was 2.5 minutes (range = 1.17 - 3.83 minutes). All sessions for Participants 2 and 3 were 5-minutes, except 2 sessions for Participant 2 (reduced to 3.75 minutes and 4.75 minutes) and 1 session for Participant 3 (reduced to 4.75 minutes).

Each targeted behavior was graphed as a percentage of intervals during each session for every participant. Data points collected for baseline and intervention sessions were visually analyzed for changes in level, trend, stability, and variability.

Reliability

Reliability was checked on 25% of the observations by a secondary coder (a master’s level student in communication disorders). The coder was trained over two consecutive sessions. The author defined on-task and off-task behavior. The author and

coder coded the behaviors of all participants. When a disagreement occurred during training, the author and coder discussed the disagreement and rationale behind their code and an agreement was made for which code to use. Reliability was above 80% before the coder was able to code alone. Reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Interobserver agreement was 96% for Participant 1, 92% for Participant 2, and 88% for Participant 3.

Experimental Design

A multiple baseline design across participants was used to evaluate the effectiveness of the social story intervention. Intervention was administered in a staggered fashion across participants so that one participant served as a control for another participant. If desired behavior change was evident when and only when therapy was initiated and this was replicated across three participants, one can be reasonably confident this behavior change was a function of social story intervention.

During baseline, the participants engaged in the typical classroom routine. All participants showed considerable variability, but no evidence of improvement over the course of 9, 9, and 39 baseline sessions, respectively. The intervention was introduced only after an average level of performance become evident with no apparent trend in the targeted behavior.

Social Validity

Before and after the intervention, two mainstream kindergarten teachers who were unfamiliar with the purpose of the study completed a 7-question Likert scale survey and provided subjective ratings of the targeted behavior for Participants 2 and 3 (see Appendix C). Social validity for Participant 1 was not measured as the paraprofessional was in the same room when the intervention was administered and may have skewed social validity results.

Results

Targeted Behaviors

Each participant's data were analyzed using the aforementioned scoring protocol ("+" for on-task or appropriate, "-" for off-task or inappropriate). Targeted behaviors were coded every 15 seconds during the 5-minute routine for Participants 2 and 3 and every

10 seconds for Participant 1. Frequencies of the "appropriate" targeted behaviors during the classroom routine are presented in Figure 1. A visual analysis showed that all three participants demonstrated an increase in the targeted behavior after the social story intervention was implemented.

Participant 1. As shown during baseline, the mean frequency of on-task behavior or preparing to leave the computer room to the regular classroom in an appropriate way for Participant 1 was 29% (range = 5-50; see Table 2). During social story intervention, the mean frequency was 50% (range = 31-81). Following the introduction of the pictorial version, the mean frequency was 72% (range = 43-90). During baseline, it took Participant 1 an average of 87 seconds to initially leave his computer (range = 50-130; see Table 3). During the social story and pictorial board intervention, Participant 1 got in line after an average of 85 seconds (range = 30-220) and 41 seconds (range = 10-110), respectively.

Table 2. Percentage of intervals of on-task behavior

		Baseline	Social Story	Pictorial Version
Participant 1	Mean	29	50	72
	St. Dev.	17.3	17.5	12.4
	Range	5-50	31-81	43-90
Participant 2	Mean	56	76	78
	St. Dev.	13.6	10.6	12.2
	Range	30-65	55-95	60-100
Participant 3	Mean	60	73	
	St. Dev.	19.4	14.4	
	Range	5-95	40-90	

Table 3. Average time (in seconds) for Participant 1 to initially leave computer

	Baseline	Social Story	Pictorial Version
Mean	87	85	41
Median	90	70	40
St. Dev.	26.9	56.3	22.6
Range	50-130	30-220	10-110

Participant 2. During baseline, the mean frequency of on-task behavior or behaving appropriately during circle time for Participant 2 was 56% (range = 30-65). During intervention of the social story, the mean frequency was 76% (range = 55-95). When given the pictorial strip, the mean frequency was 78% (range = 60-100). The number of times Participant 2 spoke out-of-turn was sampled during 27% of the sessions. During baseline, the mean frequency of speaking out-of-turn during the 5-minute observation period was 1.8 times (range = 0-3). Following social story and pictorial strip intervention, the mean frequency of speaking out-of-turn was 1 (range = 0-4) and 0 times, respectively.

Participant 3. During baseline, the mean frequency of on-task behavior or behaving appropriately during circle time for Participant 3 was 60% (range = 5-95). During intervention, the mean frequency was 73% (range = 40-90).

Maintenance. Six weeks following the end of intervention, data for two maintenance sessions were recorded. Each participant maintained the level of behavior shown in for the previous intervention.

Social Validity Assessment

Teacher opinions on Participants 2 and 3 behaviors during the morning circle time are presented in Table 4. Following intervention, Participant 2's teacher reported an improvement in greeting the teacher upon arrival in the morning and no change in other behavior. Participant 3's teacher reported an improvement in initiating conversation, no change in greeting the teacher, and a decrease in other behaviors (i.e., quits playing, raises hand, sits quietly, behaves, is attentive).

Pretreatment ratings were collected while the participants were in a self-contained classroom and spend one hour each day with the Kindergarten teacher. Posttreatment ratings were collected after the participants were mainstreamed to a full-time Kindergarten class. The difference in scores may be due to the amount of time the teachers had with the participants prior to (e.g., one hour a day) and following (e.g., 7 hours a day) treatment. Participant 3's teacher consistently scored the Pretreatment assessment with 4's and 5's. These high scores did not allow Participant 3 to improve his behaviors for Posttreatment ratings and could only be given the same or a lower score.

Table 4. Summary of Teacher Social Validity Ratings Pre- and Posttreatment

	Participant 2			Participant 3		
Behavior	Pre	Post	Difference	Pre	Post	Difference
Greets teacher	4	5	1	4	4	0
Quits playing	4	4	0	4	3	-1
Raises hand	4	4	0	5	3	-2
Sits quietly	4	4	0	5	4	-1
Behaves	4	4	0	5	3	-2
Attentive	4	4	0	4	3	-1
Initiates conversation	4	4	0	1	2	1

Discussion

The present study adds to the body of literature suggesting that social stories are an effective intervention, in particular, by showing the method is effective but not necessarily optimal as the sole intervention. This study demonstrated that social stories, presented as an auditory-visual support system, were effective in increasing desired behaviors in three children with autism. Possibly the most interesting and significant aspect of this study is a visual analysis of the data, which clearly shows that the participants benefited from the intervention. As expected, after the participants were given information on how to respond to or act in a social situation, they were able to perform more appropriately. It also supports the literature proposing visual supports to be efficacious in curbing challenging behaviors in children with a developmental delay.

This study emphasized the visual, non-transient aspect of social stories and not the auditory aspect. The participants benefited from the visual presentation of seeing the story rather than relying on auditory presentation and memory.

The study confirms the results of the few other experimental studies (Adams, Gouvousis, VanLue, & Waldron, 2004; Bledsoe et al., 2003; Lorimer et al., 2002; Rowe, 1999; Scattone et al., 2002) that also implemented social stories as the only intervention for a problematic behavior. Unfortunately, three of these studies (Bledsoe et al., 2003; Lorimer et al., 2002; Rowe, 1999) implemented social stories after exhausting other

treatments that were ineffective. The positive results of these studies may have been due to the unique combination of treatments which ended with social stories. In addition, Rowe (1999) implemented a pre-experimental AB. Adams et al. (2004) used social stories as the sole intervention using an ABAB design with one child.

The present study is most consistent with the results of Scattone et al. (2002). The authors implemented a multiple baseline design across three participants and used social stories as the sole intervention. The main difference between the two studies was the design of the social stories. Scattone et al. used a 'written script' and did not incorporate pictures. This study also included two children in the same classroom. Participant 3, who received the intervention last, was able to hear the social story being read to Participant 1 who received the intervention first. The results show that for the first two days after the intervention was implemented with Participant 1, Participant 3's inappropriate behavior decreased. In addition, Participant 1 was also able to hear and social story for Participant 3. After intervention began, Participant 1 was observed reciting the social story for Participant 3.

In the present study, the amount of change for on-task behavior varied across participants. The greatest gain was seen in Participant 1. His targeted behavior was a sequence, which had to be completed in a certain order (i.e., leave computer, get jacket and bag, line up). When presented with a social story, his on-task behavior increased from an average of 29% to 50%. He left his computer and moved to the door more quickly, but was still slower than other children and became distracted by the computers when standing in line. The social story was then transformed into a mobile, tangible social board, which Participant 1 could carry and manipulate during the computer room routine. The board helped him stay focused and on-task during the routine. When standing in line he was able to hold the board and would not touch the computers as much. At the end of intervention, he would correctly go through the entire routine without looking at the board. Then, while standing in line at the end of the routine, he would then take each picture off of the board and put it in the envelope.

The circle routines for Participants 2 and 3 were not conducive to a manipulative social story. The on-task behaviors for Participants 2 and 3 were non-sequential as they had to sit quietly on the floor, listen to the teacher, and follow directions. For the interval

to be coded as on-task the participant had to perform a number of behaviors simultaneously. Unlike Participant 1, Participants 2 and 3 could not perform one behavior (e.g., sit quietly), look at their pictorial board, take the 'sit quietly' picture off, and not perform 'sit quietly' during the remainder of the routine.

Following the intervention, Participant 2 behaved more appropriately during circle time. The number of times he laid on the floor and talked out of turn decreased. He started to raise his hand and wait for his teacher to call on him. On occasion, if the teacher was not looking at him when he raised his hand he would say, "Excuse me." He looked at the teacher more often and participated during the parts of circle time.

After social story intervention, Participant 3 looked at the teacher more often, responded when called on, and participated in the reading curriculum but would speak out of turn on occasion. During baseline his behavior was highly variable. Following intervention, the variability decreased and frequency of on-task behavior increased but the effect was not as strong as Participants 1 and 2.

The results of this study indicate social stories were able to increase on-task behaviors for three children with autism. The stories were able to describe behaviors that were appropriate and required in social situations. After intervention, the participants were able to respond more appropriately and manage their behavior. This may indicate that social stories could be a precursor for self-management.

Future Directions

There remain a number of unanswered questions that still need to be addressed. Gray (1998) does not specify the number of times a story needs to be read to be effective. Future research can address effectiveness between stories that are read numerous times a day versus once a day (or less) as well as how long the intervention lasts. The time of day the social story is read may also be addressed (e.g., immediately prior to the situation versus during the situation). Subsequent research may reveal the effects of reading different stories directed at the same behaviors. Also, some of the studies presented in Table 1 acknowledged that the participants were aware that their behavior was being evaluated and may have tailored the targeted behavior accordingly. This confound can be eliminated by having someone who is with the individual on a regular basis (e.g., paraprofessional, teacher, parent) collect data.

As revealed in this study, on-task behavior increased more for a sequence routine when a manipulatable social story was provided. Future research can evaluate the difference between sequence and non-sequence routines and the effects of static and dynamic social story systems. Finally, Gray (1998) outlines a particular sentence ratio to implement when writing social stories, but fails to provide evidence to support her claim. It is unclear if the change in behavior is due exclusively to the type of story being read. Children could be read a social story with a sentence ratio that differs from Gray or a similar story that does not address the challenging behavior to see if either method is effective.

Social validity measures may be collected in ways that are more meaningful. It may be useful to collect data on the same dependent measures for typical peers to be used as normative comparison data that would provide an indication of the extent to which the target children's performance met normal expectations. For example, data could be collected for a peer's on-task behavior during circle time. This would allow one to see how the target student's behavior compared to peers and evaluate the effects of the intervention in the context of what is typical in that specific environment. This would enable one to consider if the target student's change in behavior was socially meaningful.

Limitations of Research

There are a number of issues with the design of the experiments implementing this intervention. In particular, the single-subject design experiments are applicable only to the individual and the results are difficult to generalize to a population (Kazdin, 1982). Social stories, however, are highly individualized and are an ideal candidate for single-subject designs. Studies could implement between-subject designs and look at the effectiveness of a story presented to one group only (i.e., experimental vs. control group), such as what to do when the fire alarm goes off.

Although the kindergarten teachers of Participants 2 and 3 were blind to the purpose of the study, they were not blind to the start of the intervention. They may have systematically changed their behaviors when the child started receiving intervention. This problem could be avoided by taking the children aside during baseline as well as intervention. In addition, teacher behavior should be monitored more comprehensively

during baseline and intervention to see if there is a change in the way the teacher addresses or treats the child. By taking the child aside during both conditions, one would not expect differential change in the teacher's behavior as long as the teacher was blind to the purpose of the study and start of intervention. The paraprofessional in the computer room for Participant 1 was blind to the purpose of the study but was not blind to the start intervention. Participant 1 was taken to a corner of the computer room where the paraprofessional could still see him. She did not know the content of the social story, but was able to see the pictorial board when Participant 1 began using it.

The ability of children to generalize targeted behaviors across situations also should be addressed. For example, Participants 2 and 3 could be followed across the school day to see if their on-task behaviors generalized to other instances of circle time or large group instruction. The goal of the intervention should be to generalize the targeted behavior across all instances of that routine (e.g., circle time in the morning, after lunch, during reading, at the end of the day).

Future research should take into account the ability for the teacher to implement the intervention. Interventions should be designed in a way that would not only improve the child's behavior but also include ease of implementation. The intervention is intended to be easy to use and convenient.

The experimental research conducted on social stories has shown that the intervention is effective and useful in classroom and home settings. The intervention can be implemented in any service delivery model (e.g., self-contained, pull-out, mainstream). Social stories are convenient, cost effective, easy to teach and implement, and do not take up much time. Books such as *The New Social Story Book* (Gray, 1994) provide numerous examples of pre-written social stories that can be individualized to a child. The studies presented in Table 1 address a number of behaviors that are outlined in the *DSM-IV* (1994) and addressed at the beginning of this paper, such as sharing, social reciprocity, echolalia, changing routines, and using adequate, appropriate speech. The research indicated that the targeted behavior was shown to change immediately after the social story was read. Additionally, social stories may implement a strategy that is able to become part of the child's routine, a strength that children with

autism demonstrate. However, future research is merited to reveal the limitations to and optimal parameters of the intervention.

In summary, individuals with autism respond well to auditory-visual support systems that have addressed numerous challenging behaviors. Social stories (Gray & Garand, 1993) appear to be effective when addressing challenging behavior in children with autism. In this experiment, social stories were read to children with autism or they were provided with a visual cue card to address a particular problem behavior that was not being addressed by another type of intervention. Two children improved with the social story alone. The third child improved after the format of the story was altered to provide additional visual support.

APPENDIX A

PARENTAL AGREEMENT

PARENT AGREEMENT TO PARTICIPATE IN CLINICAL NVESTIGATION

Project Title: The Effectiveness of Social Story Intervention for Individuals with Autism.

You and your child are being asked to participate in a research project described in this form below. This research project is governed by the rules of both the federal government and Florida State University. These rules require that you give your signed agreement for participation in this project. This research is being conducted by Naomi J. Bell, B.A. under the guidance of Howard Goldstein, Ph.D., CCC-SLP who is a Professor at Florida State University and Juliann Woods, Ph.D., CCC-SLP who is a Professor at Florida State University. For further information, please contact Naomi Bell at 942-9478, Dr. Howard Goldstein at 644-6264, or Dr. Juliann Woods at 645-4972.

The investigator will explain to you the purpose of this project, the procedures to be used, as well as potential risks and benefits associated with participation in this project. You may ask questions to help you understand this study. A basic explanation of this study is written below. Please read this explanation and discuss any questions you might have with the investigator.

If you decide that you will participate in this project, please sign this form on the line below. You will be given a copy of this form to keep.

Nature and Purpose of the Project: The purpose of this study is to determine the effectiveness of an intervention that focuses on assessing the behavior of children with developmental delays after reading a social story describing how to react to a particular situation. A social story is a short story that objectively describes a situation, concept, person, behavior, etc. The social story is a short story that shares applicable information with the reader regarding what is happening in the situation, who is involved, why is it taking place, and where and when the situation will occur. The estimated duration of the project is four months. Once initial evaluations are completed, one story reading (about 5-15 minutes long) will be scheduled each day according to the classroom schedule.

Explanation of Procedures: The investigator will complete pre-and post behavior assessments to determine the effectiveness of the social story intervention. Once the target behavior (e.g., waiting for a turn, interrupting, sitting quietly) is identified by the interventionist, the classroom teacher and/or yourself, intervention will begin. The intervention itself will consist of observation of behavior and reading the social story. Sessions will be videotaped in order to provide you with feedback and for purposes of data collection.

Discomforts and Risks: These procedures do not involve activities that would cause discomfort to your child or put you at any risk. However, if your child should become upset with involvement in the intervention, you can decide to withdraw from the study at any time.

Benefits: You and your child may benefit from this project in many ways. First, there is a possibility of learning a useful intervention for working with your child with developmental delays throughout the day. Secondly, the results of this study will provide empirical evidence of the effectiveness of social story intervention.

Confidentiality: Confidentiality will be protected to the extent allowed by law. Confidentiality will be maintained by assigning each student a participant number and all records will be kept in a locked office in the research laboratory consistent with the professional standards maintained in our clinical facility. All records and videotapes will be maintained in the locked office until December 31, 2011. After that time, written records will be shredded and videotapes will be bulk erased. Presentations and publications resulting from this project will utilize pseudonyms when referring to participants within this study.

Refusal/Withdrawal: At any time during your participation in this study, you will have the opportunity to refuse participation or withdraw from the study at any time without prejudice or effect on you.

Risks: We do not expect any unusual risks as a direct result of participation in this project, as the intervention procedures involve standard clinical procedures.

Videotaping: Your child will be videotaped by the clinician during the intervention sessions. These videotapes will be kept by the project staff in a locked room and will be saved indefinitely. These videotapes will be accessible only to clinical staff, unless otherwise specified by you. We may ask your permission to use segments of these videotapes for educational purposes; however, this is optional.

I ACKNOWLEDGE THAT I HAVE READ AND FULLY UNDERSTAND THE ABOVE EXPLANATION OF THE PROJECT, THAT ALL OF MY QUESTIONS HAVE BEEN SATISFACTORILY ANSWERED, AND I GIVE PERMISSION FOR MY CHILD TO PARTICIPATE IN THIS RESEARCH PROJECT.

_____

Parent's Name

_____

Signature of Parent Date

I CERTIFY THAT I HAVE EXPLAINED FULLY TO THE ABOVE PARENT THE NATURE AND PURPOSE, PROCEDURES, POSSIBLE RISKS AND POTENTIAL BENEFITS OF THIS RESEARCH PROJECT.

_____

Signature of Investigator Date

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

Dear Parent,

You and your child are invited to participate in an intervention study to be initiated this fall. This study will be conducted as a thesis project by Naomi Bell, a master's candidate, under the guidance of Dr. Howard Goldstein and Dr. Juliann Woods at the FSU Department of Communication Disorders. The aim of this study is to validate a behavioral intervention that teachers can use with children while in the classroom. All materials associated with participation in this intervention will be provided at no cost. It is hoped that your participation in this study will help in determining the effectiveness of teacher-implemented invention in a classroom environment for children with autism.

If you are interested in having your child participate in this study, please contact Naomi Bell at 942-9478, Dr. Howard Goldstein at 644-6264, or Dr. Juliann Woods at 645-4972. I look forward to hearing from you soon.

Respectfully,

Naomi Bell

Florida State
UNIVERSITY

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2763
(850) 644-8633 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 6/29/2004

To:
Naomi Bell
MC 1200

Dept.: **COMMUNICATION DISORDERS**

From: **John Tomkowiak, Chair**

Re: **Use of Human Subjects in Research**
The effectiveness of Social Story Intervention for Individuals with Autism

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on **6/9/2004**. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by **6/8/2005** you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Howard Goldstein
HSC No. 2004.409

PERMISSION FOR USING AUDIO/VIDEOTAPES/PHOTOGRAPHS
FOR INSTRUCTIONAL OR EDUCATIONAL PURPOSES

I, _____(Client, Parent's or Guardian's name),

parent or guardian of _____(Client's name if applicable)
(complete this line only if client is a minor)

hereby give my consent that all audio/videotapes/photographs of my child and/or myself or any reproduction of these same materials made in the FSU Speech and Hearing Clinic, Department of Communication Disorders may be used for instructional or educational purposes.

I understand that I will receive no financial compensation for the use of these recorded materials. I also understand that my consent is irrevocable, meaning that once I give my consent I cannot take it back. The reason for this is that once an audio/videotape or photo that includes an image or segment of my child or myself is edited for instructional purposes, it would not be possible to remove that segment from the audio/videotape/slide presentation. I also agree to impose no further restrictions on the use of these recorded materials.

All videotapes will be maintained in a locked office in the research laboratory consistent with the professional standards maintained in our clinical facility until December 31, 2011. After that time, videotapes will be bulk erased.

I have read the foregoing statements and agree to abide by them.

_____ Date:_____
Signature of Client

_____ Date:_____
Signature of Parent/Legal Guardian if applicable

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

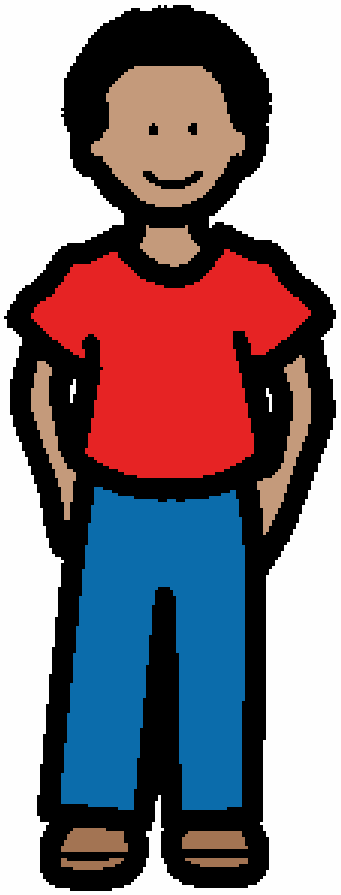
APPENDIX B

SOCIAL STORIES

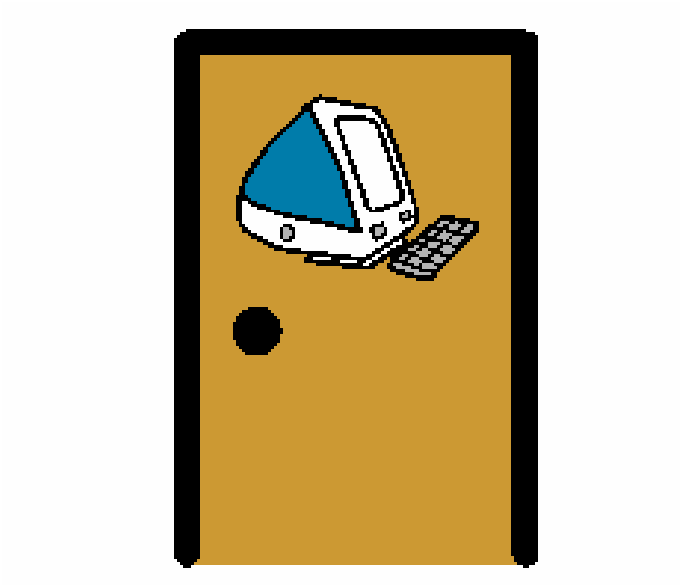
Morning

Computer

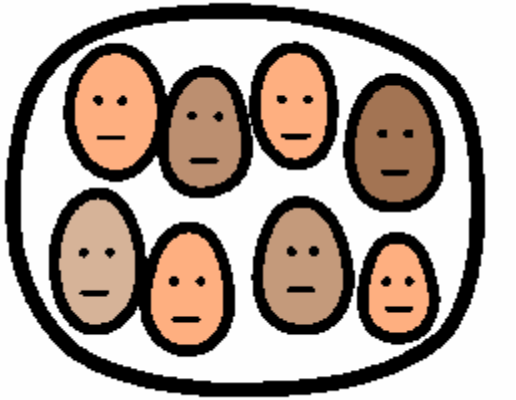
Room



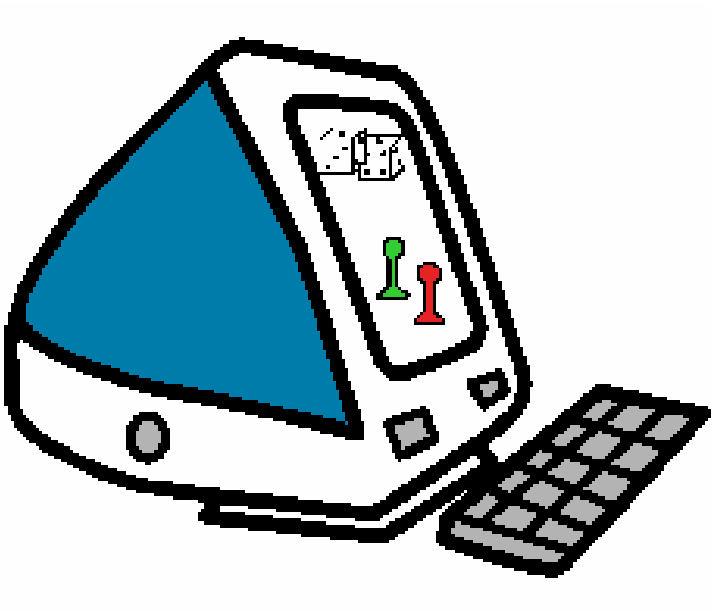
My name is Name.



I go to the computer room
in the morning.

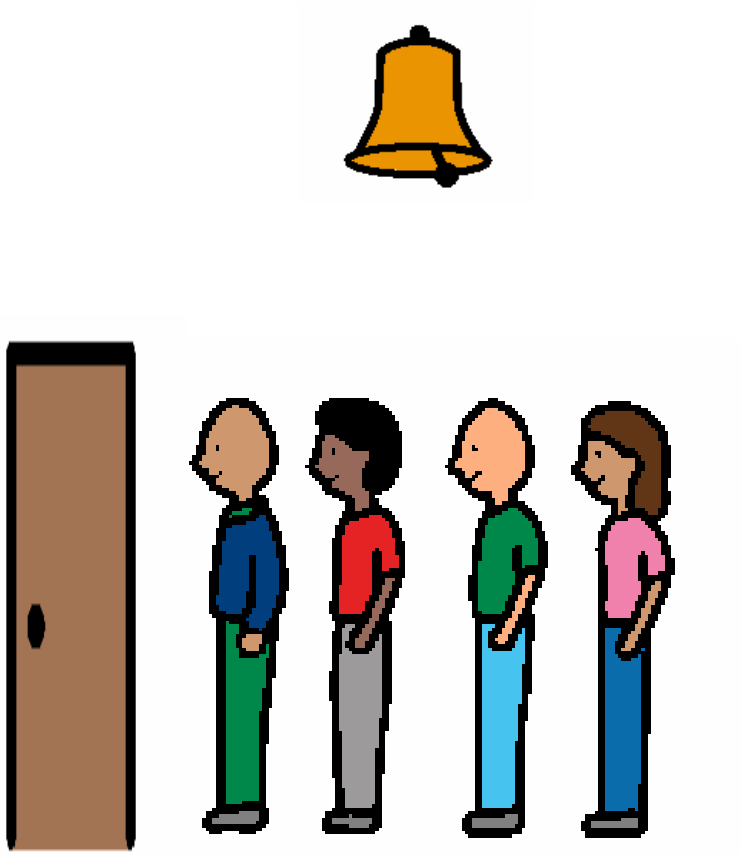


There are many students in
the computer room.

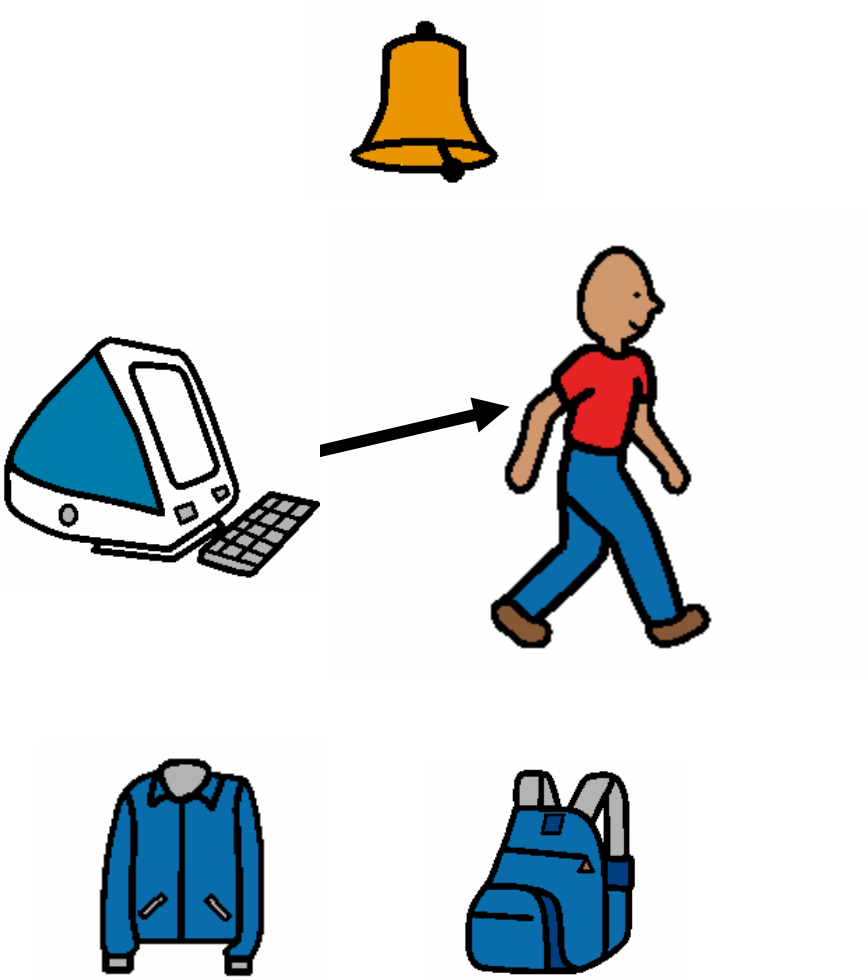


Some students play games on
the computer or do homework.

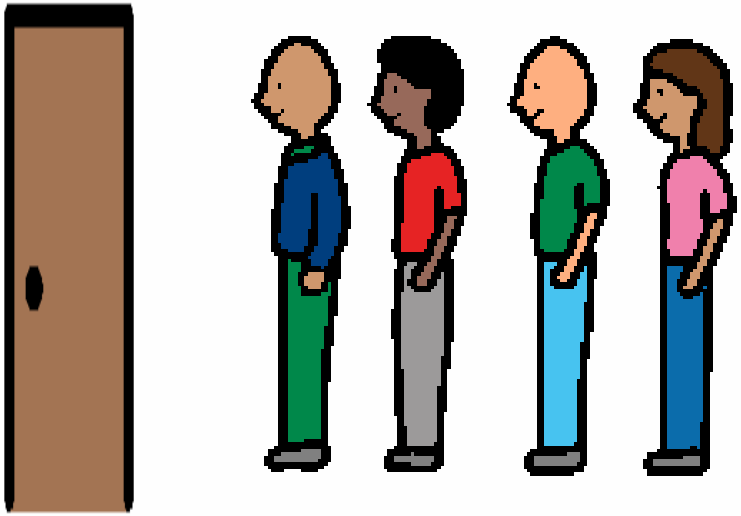
I can play games on the computer.



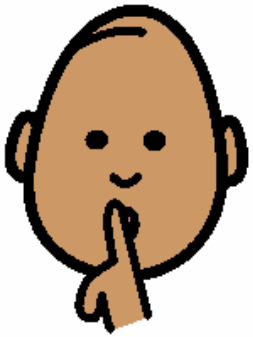
When the bell rings everyone has to leave their computer and get in line at the door.



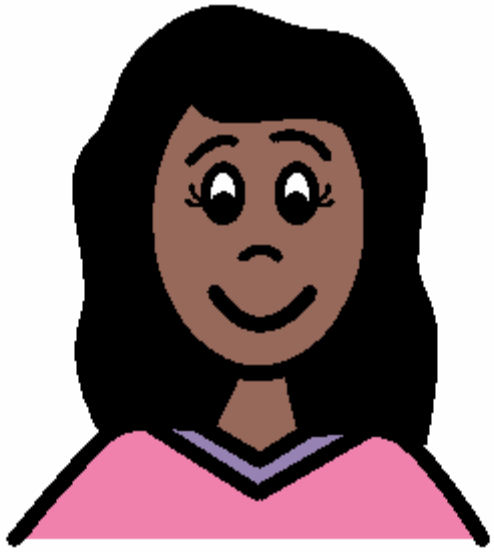
When the bell rings I will try to quickly leave my computer and get my jacket and bag.



I will try to line up at the door
with the other students.



I will try to stand quietly in line
like the other students and
not touch the computers.



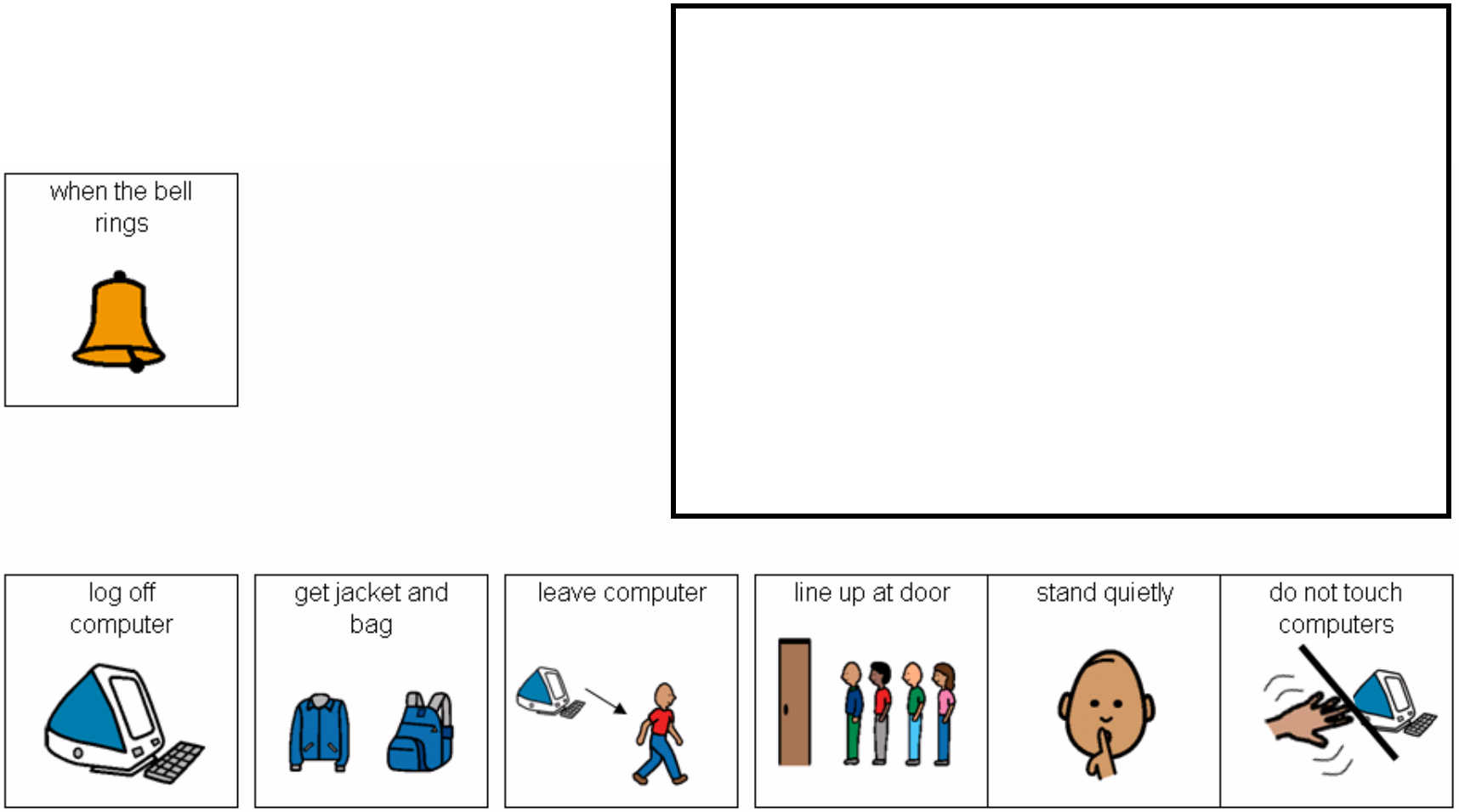
My teacher is happy when I leave
my computer and stand in line
with the other students.

What will you do when the bell rings?

Where will you stand after you leave your computer?

Will you touch the computers when you stand in line?

Participant 1's Pictorial Board



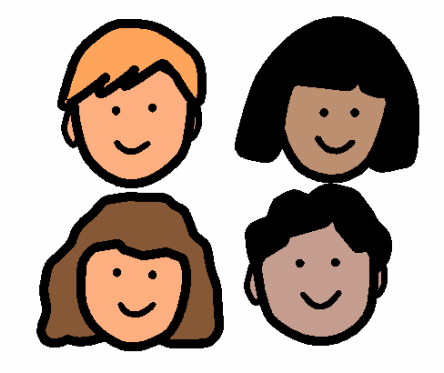
Participant 2's Social Story

Name's

Circle

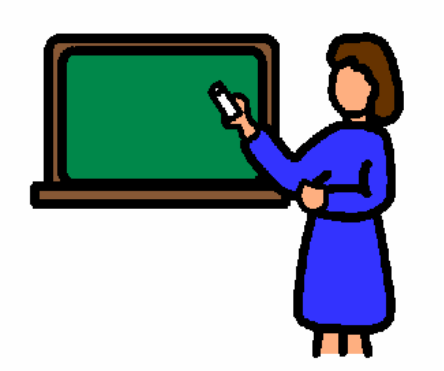
Time

My name is Name.



I go to Kindergarten in the morning.

There are many other kids in my room.

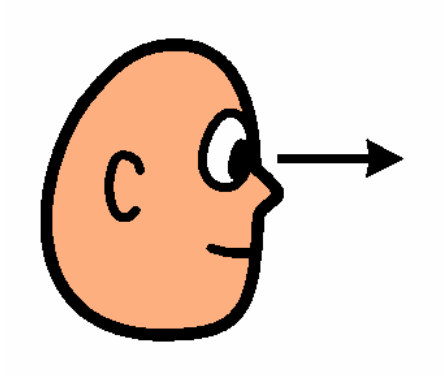


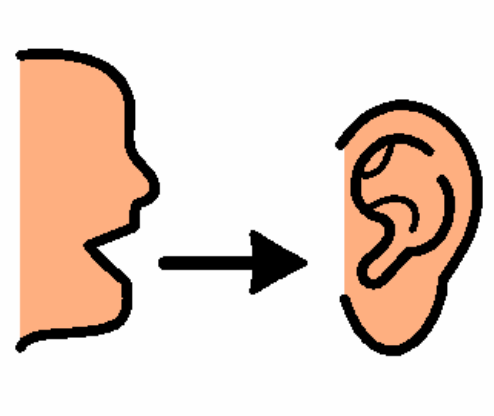
My teacher is Mrs. Name.

Sometimes we count or say our letters.

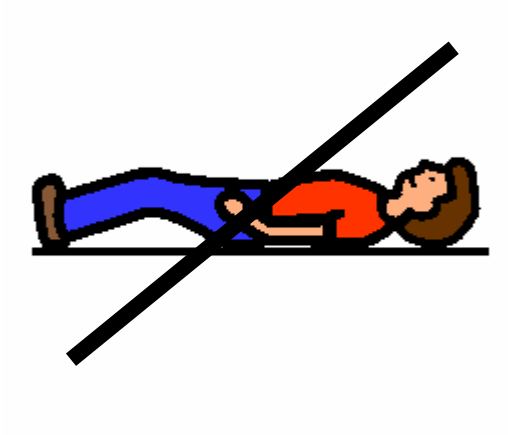
Sometimes we sit in circle and listen to our teacher.

The other kids sit on the floor and listen to Mrs. Name.

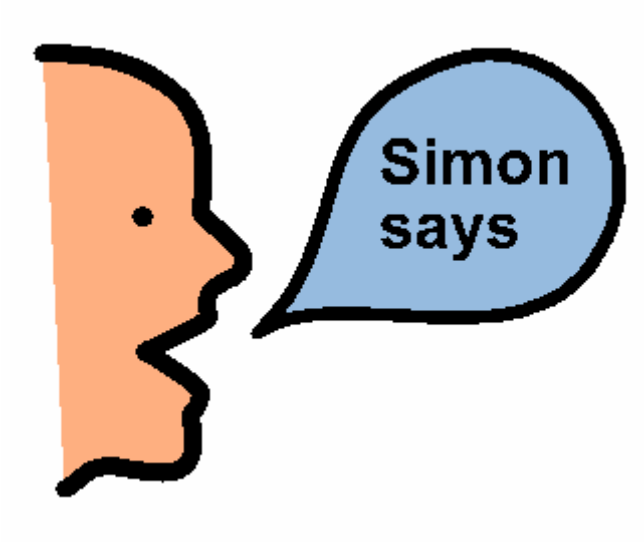




When I sit in circle I will try to look at the teacher and listen to the teacher.



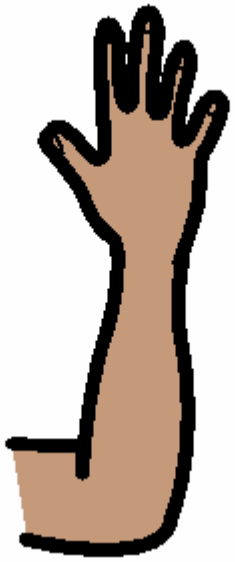
I will try to sit in circle and not lay on the floor.



Sometimes the teacher tells us directions.

The other students follow her directions.

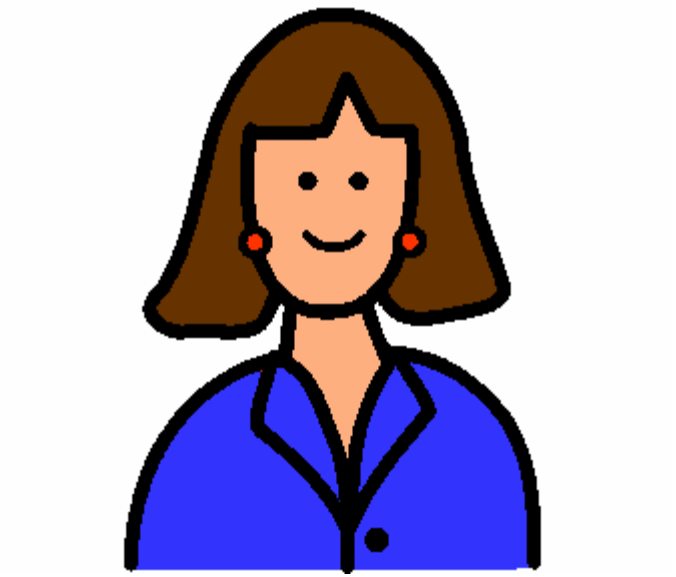
I will try to follow the teacher's directions.



Students raise their hand when they want to talk to the teacher.

The teacher calls on them and then the student can talk.

I will try to raise my hand and wait for my teacher to call on me before I talk.



My teacher is happy when I sit in circle and look at her.

What will you do during circle time?

Will you sit on the floor or lay on the floor?

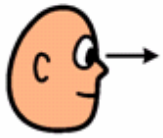
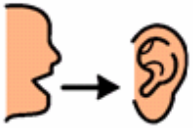
What will you do when the teacher tells you directions?

What do you do when you want to talk to the teacher?

Circle time can be fun.

I like sitting by my friends in circle.

Participant 2's Pictorial Strip

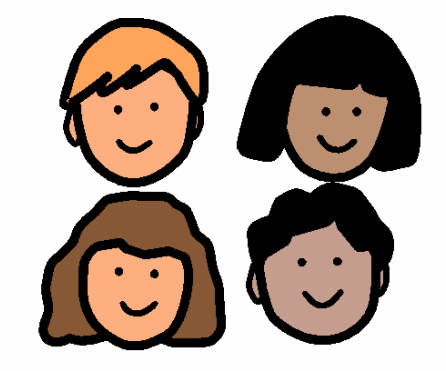
look at teacher	listen to teacher	sit on floor	do not lay	follow directions	raise hand
					

Name's

Circle

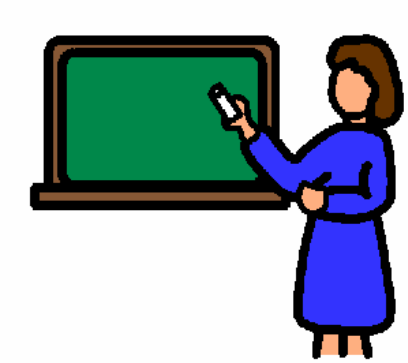
Time

My name is Name.



I go to Kindergarten in the morning.

There are many other kids in my room.

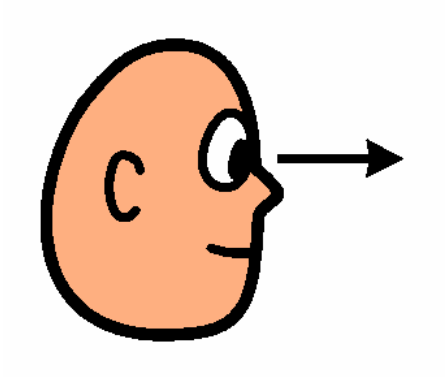


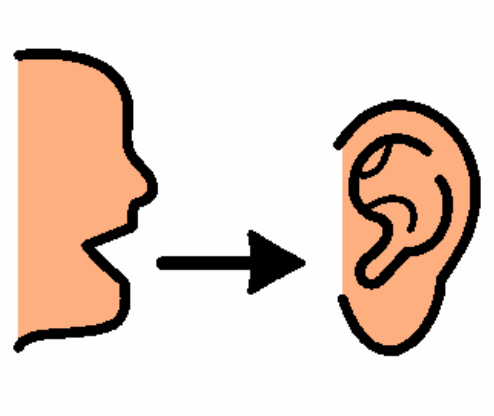
My teacher is Mrs. Name.

Sometimes we read or practice words.

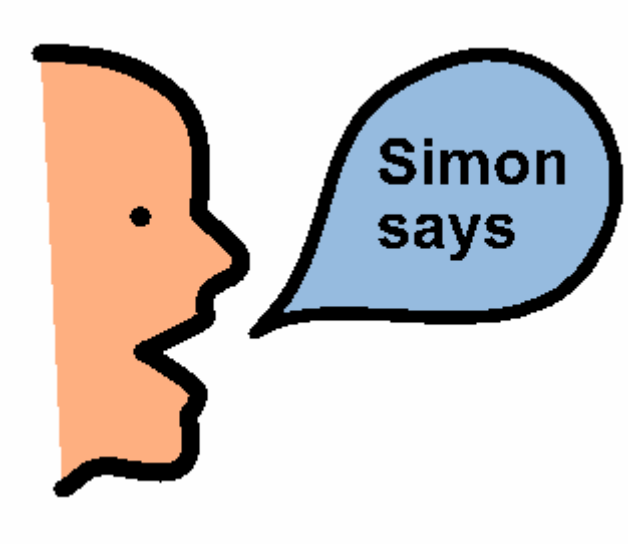
Sometimes we sit in circle and listen to our teacher.

The other kids sit on the floor and listen to Mrs. Name.





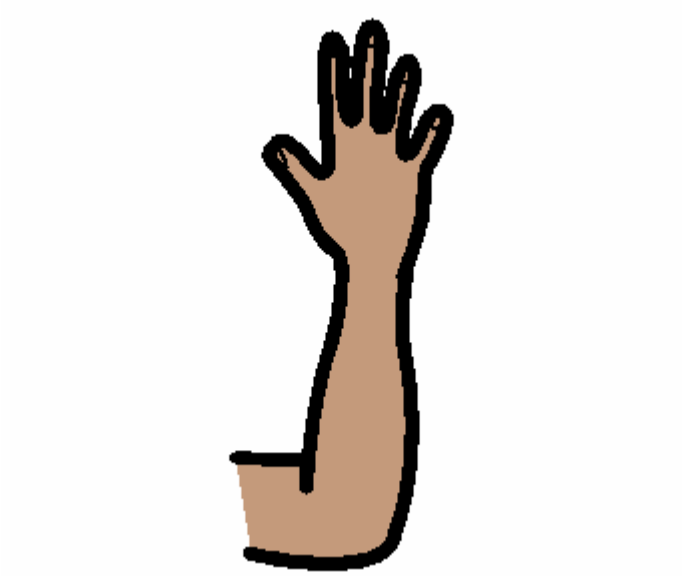
When I sit in circle I will try to look at the teacher and listen to the teacher.



Sometimes the teacher tells us directions.

The other students follow her directions.

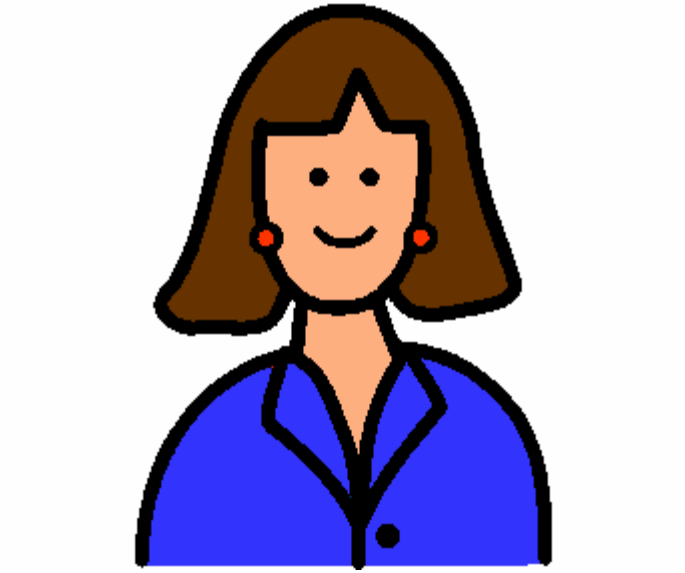
I will try to follow the teacher's directions.



Students raise their hand when they want to talk to the teacher.

The teacher calls on them and then the student can talk.

I will try to raise my hand and wait for my teacher to call on me before I talk.



My teacher is happy when I sit in circle and look at her.

Circle time can be fun.

I like sitting by my friends in circle.

Who is your teacher?

What will you do during circle time?

What will you do when the teacher tells you directions?

What do you do when you want to talk to the teacher?

APPENDIX C

SOCIAL VALIDITY RATING SCALE

Rate the child's behaviors during morning circle (in comparison to *typical* peers):

1 – not at all
2 – much less than average for age group
3 – somewhat less than average
4 – average for age group
5 – better than average

The child greets the teacher upon arrival in kindergarten room.	1	2	3	4	5
When asked, the child quits playing and attends to teacher.	1	2	3	4	5
The child raises his hand and waits to be called on before speaking.	1	2	3	4	5
The child sits quietly in the circle (only talking when called upon or during a group response).	1	2	3	4	5
The child behaves appropriately during circle (sitting in circle, not laying, rolling, or leaving circle).	1	2	3	4	5
The child is attentive and follows directions during circle time.	1	2	3	4	5
The child initiates conversations with other children.	1	2	3	4	5

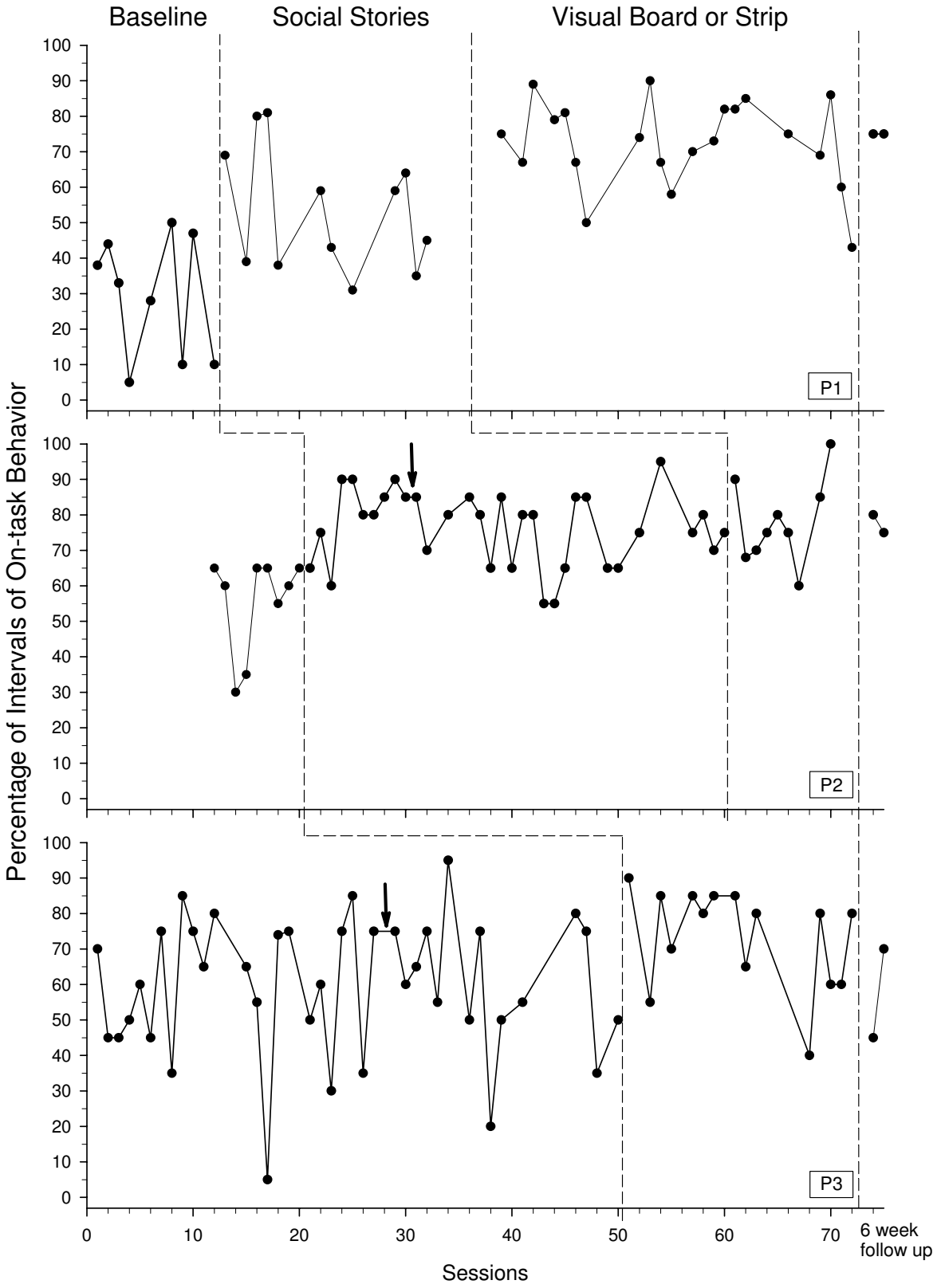


Figure 1. Percentage of intervals of targeted behaviors for Participants 1, 2, and 3. Arrows indicate change in classrooms for Participants 2 and 3.

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Naomi Bell received her Bachelor's degree in Psychology at North Dakota State University in 2002. She is a Master's student in the Department of Communication Disorders at Florida State University and will graduate in August 2005. She will continue her doctoral work at Florida State University. Her research interests include visual support systems and social skill development in children with developmental disabilities.

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