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# Social Story™ Interventions: An Examination of Effectiveness in Addressing Transition Difficulties of Students with Autism Spectrum Disorders

Anastasia Kokina  
*Lehigh University*

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Social Story™ Interventions: An Examination of Effectiveness in Addressing Transition  
Difficulties of Students with Autism Spectrum Disorders

By

Anastasia Kokina

Presented to the Graduate and Research Committee

of Lehigh University

In Candidacy for the Degree of

Doctor of Philosophy

In

Special Education

Lehigh University

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2011

Anastasia Kokina

Approved and recommended for acceptance as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Date

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Dissertation Director  
Lee Kern, Ph.D.  
Professor of Special Education

---

Accepted Date

Committee Members:

---

Brenna Wood, Ph.D.  
Assistant Professor of Special Education

---

Christine Cole, Ph.D.  
Professor of School Psychology

---

Linda Bambara, Ed. D.  
Professor of Special Education

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## **Abstract**

Students with Autism Spectrum Disorders (ASD) may engage in high levels of disruption and off-task behaviors when faced with school transitions and changes in daily routines. These difficulties are often viewed by parents as some of the most challenging behaviors to address in their children on a daily basis (South, Ozonoff, & McMahon, 2005). One intervention that has been proposed to address transition difficulties of individuals with ASD is Social Stories. However, their effectiveness in situations involving daily school transitions remains largely unexplored, with only a limited number of studies conducted to date. Using a withdrawal (i.e., ABAB) design, this study examined the efficacy of Social Stories in addressing transition difficulties of three students with ASD and moderate intellectual disability (ID). Results suggest mixed effectiveness of Social Stories, with promising results obtained for one out of three participants. Out of the four dependent variables targeted, the intervention held promise for addressing disruptive behaviors. The effects of the intervention were minimal for on-task behaviors, and absent for latency to transition and duration of time in transition. The intervention was viewed as acceptable by teachers and by students, and was implemented with high fidelity.

## Chapter 1

### Statement of the Problem

Much of any child's waking time is spent in transitions between activities, people, and settings, and environmental changes are sometimes unavoidable. Those situations may be particularly challenging for children with Autism Spectrum Disorders (ASD) due to their inherent characteristics that involve a lack of behavioral flexibility and resistance to change (American Psychiatric Association, 2000). As a result of those characteristics, children with ASD may engage in high levels of disruptive behaviors, including noncompliance, disruption, aggression, and self-injury (Schreibman, Whalen, & Stahmer, 2000; Sterling-Turner & Jordan, 2007) when presented with daily school transitions.

Transition difficulties place significant constraints on families in terms of the number, variety, and types of the activities in which they can engage in at home and in the community, and are viewed by parents as a one of the most difficult aspects of the disorder to deal with on a daily basis (e.g., South, Ozonoff, & McMahon, 2005; Stoner, Angell, House, & Bock, 2007). Although classrooms may be more structured than home or community environments, they may nonetheless require numerous daily transitions and schedule adjustments. In fact, some estimates suggest that preschool and elementary grade students spend as much as 25% of their school time in transitions between settings and activities (Schmit, Alper, Raschke, & Ryndak, 2000). If not addressed effectively, transition difficulties may have an adverse impact on children's school functioning, resulting in decreased instructional time, poor academic outcomes, a lack of independence, and disruptive behaviors, and ultimately may preclude full inclusion (Sterling-Turner & Jordan, 2007). Therefore, addressing transition difficulties of students with ASD in school settings should be an important part of educational programming.

To clarify the terminology, researchers (e.g., Stoner et al., 2007) have suggested differentiating between “vertical” and “horizontal” transitions. Vertical transitions are developmental transitions experienced by all individuals (e.g., transition from preschool to kindergarten, transition to adult life). Horizontal transitions are defined as transitions that happen on a daily or weekly basis, are individual and specific, and often refer to movement from one situation, activity, or setting to another. It may be useful to further differentiate between horizontal transitions that are predictable and are part of everyday routines (e.g., from bus to classroom, from math to reading) and unpredictable transitions (e.g., visiting a novel setting or participating in a novel situation, schedule modification, an unexpected interruption or cancellation of an activity). Although both types of horizontal transitions will be discussed in the next two chapters, the current investigation addressed horizontal predictable transitions, as they happen frequently and therefore present significant challenges to educators. Transitions were defined in this investigation as any environmental change involving a termination of one activity and moving to the next activity. The term “transition difficulties” will be used throughout the paper to refer to a group of challenging behaviors, including but not limited to noncompliance, off-task behaviors, disruption, and aggression, which may occur during transitions.

### **Interventions Addressing Transition Difficulties in ASD**

Given the significant negative impact that transition difficulties have on the lives of students with ASD, their families, and educators, effective interventions to address them are warranted. However, few intervention studies have specifically targeted transition difficulties of individuals with ASD. Interventions that address transition difficulties commonly involve providing students with cues that signal the upcoming change and /or preview the upcoming activity. A range of antecedent interventions that modify the environmental factors to prevent the

problem behavior from occurring has been used, including auditory or visual cues, visual activity schedules, video modeling, and video priming.

In many cases, simply providing students with an advance verbal notice or an auditory signal (e.g., beep of a timer, ring of a bell) indicating the upcoming change is sufficient to ease the transition and decrease the level of challenging behaviors. Studies using auditory and verbal cues to signal transitions have been successful in reducing the duration of transition (Sainato, Strain, Lefebvre, & Rapp, 1987) and decreasing problem behaviors, such as stereotypy, property destruction, and aggression (Flannery & Horner, 1994; Tustin, 1995). Interestingly, verbal cues seem to be more effective when provided within a short time before the transition (e.g., 2 min), than immediately prior to it (Tustin, 1995).

Despite the promising results obtained in the studies using auditory cues, most of the intervention studies addressing transition difficulties used visual strategies. Many students with ASD seem to benefit from visual methods of instruction (Quill, 1997). One possible explanation for the preference for visually based instruction is that some students with ASD (e.g., younger children or students with limited receptive language skills) simply may not understand the meaning of verbal prompts. However, accounts of high-functioning individuals with ASD (e.g., Grandin & Scariano, 1986) also suggest that they process information more efficiently when it is presented in a visual format. Recently, West (2008) compared the effectiveness of auditory and pictorial cues in teaching young students with ASD independent performance of two daily living activities (i.e., setting the table and preparing for an art project). The study provided further support for visually-based instruction, as picture cues were more effective and efficient than auditory signals in eliciting independent responses of three out of four participants. Visually-based interventions, wherein visual cues are presented to a student in the form of a picture,

symbol, or a photograph of the transition activity (e.g., visual activity schedules or visual prompting systems), are frequently the method of choice when addressing transition difficulties.

Sometimes, several visual cues are combined into an activity schedule representing a longer sequence of tasks, settings, or events. Activity schedules typically consist of a set of pictures, written words, photographs, or videos depicting the specific steps or activities. Those visual symbols prompt students to engage in an activity or a sequence of activities, while increasing environmental predictability (McClanahan & Krantz, 1999). Activity schedules may be as simple and general as a three-item written list of “things to do” or as detailed as a book with photographs describing the steps of a complex routine. Over time, schedules may be gradually faded to just one symbol representing the whole sequence of steps rather than each of the small steps separately. An important advantage of activity schedules is that they may decrease prompt dependence of some learners with ASD, as students gain independence in creating and following their own schedules (MacDuff, Krantz, & McClannahan, 1993). Activity schedules also have been found effective in improving children’s social and communication skills (Dauphin, Kinney, & Stromer, 2004; Krantz & McClannahan, 1993, 1998), daily living skills (MacDuff et al., 1993), and on-task behaviors during the daily routines (Bryan & Gast, 2000; MacDuff et al., 1993). Both visual cues and activity schedules have been successful in addressing transition difficulties of students with ASD, resulting in reductions in disruption and aggression (e.g., Dooley, Wilczenski, & Torem, 2001; Flannery & Horner, 1994; Schmit et al., 2000), decreased transition time, and reduced the number of prompts (Dettmer, Simpson, Smith Myles, & Ganz, 2000). Whereas earlier studies of activity schedules used printed activity schedules, recent advances in technology have allowed presentation of activity schedules via



computers and mobile devices (e.g., Mechling & Savidge, 2011), resulting in improved rates of task completion and a greater number of between-task transitions.

A recent study (Cihak, Fahenkrog, Ayres, & Smith, 2010) used video modeling with self as a model to address transition difficulties of four children with ASD. The videos depicted participants engaging in the desired behavior (i.e., transitioning independently from place to place). Videos were played on iPods just prior to the targeted transitions. Ten transitional situations were targeted per participant, and data were collected on percentage of independent daily transitions. Improved independent transitioning between settings was observed as a result of the video-modeling intervention. Another study (Cihak, 2011) examined the differential effects of a video modeled activity schedule to those of a schedule that used static photographs on independent transitioning of four middle-school students with severe ASD. Results of the study suggested that two participants benefited from video modeled activity schedules, one participant performed better with the photographic activity schedule, and another student performed equally well in both conditions. Those results suggest similar effectiveness of both types of activity schedules and point to the need to make individual decisions when choosing the types of interventions. The study was limited, however, by its use of a simple ABC design, with no return to baseline conditions.

In another visually-based intervention, video priming, an advance visual notice of transition is provided and the details of transition situation or setting in a custom-made short video clip prior to the actual transition are previewed (Schreibman et al., 2000). Video priming is different from video modeling in that details of transition are demonstrated (e.g., the camera shows the places that will be visited on the way from home to school) without modeling of the appropriate behavior. To date, the only study that examined the use of video priming to assist

children with ASD in transitions resulted in the reduction of challenging behaviors of participants (Schreibman et al., 2000). Video priming seems to be a practical intervention in that it describes all the details of the transitional setting and situation to students without physically taking them to each of the settings (Stromer, Kimball, Kinney, & Taylor, 2006).

If increasing environmental predictability is not sufficient to make transitions successful, antecedent interventions may be combined with reinforcement systems and / or function-based behavioral procedures such as functional behavior assessment (FBA) or functional analysis (FA) (Sterling-Turner & Jordan, 2007). FBA and FA consist of a comprehensive examination of the environmental variables that influence the occurrence of challenging behaviors (Hanley, Iwata, & McCord, 2003). After conducting experimental manipulations of environmental variables (FA) or observations of the behavior in natural settings (FBA), a hypothesis regarding the function of behavior is developed (Sugai et al., 2000). The information regarding the possible causes of behavior is used to inform the interventions, usually by modifying the environmental variables that trigger or maintain behavior problems. To date, few studies of transition difficulties involved FA or FBA procedures. Among those that did, several used it as part of a treatment package (e.g., Dooley et al., 2001; Flannery & Horner, 1994; Waters, Lerman, & Hovanetz, 2009) or as their main procedure (e.g., Kern & Vorndran, 2000; McCord, Thomson, & Iwata, 2001; note that the Kern and Vorndran (2000) study did not involve a participant with ASD). Those studies, albeit few in number, demonstrated the effectiveness of FBA/ FA procedures in improving students' transition difficulties. Moreover, those studies contributed to the understanding of transition difficulties from the operant perspective, having provided some insight into the function and nature of those behaviors.

In summary, antecedent strategies aimed at increasing predictability, such as auditory and visual cues and activity schedules, have a strong rationale for students with ASD and have been successfully used to assist them in difficult transitions. At least some children with ASD may benefit from receiving an advance notice of transition, delivered in the auditory or visual form. Moreover, visual techniques seem to be superior to auditory cues (West, 2008) in improving the behaviors of students with ASD. Finally, effectiveness of those interventions may be enhanced by implementing FBA/ FA, although each of those procedures has also been used separately.

In general, intervention literature specifically addressing transition difficulties of students with ASD is scarce. A number of studies that targeted transition difficulties were conducted with students without a diagnosis of ASD (e.g., Ferguson, Ashbaugh, O'Reilly, & McLaughlin, 2004; Kern & Vorndran, 2000). It is also possible that some studies involving children with ASD addressed their challenging behaviors without further specification of whether or not those were a consequence of transition difficulties. As a result, studies that targeted challenging behaviors during transitions without identifying the cause of the behavior problem could have remained beyond the scope of this review. Nevertheless, the analysis of intervention research reveals substantial gaps in the literature, and additional intervention studies that specifically target transition difficulties of students with ASD are clearly needed.

### **Social Story Interventions**

Another popular strategy that incorporates elements of priming, visual activity schedules, and visual cues and may be used to assist individuals with ASD in transitions is Social Stories™. A Social Story is an individualized short story that describes a person, skill, event, concept, or situation (Gray, 1998, 2004). The intervention was initially developed to assist students with ASD in their social difficulties, with the premise that social situations may be difficult to

understand, confusing, or overwhelming. Providing a child with ASD with relevant social information may result in improved understanding of the challenging situations and better social functioning. Carol Gray, the author of the method, emphasized that Social Stories are in no way a behavior modification tool; however, their frequent byproduct is the reduction in undesired behaviors (Gray, 2004). Social Stories are typically written by parents or teachers of students with ASD, although a number of ready-made Social Stories are commercially available (e.g., Gray, 2000). They are then read by adults or children with adult assistance.

Although Social Stories derive a number of elements from other interventions (e.g., task analysis and activity schedules), Gray (1998, 2000, 2004) argued that they are a distinct method due to the format used in their construction and implementation. First, as most stories, Social Stories have a title, an introduction, a main part, and a conclusion. Second, they must include some of following sentence types: (a) descriptive – factual statements used to describe the situation and people involved in it; (b) perspective – descriptions of the reactions, feelings, and responses of others; (c) directive – statements that identify an appropriate response and positively guide child’s behavior; (d) cooperative - sentences to identify what others will do to assist; (e) affirmative - statements that enhance the meaning of Social Stories by expressing common values or opinions in a given culture; and (f) control - sentences that help the child to identify personal strategies to recall and apply information. Third, Gray (2004) recommends using a ratio of one directive sentence to two or more other sentence types in Social Stories. This ratio is important for the student to have enough information and to avoid the Social Story becoming merely a list of things to do (Gray, 1998). Social Stories, typically written from a first- or third- person perspective, should avoid any terms or statements that are “inflexible” as students with ASD may interpret them literally. Instead, the terms “usually”, “sometimes”, and

“probably” are preferable. Abstract concepts and complex situations are described in simple words and are broken down to smaller components, understandable to students. Finally, authors of Social Stories are encouraged to describe the situations from the target child’s perspective. In general, Social Stories are a person-centered individualized intervention, characterized by their patient, positive, and reassuring quality.

Social Stories have been used to teach social and communication skills, such as appropriate requesting, contingent responding, social engagement (Delano & Snell, 2006), play and conversation skills (Sansosti & Powell-Smith, 2006), and social interactions (Scattone, Tingstrom, & Wilczynski, 2006). A number of studies have used Social Stories to target reduction in undesirable behaviors such as talking out in class (Crozier & Tincani, 2005), precursors to tantrums (Lorimer, Simpson, Myles, & Ganz, 2002), frustration behaviors (Adams, Gouvousis, VanLue, & Waldron, 2004), and echolalia and the use of loud voice (Brownell, 2002). A number of additional studies (e.g., Chan et al., 2011; Schneider & Goldstein, 2010) were aimed at increasing appropriate classroom behaviors of students with ASD such as on-task and compliance.

Several quantitative meta-analyses conducted to date suggest that the overall effectiveness of Social Stories is questionable, with substantial between-subject variability (e.g., Reynhout & Carter, 2006, 2011; Kokina & Kern, 2010; Test, Richter, Knight, & Spooner, 2010). Researchers are in agreement, however, that additional investigations of Social Stories, including studies addressing the sources of between-subject and between-study variability, are warranted (e.g., Reynhout & Carter, 2006; Test et al., 2011). Researchers have further called for improved methodological rigor in future investigations, including adequate participant descriptions,

assessments of social validity and treatment fidelity, and evaluation of maintenance and generalization of outcomes.

Gray states that Social Stories can be used to “describe classroom routines including variations in that routine” (2000, p. 13-1). Indeed, Social Stories seem to have a strong rationale for addressing challenging behaviors of children with ASD specifically associated with transitions. Similar to activity schedules, Social Stories are often presented in an illustrated format, thus having a potential to help students with ASD who are visual learners. Similar to priming, they provide an advance description of the problematic situation. Importantly, Social Stories may increase participants’ independence, as they stay with a child and may be used to monitor behavior independent of adult prompts. The intervention may bring predictability to environmental situations that can be confusing, overwhelming, or frightening to students with ASD. They are presented in a relaxed informal manner, thereby alleviating anxiety that is often associated with transitions. Finally, Social Stories seem to be routinely used in school settings as an intervention to assist students during transitions. Recently, 39 teachers of students with ASD were surveyed on their use of Social Story interventions (Kokina & Kern, in preparation). Results indicated that the most common use of this intervention was to assist students in transitions (reported by 82% of teachers). Moreover, Social Stories written to address transition difficulties were perceived to have the highest effectiveness (compared, for example, to using them to teach social communication skills).

However, despite the intuitively strong rationale for the use of Social Stories in transitions, their efficacy in addressing transition difficulties of individuals with ASD is not adequately addressed in research literature. Only a few studies to date targeted transitions of students with ASD. A study of Ivey and colleagues (2004) addressed participation of children

with ASD in novel events (i.e., unpredictable transitions). The intervention resulted in increased number of the targeted skills (i.e., remaining on task, performing two key tasks for each novel event, using a novel vocabulary word, and making a request). Four additional studies (i.e., Kuttler, Smith Myles, & Carlson, 1998; Schneider & Goldstein, 2010; Mancil, Haydon, & Whitby, 2009; Quilty, 2007) addressed transitions difficulties without specifically labeling them as such and/or making them a focus of their intervention. All four studies targeted predictable daily transitions, and will be briefly described next.

Kuttler and colleagues (1998) examined the effectiveness of Social Stories in addressing reductions of tantrum behaviors of an adolescent with severe ASD. Transitions, wait time, and free time were identified as challenging situations for this student. Promising results were obtained, as the participant's disruption decreased following the implementation of Social Stories. However, Social Stories did not specifically describe transitions, and observations were conducted during lunchtime and morning work rather than transitions. Moreover, the intervention included a combination of Social Stories and a reinforcement system, making conclusions about the effectiveness of Social Stories alone impossible.

Quilty's (2007) study included one participant whose challenging behaviors involved repeated verbal statements (i.e., "Go home"), which happened one hour before the transition from classroom to bus (i.e., dismissal). A multiple baseline design across participants was used. Although floor effects were observed in baseline, in general, the intervention led to decreased frequency of challenging behaviors (from 15.8 to 7.5) and decreased behavior variability.

Mancil and colleagues (2009) examined the differential effectiveness of printed and computer-delivered Social Stories on aggression (i.e., pushing of peers while transitioning from class to lunch room) of three students with ASD. The study resulted in the overall reduction in

the number of pushing behaviors, and pointed to a modest superiority of computer-delivered Social Stories over paper Social Stories.

Finally, the targeted situation for one participant in Schneider and Goldstein's (2010) study involved transitioning from computer room back to the classroom. On-task behaviors, including getting jacket, moving away from computer, and standing in line, were targeted. Although the Social Story resulted in increased on-task behaviors for this participant (i.e., from 29% in baseline to 50% in intervention), this increase was considered moderate and therefore an intervention package including Social Story and an activity schedule was implemented, yielding additional increases in on-task behaviors (i.e., to 72% of intervals).

Results of the aforementioned studies provide preliminary evidence regarding the effectiveness of Social Stories in addressing transition difficulties of students with ASD. However, none of the studies to date specifically and systematically examined the effectiveness of Social Stories in daily school transitions. In summary, given that: (a) Social Stories seem to have a strong rationale for the use in transitions; (b) Social Stories have been described by Gray (2000) as an intervention to assist students with ASD in transitions; and (c) teachers report routinely using Social Stories in transitions, the fact that only a handful of empirical study to date explored this use of Social Stories indicates the need for further empirical examination of the effectiveness of Social Stories in addressing transition difficulties of students with ASD.

### **Significance of the Study**

Transition difficulties are often viewed by parents as some of the most challenging behaviors to address in their children on the daily basis (South et al., 2005; Stoner et al., 2007). As classroom environments are not always predictable and structured, and unexpected changes in daily routines and activities are likely to happen, children with ASD may engage in a range of



challenging behaviors and noncompliance, and may require extensive prompting to complete the transitions. Therefore, identifying and examining effective interventions to address transition difficulties of children with ASD becomes an important goal for research and educational practice.

Intervention literature on transition difficulties of students with ASD is, however, limited (Sterling-Turner & Jordan, 2007). A small body of studies examined the effects of antecedent interventions aimed at increasing environmental predictability, with promising results. Social Story interventions are another strategy that may be used to address transition difficulties in ASD. This use of Social Stories has been described by the author of the method, Carol Gray (2000). Social Stories are often an intervention of choice when addressing transition difficulties of students with ASD in the school settings (Kokina & Kern, in preparation). However, research examining the use of Social Stories in transitions is almost nonexistent; only a few studies to date addressed the use of Social Stories in transitions, both unpredictable (i.e., introduction of novel events; Ivey et al., 2004) and predictable (e.g., Schneider & Goldstein, 2010). None of the previous studies, however, specifically and systematically focused on the effectiveness of Social Stories in transitions. Therefore, given a general lack of intervention research to address the transition difficulties of students with ASD, and the gaps in the Social Story literature, it is important to examine the use of Social Story interventions to assist children with ASD in transitions. This study was the first attempt to specifically examine the effectiveness of Social Story interventions in daily school transitions.

## **Purpose and Research Questions**

The main goal of this study was to examine the efficacy of Social Story interventions in addressing transition difficulties of students with ASD and intellectual disability (ID). The following research questions were addressed:

1. Does implementation of a Social Story intervention lead to decreased occurrence of challenging behaviors associated with transitions of children with ASD and ID? It is hypothesized that participants' challenging behaviors, measured by direct observation, will be reduced following the implementation of Social Story interventions.
2. Does implementation of a Social Story intervention lead to increased occurrence of on-task behaviors in transition situations? It is hypothesized that participants' on-task behaviors, measured by direct observation, will increase with implementation of Social Story interventions.
3. Does implementation of a Social Story intervention lead to decreased latency to transition? It is hypothesized that the intervention will be associated with decreased latency to transition measured by direct observation.
4. Does implementation of a Social Story intervention lead to decreased duration of time in transition? It is hypothesized that the intervention will be associated with decreased duration of transition measured by direct observation.
5. Do effects of a Social Story intervention on challenging behaviors and on-task behaviors maintain over time? It is expected that effects of Social Stories will maintain at a one to three-week follow-up.
6. Will Social Story interventions result in improved general behavioral flexibility, as measured by the Behavior Flexibility Rating Scale-Revised (BFRS-R; Peters-Scheffer et

al., 2008) and by a questionnaire for teachers created for this study? It is hypothesized that participants' behavioral flexibility will improve, as evidenced by reduced total scores on the BFRS-R and the teacher questionnaire following the intervention.

7. Are Social Stories viewed by teachers and students with ASD and ID as an acceptable and effective intervention to address transition difficulties? It is hypothesized that Social Stories will be viewed as an acceptable intervention, as supported by the scores on the Intervention Rating Profile (*IRP-15*; Martens, Witt, Elliot, & Darveaux, 1985).
8. Can intervention agents implement Social Story interventions with fidelity? It is hypothesized that Social Stories will be implemented with high fidelity, as supported by the results of a treatment fidelity checklist.

## Chapter 2

### Review of Literature

This chapter will review research on transition difficulties in ASD. First, investigations and theories addressing the nature of those behaviors and the existing assessment methods will be reviewed briefly. Second, an overview of the intervention research addressing transition difficulties will be provided. Finally, research on Social Story interventions will be discussed, with a specific focus on studies addressing challenging behaviors and/or appropriate replacement behaviors in transitions.

#### Transition Difficulties of Students with ASD

**Theory.** Reasons for transition difficulties of students with ASD are poorly understood, despite the wide documentation of those problems and their negative impact on students' functioning at school, home, and community. Leo Kanner, an Austrian-American psychiatrist provided early documentation of some of the behaviors that could be described as transition difficulties. For example, when observing his young patients with "early infantile autism", Kanner noted that their behavior was ruled by "an anxiously obsessive desire for maintenance of sameness that nobody but the child himself may disrupt on rare occasions" (Kanner, 1943, p. 245). As such, transition difficulties may be viewed as manifestation of some of the behaviors within the Restricted and Repetitive Behaviors (RRBs) domain of autism. Together with social and communication difficulties, RRBs constitute a core defining impairments in ASD (American Psychiatric Association, 2000). They are broadly defined and include several heterogeneous groups of behaviors, including restricted and intensive focus of interests (e.g., talking almost exclusively about dinosaurs), stereotyped motor behaviors (e.g. hand or finger flapping or twisting, complex whole-body movements), inflexible adherence to routines, and preoccupation

with parts of objects. Research on RRBs has been growing in the recent years, but many issues, such as their nature, causes, and developmental course, are still poorly understood (Abramson et al., 2005; Carcani-Rathwell, Rabe-Hasketh, & Santosh, 2006).

Recent studies that have examined the factor structure of RRBs (e.g., Richler, Bishop, Kleinke, & Lord, 2007; Szatmari et al., 2006) suggest that they fall into two subgroups of “high level” behaviors, such as insistence on sameness and stereotyped interests, and “low level”, such as stereotyped motor movements and preoccupation with parts of objects. An important question is whether RRBs are specific to and/or more pronounced in individuals with ASD than in individuals with other developmental disabilities (e.g. ID). Findings from experimental research suggest that this is the case. First, the levels of all types of RRBs are higher in individuals with ASD than individuals with ID only (Carcani- Rathwell et al., 2006). Furthermore, RRBs seem to be more pronounced in individuals with ASD and ID than in individuals with ASD and no comorbid ID. Finally, whereas “low level” RRBs may be a function of low cognitive ability independent of ASD diagnoses, “high level” behaviors have been found to be significantly positively correlated with ASD symptoms (Carcani-Rathwell et al., 2006; Lam et al., 2008; Szatmari et al., 2006), which suggests that “high level” RRBs, such as insistence on sameness may comprise a deficit specific to ASD. The high-level RRBs, particularly insistence on sameness and resistance to change, may arguably be linked to transition difficulties of students with ASD, particularly in situations involving change in an existing order of activities or routines. The “insistence on sameness hypothesis” may be less suited, however, for explaining the everyday predictable transitions.

Several cognitive theories of ASD, described next, attempt to explain the underlying causes of transition difficulties. The Theory of Executive Functioning views impairments in

executive functioning as central to ASD (see Hill, 2004; Ozonoff & Jensen, 1999). Individuals with ASD manifest significantly impaired performance on several specific tasks of executive functioning (most notably, cognitive flexibility and planning) compared to individuals without the disorder (Ozonoff and Jensen, 1999). A lack of cognitive flexibility of individuals with ASD has been established by impaired performance on the Wisconsin Card Sorting Task (Grant & Berg, 1948, as cited in Ozonoff & Jensen, 1999), a measure of flexibility that requires subjects to shift cognitive set up several times during the task. This tendency to perseverate or get “locked into” one behavior or thought (South et al., 2005) may be an aspect of executive functioning responsible for difficulties in transitions that require shifting between tasks and activities. This theory may serve as an explanation for both predictable daily transitions and for unpredictable routine changes.

The theory of Weak Central Coherence (WCC; Happe, 2005) also has a potential to provide an explanation for some of the transition difficulties. According to this theory, individuals with ASD have significant difficulty deriving meaning from diverse pieces of information in a context. In particular, people with ASD tend to focus on local details rather than process information globally. This “local processing bias” (Loth et al., 2008) may explain a difficulty of individuals with ASD to effectively navigate their environment, leading to challenges in daily transitions and routine changes.

Somewhat related to the WCC theory, the “predictability hypothesis” (Flannery & Horner, 1994) is an explanation for transition difficulties frequently cited in intervention literature. According to this theory, transition difficulties of individuals with ASD may be a direct consequence of their lack of awareness of the cues that signal an upcoming change to prepare for situational variability. As a result, people with ASD require greater environmental

predictability than individuals without the disorder. The hypothesis was tested and partially supported in an experimental demonstration of reductions in problem behaviors of students with ASD following the increased environmental or task predictability (Flannery & Horner, 1994). Reasons for the greater need in predictability are unclear. It may be possible that a lack of awareness of the cues signaling the environmental change may be a function of some cognitive processing deficits, such as the local processing bias (i.e., WCC) or shorter attention span. However, no studies to date have examined this issue. Second, although attractive as a testable assumption, “predictability hypothesis” seems to be better suited for explaining difficulties associated with unpredictable transitions than difficulties with daily predictable transitions (e.g., from class to dismissal). Finally, although the hypothesis assumes that improved predictability leads to improved behavior via the cognitive mechanisms (i.e., improved awareness), participants’ awareness of environmental predictability has never been directly assessed.

Finally, in the operant theory, transition difficulties are viewed as positively or negatively reinforced (e.g., McCord et al., 2001). From the viewpoint of this theory, transition difficulties are maintained by the consequences that they provide, such as sensory or social consequences, or the consequence of avoidance or escape of unpleasant tasks or situations (e.g., McCord et al., 2001; Kern & Vorndran, 2000). Specifically, if the motivation of behavior is to avoid the unpleasant setting, event, or activity, to avoid changes in routines, or the transition process itself, the challenging behavior is negatively reinforced. On the other hand, if a student is motivated by obtaining social consequences, such as the attention of adults, or by the access to a desired activity or item pre-transition, then the challenging behavior is viewed as positively reinforced. Operant theory may provide an explanation of a range of difficulties, including predictable, consistent transitions, as well unpredictable transitions.

Researchers have attempted to understand transition difficulties among individuals with ASD by developing structured or standardized assessments that might elucidate the nature and the extent of those problems. Several assessments aimed at identifying the presence, frequency, and severity of a lack of behavioral flexibility in individuals with ASD have been created to date. Those assessments may also be used to detect a range of problematic situations, and may hold promise as outcome measures in empirical studies. Next, several instruments that may be used to assess transition difficulties in children with ASD will be described.

**Assessment.** Two existing assessments, Repetitive Behavior Scale-Revised (RBS-R; Bodfish et al., 2000; Lam & Aman, 2007); and Activities and Play Questionnaire (APQ-R; Honey, Leekam, Turner, & McConachie, 2007), look broadly at all types of RRBs, including insistence on sameness and resistance to change. Repetitive Behavior Scale-Revised (RBS-R; Bodfish et al., 2000; Lam & Aman, 2007) is an informant-based scale aimed at assessing a variety of RRBs, including motor RRBs, restricted interests, and insistence on sameness. It consists of 43 items, which in a recent factor analytic studies were found to group into 5 subscales: (a) Ritualistic/ Sameness behaviors, (b) Stereotypic behaviors, (c) Self-injury, (d) Compulsive behavior, and (e) Restricted interests (Lam & Aman, 2007). The scale derived some of its items from Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & LeCouteur, 1994), the Sameness Questionnaire (Prior & MacMillan, 1973) and a number of other instruments. Items are rated on the scale from 0 - behavior does not occur, to 3 - behavior occurs and is a severe problem. The Lam and Aman (2007) study demonstrated adequate internal consistency of the scale, with Cronbach alpha values ranging from 0.78 (for Restricted Interests) to 0.91 (Ritualistic/ Sameness Behaviors). Inter-rater reliability ranged from 0.78 to 0.91 ( $M=0.83$ ) in the sample of raters who worked in an outpatient clinic and from -0.24 to 0.95 in a



sample of participants in a residential center. The results provided support to the utility of RBS-R as an experimental scale particularly well-suited for outpatient clinic settings. More research is needed, however, to establish its psychometric properties and to examine its use in other types of settings (e.g., school).

The recently developed Activities and Play Questionnaire (APQ-R; Honey et al., 2007) is a parent rating scale aimed at measuring repetitive behaviors and play in children with ASD. It was developed on the basis of items from the unpublished Repetitive Behavior Questionnaire (RBQ; Turner, 1996), a comprehensive parent interview assessing RRBs, and the Diagnostic Interview for Social and Communication Disorders (DISCO; Leekam, Libby, Wing, Gould, & Taylor, 2002), an interview used to in a diagnosis of ASD. Items related to RRBs were drawn from RBQ and items related to play were derived from DISCO. Analysis of factor structure of the resultant questionnaire suggested the presence of two factors, “Play” and “Repetitive Behavior”. This solution was applicable for the sample with ASD ( $n=79$ ) and for the typically developing children ( $n=117$ ), as well as for the two groups combined. Internal consistency of the scale was adequate, with Cronbach’s alphas ranging between 0.84 and 0.93. Other psychometric properties of the scale are currently unknown.

Although the RBS-R and the APQ-R are appropriate for measuring a range of repetitive behaviors and include a lack of behavior flexibility as one of their domains, none of them specifically examine students’ difficulties in situations involving environmental change. The only assessment specifically designed evaluate the extent of transition difficulties in students with ASD is Behavior Flexibility Rating Scale-Revised (BFRS-R; Peters-Scheffer et al., 2008). The BFRS-R is a rating scale used to aid clinicians and practitioners in identifying specific situations that cause difficulty and the degree of impairment those behaviors cause. The scale

consists of 16 items, each accompanied by examples and descriptions of daily transitional situations such as: (a) an item is unavailable or may have been broken, moved, or misplaced; (b) a desirable event or activity is interrupted, cancelled, or delayed; (c) the person is subjected to unexpected sensory stimulation, (d) the person fails at a task; or (e) a task is left unfinished (e.g., some dirty dishes are left in the sink). The potentially problematic situations are rated on a 3-item Likert scale from zero - not at all a problem, to two - situation causes severe problems. Results of a study using the earlier version of the scale (Green et al., 2006) suggested that it may be used to discriminate between different diagnostic groups. Specifically, individuals with Asperger syndrome were rated as having lower flexibility than subjects with autism, followed by participants with Down syndrome. A recent study (Peters-Scheffer et al., 2008) suggested a three-factor structure of the scale, including factors “Flexibility towards objects”, “Flexibility towards environments”, and “Flexibility towards persons”. In addition, good internal consistency, convergent validity, and inter-rater reliability were found for the scale. An advantage of BFRS-R is that it covers a range of transitions, both routine and unpredictable. It is a useful tool for practitioners as it may assist them in identifying a range of problematic transitions and make them a part of their intervention efforts. Unfortunately, standard scores are currently unavailable for the scale.

In summary, although a number of emerging theories may provide an explanation for transition difficulties, there is a lack of agreement on the causes and nature of those behaviors and their developmental course. Future research should seek an explanation for the reasons of transition difficulties of individuals with ASD, both in routine and unexpected transitions. Additional research is also needed to further establish the psychometric properties of the existing assessment scales used to examine transition difficulties. Moreover, assessment instruments

sensitive to post-treatment changes in transition difficulties need to be developed. Future research and practice would clearly benefit from the assessments using direct observations of transition-related challenging behaviors. Meanwhile, the search for effective interventions specifically addressing transition difficulties of individuals with ASD is warranted, particularly in light of the preliminary findings that those difficulties may be more prevalent and intensive in this population of students than in other groups of individuals with disabilities.

### **Interventions for Transition Difficulties of Students with ASD**

Most of the interventions for transition difficulties have been aimed at increasing predictability by restructuring the environment, providing individuals with advance auditory or visual cues signaling the upcoming change, or implementing activity schedules. The majority of intervention studies have used antecedent methods that modify or change the environment to prevent challenging behaviors from occurring. Antecedent interventions may be viewed on a continuum according to the extent of dependence on external control. Thus, cues and priming rely more heavily on external prompts; in contrast, activity schedules transfer control to students and are used to reduce prompt dependence. All those methods will be reviewed first. Then, an overview of classroom structuring methods will be provided, followed by a review of additional behavioral interventions such as task interspersal and functional behavioral assessment (FBA) methods.

**Auditory and visual cues.** Sometimes providing a person with a warning about the upcoming change is sufficient to make a transition less challenging. Those cues may be provided in auditory or visual modes. Auditory cues may involve a verbal reminder, beep of a timer, or ring of a bell provided in advance of transition. Verbal cues seem to be more effective when provided some time in advance of transition (e.g., 2 min) than immediately prior to transition

(Tustin, 1995). Flannery and Horner (1994) used auditory cues to assist a 14-year-old adolescent with autism in performing unfamiliar tasks. Prior to the initiation of a novel task, an instructor verbally primed the participant by describing and modeling the nature of the task. This resulted in substantial decreases in rates of the participant's problem behaviors relative to baseline levels. Similarly, Ferguson and colleagues (2004) demonstrated reductions in transition times of young students with ASD ( $n=14$ ) following the implementation of auditory cues (bell ring and a verbal prompt). Finally, Sainato and colleagues (1987) verbally prompted students to go to the next activity setting and to ring a bell signaling the beginning of a new activity. The dependent variable was defined as meters per second of transition from activity to activity and from setting to setting. The treatment condition produced twofold increases in children's rates of movement relative to baseline.

Although auditory cues seem to improve transition behaviors of individuals with ASD and are easy to implement, many students with ASD seem to respond better to visually-based instruction such as visual cues and activity schedules. The claim that many individuals with ASD are "visual learners" (Grandin & Scariano, 1986; Quill, 1997) received empirical support in a recent study by West (2008). This investigation compared the effects of auditory and visual cues in the context of teaching two daily living activities to young students with ASD. Results demonstrated superior effectiveness of visual cues relative to auditory stimuli in improving the students' independent performance.

Visual cues are typically provided in the form of a picture, symbol, or photograph of the activity. An example of the use of visual cues to improve transition difficulties of students with ASD is provided by Schmit and colleagues (2000) in a study using a multiple baseline across contexts design. A photographic cueing package was implemented to decrease tantrum behaviors

and improve compliance of a 6-year-old boy with autism. Immediately prior to transition, the participant was provided with a verbal cue (e.g., “Time to go to the library”) and a photographic symbol representing the activity. The intervention package resulted in reductions of tantrum behaviors in all the targeted contexts.

**Visual activity schedules.** Activity schedules are similar to visual cues in that students are provided with an advance visual notice of transitions. Unlike visual cues, however, they consist of a sequence of pictures, written words, or photographs describing components of a routine or activity. The visual symbols prompt students to engage in the activity and may result in increased predictability and decreased dependence on the prompts of others (Krantz & McClannahan, 1998; McClannahan, & Krantz, 1999). Activity schedules may be as simple as a three-item written list of “things to do” or as detailed and comprehensive as a book with photographs of a complex routine. Schedules may be gradually faded to just one symbol representing the whole sequence rather than each of the small steps separately. They have been successfully used to target a variety of behaviors, including social and communication skills (e.g., Dauphin et al., 2004; Krantz & McClannahan, 1998), daily living skills (Krantz et al., 1993) and on-task behaviors during daily routines (Bryan & Gast, 2000; MacDuff et al., 1993).

Several studies examined the effects of visual activity schedules on transition difficulties of students with ASD. The study of Flannery and Horner (1994) cited earlier, used a visual activity schedule to address challenging behaviors (e.g., head butting, screaming, hitting, kicking) of one of the participants in their study. The participant was provided with a printed list of tasks that he was to work on, along with a timer set for the pre-specified duration. The intervention condition resulted in marked decreases in challenging behaviors of the student compared to the phase in which tasks were presented in an unpredictable order.

Dettemer, Simpson, Myles, and Ganz (2000) examined the effects of visual schedules to address transition difficulties of two boys with ASD. The participants, 7 and 5 years of age, constantly resisted transitions across settings or activities and engaged in self-stimulatory behaviors, presumed to be a sign of anxiety. The intervention consisted of visual schedules with picture icons indicating the order of activities, combined with a verbal cue (e.g., “It’s time to go to...”). The intervention resulted in decreases in latency to transition for both of the boys (e.g., from an average of 6.2 min to 1.8 min for one of the participants). In addition, the intervention led to decreased number of verbal and physical prompts required to initiate a transition.

Finally, Dolley, Wilczenski, and Torem (2001) used cards from the Picture Exchange Communication System (PECS) to assist a preschool-aged boy with ASD in transitions from one activity to another. The intervention targeted the participant’s challenging behaviors, described as crying, screaming, and aggression. In one of the intervention phases, an activity schedule was combined with an edible reward, which was subsequently removed. Decreases in problem behaviors were evident when the visual schedule and reinforcement system was implemented, as well as when the tangible reward was removed.

**Video priming and video modeling.** In video priming, predictability is increased by showing a video of the transition prior to the actual transition. Video priming is distinct from video modeling (e.g., Charlop-Christy, Le, & Freeman, 2000) in that the videos merely demonstrate the details of the upcoming routine or setting, without providing models of appropriate behavior. Only one study to date examined the effects of video priming on transition difficulties of preschool-aged children with ASD (Schreibman et al., 2000). The videos showed details of the challenging routines (e.g., visit to a mall, leaving home to go outside). For example, a video for one of the participants depicted the settings visited on the way to a mall, beginning

with an entrance to the mall, going through several stores, and ending at a toy store, which had reinforcing value for him. Following the intervention, inappropriate behaviors of all 3 participants were reduced relative to the baseline. In addition, “no video” and “irrelevant video” probes were conducted to control for the possibility that the behavior change occurred because of watching videos rather than as a result of the intervention. Moreover, maintenance of treatment effects was demonstrated at one month follow-up. This study provided preliminary evidence regarding the effectiveness of video priming in reducing transition difficulties. A limitation of the video priming method, however, is that it may only be used in transitions involving setting changes. Video modeling may be more appropriate for transitions between different activities and for situations involving changes in routines than for predictable transitions.

Video modeling was used in a recent study by Cihak and colleagues (2010) to improve independent transitions of students with ASD. Participants were four elementary grade children receiving education in general education classrooms who had difficulty in daily transitions between settings. Videos were created involving participants as models of expected behaviors (i.e., appropriately independently transitioning from setting to setting). Ten transitions were selected per participant per day (e.g., from bus to classroom) and event recording was used to document the daily percentage of independent transitions. Videos were played on video iPods just prior to the actual transitions. Using the ABAB withdrawal design, improvements in participants’ independent transitions were demonstrated following the implementation of video modeling. Furthermore, independent transitional behaviors maintained at follow-up. Finally, video modeling was perceived as an acceptable intervention by teachers and students. The study was limited by its use of video modeling in a combination with the system of least-to-most prompting, making conclusions related to the effectiveness of video modeling alone impossible.

**Classroom structuring.** Classroom structuring methods involve rearranging the classroom environment to increase predictability and consistency. According to Iovannone, Dunlap, Huber, and Kincaid (2003), structure is the extent to which all elements of the program are clear and comprehensible for both students and staff members. Elements of classroom organization that support environmental predictability include: (a) organization of instructional settings, such as identifying and clearly labeling classroom areas designated for specific tasks (e.g., art, one-on-one, leisure areas); (b) eliminating irrelevant visual materials that may distract students (e.g., posters); (c) designing individual student's work areas, using color coding or picture symbols; and (d) providing a clear schedule of activities (Ganz, 2007; Iovannone et al., 2003). No study to date specifically evaluated the effects of classroom organization and structure on transition difficulties of students with ASD; however, some empirical support for classroom structuring methods comes from research conducted at Division TEACCH (Treatment and Education of Autistic and Related Communication Handicapped Children). TEACCH is a comprehensive treatment model for students with ASD and their families that involves structured teaching and visual supports as its essential components. Studies support the effectiveness of the TEACCH model (e.g., Panerai, Ferrante, & Zingale, 2002; Van Bourgondien, Reichle, Schopler, 2003). Although those results are promising, evaluation of a treatment package was conducted. Future studies should examine the effects of classroom structuring separately from other interventions. In addition, none of the studies specifically addressed transition difficulties as intervention outcomes; thus, evidence related to effectiveness of classroom structuring methods remains limited.

**Behavioral interventions.** Finally, behavioral interventions such as task interspersal and FBA may be used to assist individuals with ASD in transitions. Task interspersal involves



providing several high-probability (i.e., easy) requests, just prior to presenting a low-probability (i.e., more difficult) task. The effects of high-probability requests on transition difficulties of students with ASD were examined in a study by Banda and colleagues (2006). Three morning transitional routines (i.e., emptying a backpack, arranging the daily visual schedule, and going to the locker) were selected as low-probability requests. Those tasks were presented among verbal questions that readily elicited verbal responses from the participant (e.g., “How was your day?”) The intervention resulted in decreased transition time and reduced number of prompts. Two additional studies that used task interspersal provided additional support for the use of this intervention in transitions (i.e., Ardoin, Martens, & Wolfe, 1999; Davis, Reichle, & Southard, 2000); none of those studies, however, involved participants with ASD diagnoses.

When simple environmental modifications or intervention procedures are not sufficient to decrease the levels of challenging behaviors and ease transitions of students with ASD, functional behavior assessment (FBA) or functional analysis (FA) procedures may be used. Those procedures involve a comprehensive examination of the environmental variables that influence the occurrence of challenging behaviors (Hanley et al., 2003). After implementing the assessment procedure that involves experimental manipulations of environmental variables (FA) or observations of the behavior in natural settings (FBA), a hypothesis regarding the function of behavior is made (Sugai et al., 2000). The information regarding the possible causes of behaviors is used to inform the intervention. For example, if the motivation of a challenging behavior during transition is to obtain others’ attention, the intervention may involve providing noncontingent attention prior to and during the transition. A few studies that have examined the effectiveness of FBA for transition difficulties of students with ASD yielded promising results. In one such study (O’Reilly, Sigafos, Lancioni, Edrishinha, & Andrews, 2005), self-injury of

the participant, a nonverbal boy with autism and intellectual disability, was found to be a function of academic demands. Results of the FA also supported the hypothesis that conditions presented in a particular order (i.e., demand, followed by no interaction, and preferred activity) would result in lower self-injury. When an activity schedule informed by the results of the FA was implemented, the student's self-injury decreased, his engagement increased, and results maintained at follow-up. Results support the usefulness of FA procedures in determining the optimal predictable sequence of activities.

McCord and colleagues (2001) examined the use of FBA in identifying the function of self-injurious behaviors of two adults with developmental disabilities during transitions. Results of the initial assessment indicated that challenging behaviors of both participants were not associated with the reinforcing value of the activity, but merely with changes in location. Further assessment suggested, however, that self-injury of one of the participants was maintained by escape from ongoing tasks and avoidance of task initiation. The first phase of the intervention, which consisted of a verbal cue, seemed to be ineffective for both participants. A subsequent addition of differential reinforcement of alternative behavior (DRA), followed by the addition of escape extinction and blocking of self-injury resulted in immediate decreases in challenging behaviors. This study, being one of the few existing empirical investigations of applications of FBA procedures to transitions, identified specific functions of transition difficulties and contributed to the understanding of transition difficulties from the operant perspective. However, additional research to examine the use of FBA in transitions is needed.

**Comparisons of methods.** Several recent investigations compared the use of traditional printed activity schedules to those delivered via personal electronic devices. Mechling and Savidge (2011) examined the effectiveness of activity schedules that used photographs, videos,

and auditory prompts and were presented on Personal Digital Assistants (PDA) to the traditional printed activity schedule (i.e., a task strip). Another interesting aspect of the study was the examination of task completion and independent transitioning in the context of novel tabletop tasks. Three middle-school students with ASD and moderate ID who were members of classrooms following the TEACCH model were participants in the investigation. The use of the PDA activity schedule resulted in increased task completion in two of the students relative to the printed schedule condition. Furthermore, all participants completed a higher number of between-task transitions. Finally, one of the participants began to self-fade the use of more intrusive prompts. The results of the study are promising as they clearly establish the potential of personal technology in improving transitions of students with ASD.

In another recent investigation, Cihak (2011) compared the effectiveness of pictorial and video modeled activity schedules. Static-picture schedules, each depicting a participant engaging in a targeted activity, were printed and displayed horizontally. The video-modeled schedules showed participants engaging in activities and transitioning between the tasks, and were presented on a desktop computer. Four middle-school students with severe ASD participated in the study. Ten transitions per day (e.g., unpack to calendar, classroom to recess, reading to computer) were targeted with each student. Although participants' independent transitions increased following the implementation of visual schedules, the results were mixed with regard to the relative effectiveness of video-modeled vs. static activity schedules. Specifically, two participants completed more independent transitions with the video-modeled schedule, one did better with pictorial schedules, and one student performed equally with both schedules. Although it is true that individual decisions need to be made when choosing the types of activity schedules to address transition difficulties, additional research is needed to establish student characteristics

associated with effectiveness of and/or preference for particular methods of intervention delivery. Furthermore, a number of practical considerations should be taken into account (e.g., costs of making video clips, time investment).

Although the two studies reviewed above addressed independent performance and on-task behaviors in transitions, another recent study (Waters, Lerman, & Hovanetz, 2009) specifically targeted problem behaviors occasioned by daily transitions. It also compared separate and combined effects of pictorial activity schedules and extinction combined with differential reinforcement of other behavior (DRO). Participants were two 6-year-old boys with ASD. Results of a brief FBA conducted prior to the study indicated that the behaviors were maintained by escape from nonpreferred activities and by access to preferred activities. The visual schedule alone was ineffective in reducing challenging behaviors, so the behavioral interventions (i.e., DRO and extinction) were implemented. In this phase, an alternating treatment design was used to examine the additive effects of activity schedules on problem behavior. Results indicated immediate reductions in transition difficulties with extinction and DRO (i.e., 69% and 83%), and slightly greater reductions when the behavioral procedures were combined with visual schedules. Those results suggest that transition difficulties of some children with ASD need to be addressed in a comprehensive manner, both with antecedent and consequence interventions.

In summary, intervention research addressing transition difficulties of students with ASD is currently limited, although the number of intervention studies seems to be growing. It is possible that a number of studies were not included in this review because challenging behaviors were not labeled as “transition difficulties.” Further, promising investigations that involved

participants with diagnoses other than ASD (e.g., Ferguson et al., 2004; Kern & Vorndran, 2000) were excluded from this review, thereby limiting the number of the discussed studies.

Furthermore, with a few exceptions, studies have addressed predictable daily transitions rather than unpredictable transitions (e.g., novel events, routine changes). This may be explained by a number of practical and ethical considerations. By definition, studies of unpredictable transitions would involve a modification of the existing order, which may be unacceptable when conducting research in naturalistic settings. In particular, many classroom environments are designed to be as predictable as possible, so introduction of an unexpected transition may lead to challenging behaviors in students and may be highly stressful for teachers and children alike. Therefore, a more feasible way of conducting studies of unpredictable transitions may be through experimental manipulations in more controlled experimental settings.

Operational definitions of transition difficulties varied across the intervention studies. The majority of reports defined the main variable of interest as frequency of transition-related challenging behaviors. A number of other definitions have been used as well, such as latency to transition or total duration of transition. Finally, several studies defined transition in terms of on-task (i.e., appropriate) behaviors, increased independence, and/or task completion.

Viewed together, findings of the intervention studies of transition difficulties suggest that increased environmental predictability may produce favorable student outcomes. Specifically, children with ASD benefited from receiving advance signals of transition, particularly those delivered in a visual (i.e., pictorial, photographic, or video) format. Effectiveness of those procedures may be enhanced by implementing the FBA procedures. However, as a relatively limited number of intervention studies targeting transition difficulties have been conducted, additional research examining the use of antecedent interventions is needed.

## **Social Story Interventions**

Another popular strategy that incorporates elements of priming, task analysis, and visual cues and may be used to assist individuals with ASD in transitions is Social Stories. This method was first introduced in 1993 by educational consultant and former teacher Carol Gray as an intervention aimed at assisting individuals with ASD with their social difficulties (Gray, 1998). However, Social Stories also have potential as an intervention for transition difficulties, as will be shown below. Social Stories are individualized short stories written by parents or teachers with the goal of objectively sharing important information about a person, skill, concept, or situation with individuals with ASD (Gray, 1998, 2004). Most frequently, social skills, concepts, and situations are targeted. Social dysfunction is viewed as a primary area of deficit in ASD (American Psychiatric Association, 2000; Carter, Ornstein Davis, Klin, & Volkmar, 2005). Specifically, individuals with ASD have lower social engagement and less frequently initiate and respond to initiations than their typical peers (Jackson et al., 2003; Jahr, Eikeseth, Eldevik, & Aase, 2007). Rules of the social world may be confusing and overwhelming even for high-functioning individuals with ASD (e.g., Grandin & Scariano, 1986). As a result, the social prognosis of people with ASD is often poor, including having experiences of loneliness, difficulty establishing and maintaining social relationships, and a range of long-term mental health problems (Howlin, Goode, Hutton, & Rutter, 2004; Lasgaard, Nielsen, Eriksen, & Goossens, 2009; Orsmond, Krauss, & Seltzer, 2004).

Social Stories address the lack of social understanding of individuals with ASD by explaining difficult situations and concepts in simple words (Gray, 1998). Gray (2004) explained that the premise underlying Social Stories is that better understanding of the concepts will lead to improved behaviors. To meet the defining criteria outlined by Gray (2004), a story must include

several types of sentences: (a) descriptive – factual statements used to describe the situation and people; (b) perspective – descriptions of the reactions, feelings, and responses of others; (c) directive – statements that identify an appropriate response and guide an individual’s behavior; (d) cooperative - sentences to identify what others will do to assist; (e) affirmative - statements that enhance comprehension of Social Stories by expressing values or opinions common in a given culture; and (f) control - sentences written by the individual to identify his/ her personal strategies to recall and apply information. Gray (2004) further recommends using the ratio of one directive sentence to two or more sentences of other types in every Social Story. This is important for students to have enough information and to avoid the Social Story becoming merely a list of things to do (Gray, 1998).

The process of creating Social Stories consists of several steps. First, the topic of a Social Story is determined. Social Stories are frequently written in response to situations that are difficult, distressing, or cause anxiety or confusion (Gray, 1998, 2000). Social Stories may also be written in advance of situations or events to prevent difficult behaviors and to alleviate unpleasant emotions. Social Stories do not need to be associated with challenging behavior. Gray (2004) suggests writing at least half of all Social Stories to praise individuals’ achievements. This is important so that the intervention does not become associated only with difficult or unpleasant situations. It is also argued (e.g., Gray, 2004) that the most effective Social Stories are those that result in improved understanding of concepts and situations.

Second, comprehensive information is gathered about a situation, event, or activity. Information is collected about the typical sequence of events, people involved (their perspectives and responses), relevant cues, and the possible sequence variations (Gray, 1998; Howley & Arnold, 2005). Information is gathered by interviewing relevant stakeholders and by conducting

direct observations of events and activities. The information gathering stage should seek answers to the “wh” questions (e.g., who, when, where, how). If the purpose of a Social Story is to address inappropriate behaviors, information about antecedents, behavior, and consequences may be useful. In addition, considerations of the target individual’s underlying cognitive processes should be made in certain situations. To illustrate, Howley and Arnold (2005) provide an example of a 10-year-old boy who calls out answers to all questions asked by the teacher, even those not directly addressed to him. The student’s misunderstanding of the situation, a mistaken assumption that whenever a teacher asks a question she is talking to him, could be responsible for the inappropriate behavior.

The third stage involves writing of a Social Story. Although Social Stories are primarily an individualized intervention, a number of ready-made Social Stories are commercially available (e.g., Gray, 2000). The following considerations should be made when writing a Social Story: (a) it should have a clear title, introduction, body, and conclusion; (b) it should be written from the first-person (as though described by the target individual) or the third-person perspective (as in a newspaper article); (c) it should use positive language (e.g., “I will try to sit quietly” rather than “I will not yell”); (d) it should avoid terms or statements that are “inflexible” as students with ASD may interpret them literally; instead, the terms “usually”, “sometimes”, and “probably” are preferred; (e) it should be written following the “Social Story ratio”; and (e) it should describe the situation objectively, avoiding writer’s judgment about the content.

Fourth, after a Social Story is written, it is reviewed and revised by a team of teachers, parents, peers, students, and other relevant stakeholders. Knowledge of the target individual is essential in making Social Stories effective. Factors such as developmental age, reading and



comprehension ability, attention span, interests, and preferred learning style (Howley & Arnold, 2005; Gray, 1998) should be considered in tailoring the content and form to the needs of an individual and in making the decision about the mode of presentation. For example, younger students with shorter attention spans may require shorter Stories with less detail, and sentences presented one at a time (the so-called “introductory Social Stories”). Reading and comprehension ability determines the choice of vocabulary. Furthermore, a student’s objects or topics of interest may be included, in the form of illustrations, verbal reference, or actual objects accompanying the presentation, to make Stories motivating. Finally, preferred learning style should guide decision making about the mode of presentation (auditory or visual; text accompanied by picture symbols, drawings, or actual photographs). Social Stories are typically presented in a written format, with or without illustrations. Gray (2004) also provides anecdotal reports of parents using unusual formats such as Social Stories weaved on a quilt, pasted on a shoe box, or acted out by puppets.

Next, the Social Story is presented to the student. This should be done in a relaxed, patient, and positive manner. Gray urges teachers and parents not to use Social Stories as a consequence for inappropriate behavior, as they may become viewed as a punishment. Typically, Social Stories are read by adults or children in a quiet, distraction-free area. Adults should be positioned by the child’s side and slightly behind (Howley & Arnold, 2005) so as to not to distract the child from the Story. The review occurs prior to a problematic situation, although the schedule of implementation depends on the topic: Social Stories may be practiced every morning, in advance of the event, or immediately before the event, depending on a situation. A review schedule that is consistent should be established and decisions should be made regarding time, duration, location, and frequency of implementation (Gray, 1998). The Story may stay with

a child as a permanent reminder and may be used by the students independently of adult prompting.

Finally, implementation is carefully monitored and the student's progress is constantly evaluated. Additions or revisions to the Social Story may be made based on the changes in situation, context, or the student's behavior. Social Stories may be eventually faded; this, however, is not always possible or advisable (Gray, 2000). When fading does occur, it is achieved by gradually by eliminating some sentences, using "partial" sentences (i.e., with blanks to be filled in by a child), or thinning the schedule of implementation.

### **Research on Effectiveness of Social Stories**

Research on effectiveness of Social Story interventions covers a relatively short time period, with the first study (i.e., Swaggart et al., 1995) published about 14 years ago. Recent years have witnessed a steady increase in the number of published studies (see, for example, Kokina & Kern, 2010). The majority of studies used single-case study designs, including simple AB designs (e.g., Norris & Datillo, 1999; Swaggart et al., 1995; Reynhout & Carter, 2008), withdrawal designs such as ABAB (e.g., Adams et al., 2004; Bledsoe, Smith Myles, & Simpson, 2003; Kuttler, Smith Myles, & Carlson, 1998), and multiple baseline designs (e.g., Delano & Snell, 2006; Sansosti & Powell-Smith, 2006; Scattone et al., 2006). Only one study published to date (Quirnbach, Lincoln, Feinberg-Gizzo, Ingersoll, & Andrews, 2009) used a group randomized control trial design.

Next, results of the recent qualitative meta-analyses describing the extant intervention literature on Social Story interventions and summarizing their effectiveness will be discussed. Specifically, findings from the reviews of Kokina and Kern (2010), Test, Richter, Knight, and Spooner (2010), and Reynhout and Carter (2011) will be summarized. Those reviews differed

with respect to their inclusion criteria, coding categories, and quantitative metrics used to estimate treatment effectiveness. For example, Kokina and Kern (2010) were very selective in their inclusion process, and excluded studies that used treatment packages, studies without adequate experimental control (e.g., AB designs), and studies with floor or ceiling effects in baselines. Studies and unpublished dissertations conducted prior to 2009 were included, resulting in the final sample consisting of a total 18 single-case intervention studies. Test and colleagues' (2010) final sample consisted of 28 studies, as no limitation was initially placed on methodological quality. However, only 18 of those studies were eligible for quantitative review (i.e., effect size calculation) due to the inadequate methodological quality of the remaining reports ( $n=10$ ; 35.7%). Both reviews used percentage of non-overlapping data (PND; Scruggs & Mastropieri, 1998) as an index of treatment effectiveness. The two syntheses differed, however, as Kokina and Kern (2010) focused on the evaluation of moderator variables (e.g., intervention characteristics, participant characteristics). Test and colleagues (2010), on the other hand, were primarily interested in evaluating the methodological quality of single-case research using the indicators proposed by Horner et al. (2005). Finally, the review of Reynhout and Carter (2011) consisted of a much larger sample of studies ( $n=62$ ), without criteria for methodological rigor and used three different quantitative metrics to evaluate the effectiveness of the intervention.

A consistent finding in all the reviews was that Social Stories have an overall questionable to low effectiveness with a range of individual outcomes. Kokina and Kern obtained a total median PND score of 62% (range, 11-100%); using the score interpretation proposed by Scruggs and Mastropieri (1998), those scores fall in the “questionable” range. Test and colleagues (2010) estimated even a lower PND score of 51 (range, 20-95%), suggesting “low” effectiveness. Finally, Reynhout and Carter 's (2011) obtained a PND of 54% (range, 0-

100%). Although the overall effectiveness of Social Stories seems to be low, the high variability of individual outcomes presents an interesting research question, which was addressed in the meta-analysis of Kokina and Kern (2010). Specifically, the meta-analysis examined the possible sources of individual variability by examining a set of moderator variables. Selected results from their review and other meta-analyses will be presented next.

First, Social Stories were used with the two main goals of improvement of social communication skills (e.g., appropriate requesting, contingent responding, social engagement, play and conversation skills) and reduction in challenging behaviors (e.g., talking out, tantrums, aggression), but seemed to be more effective in producing behavior reduction (Kokina & Kern, 2010). Note, however, that Reynhout and Carter's review resulted in almost identical PND scores for behavior increase and behavior reduction; this could have been due to divergent definitions used in the two reviews. Second, younger students with higher levels of skill development constituted a majority of the sample. Those students also seemed to benefit from the intervention to a larger extent than older and lower functioning students. Third, the largest number of studies was implemented in special education settings (41%) by teachers or researchers as intervention agents (56%) and the Social Story was read just before the targeted situation (72% of studies).

However, higher effectiveness was associated with the following intervention characteristics: (a) implementation in general education settings, (b) the use of target students as agents of their own intervention; (c) use of functional assessment as part of planning; and (d) assessment of comprehension of Social Stories after the reading sessions. With regard to the characteristics of Social Stories, most studies have used an illustrated format, which was also associated with higher intervention effectiveness. Therefore, there were some differences in both

the ways the intervention has been used in the studies and the presence of characteristics associated with higher effectiveness. The results of this meta-analysis should be viewed as preliminary and are meant to guide future experimental examinations of the moderating role of the treatment and participant variables.

With regard to the overall methodological quality of research, earlier studies of Social Stories were characterized by a lack of experimental control and have frequently used treatment packages. Test and colleagues (2010) noted, however, that methodological quality of Social Story research has improved in the recent five years. These recent studies met 74% of quality indicators (Horner et al., 2005), included adequate participant descriptions, and were more likely to evaluate treatment fidelity. However, the overall methodological quality of research remained low as many studies failed to demonstrate adequate experimental control, document maintenance and generalization, or include an assessment of social validity. Based on those analyses, the reviewers caution that Social Stories currently may not be considered an evidence-based practice; a claim that was mirrored by Reynhout and Carter (2011).

In summary, additional experimental studies characterized by high methodological quality are needed, as a large proportion of the existing intervention studies of Social Stories failed to demonstrate the required experimental control by using non-experimental designs (e.g., AB, ABC) and / or used Social Stories as part of treatment packages. Researchers should consider implementing studies with group designs, as only one published report to date (Quirnbach et al., 2009) examined Social Story interventions using a group design with random assignment. Finally, high levels of between-subject variability in evaluations of intervention effectiveness suggest a need to conduct empirical investigations of the sources of this variability (i.e., examinations of moderator variables). In the next section, several intervention studies that

addressed challenging and / or on-task behaviors of students with ASD in transitions will be discussed. It has to be noted that although all those studies addressed transitions, none of them specifically focused on those difficulties or labeled them as such.

### **Research on Effectiveness of Social Stories in Addressing Transition Difficulties**

Only one study to date has specifically addressed another use of Social Stories described by Gray (2000), introduction of routines. Ivey and colleagues (2004) used a set of Social Stories, accompanied by photos or line drawings, to prepare 3 participants with ASD for novel events. The novel events included setting changes, purchases, novel toys presented by unfamiliar persons, and novel activities such as attending a birthday party or making a video. The intervention resulted in the increase of the targeted skills (i.e., remaining on task, performing two key tasks defined for each separate event, using the novel vocabulary word, and making a request). Although the investigators deserve credit for addressing the previously unaddressed area of difficulty in ASD, the study also had several limitations. Most importantly, the extent to which transitions or novel events were problematic to children was not obvious, as challenging behaviors were not directly measured. It could be argued that a lack of participation in the routines may not be related to transition difficulties. Finally, the extent to which the selected tasks were truly novel for participants was not examined prior to the study.

Four additional studies (i.e., Kuttler, Smith Myles, & Carlson, 1998; Mancil, Haydon, & Whitby, 2009; Schneider & Goldstein, 2010; Quilty, 2007) addressed transitions difficulties without specifically labeling them as such and/or making them a focus of their intervention. All of those studies targeted predictable daily transitions. In an early study, Kuttler and colleagues (1998) examined the effectiveness of Social Stories in addressing tantrum behaviors (e.g., screaming, dropping) of an adolescent with severe ASD. Transitions, wait time, and free time

were identified as challenging situations for this student. Two Social Stories, one for lunch and one for work times, supplemented by picture symbols and combined with a token system, were created to address his difficulties in the two contexts. Using an ABAB design, promising results were obtained, as the participant's disruption decreased. Specifically, initial baseline data revealed the average occurrence of precursors to tantrums of 15.6 during work and 11.6 during lunch. Upon implementation of the intervention, the behaviors were reduced to a mean of zero during the work time and to two during lunch. A return to baseline resulted in increase of precursor behaviors to the average of 15.33 and 18 episodes respectively during the three days of data collection. Finally, when the intervention was reintroduced, the mean during work time was zero again and the mean during lunch was one. Although the results supported the effectiveness of the intervention for reducing the participant's problem behaviors, generalization and maintenance were not assessed, and social validity and treatment integrity were not monitored. In addition, Social Stories did not specifically describe transitions, and observations were conducted during lunch time and morning work rather than in transitions. Therefore, the extent to which the participants' difficulties were related to transitions was unclear. Finally, the intervention included a combination of Social Stories and a reinforcement system, making conclusions about the effectiveness of Social Stories impossible.

Out of a total of three participants in Quilty's (2007) study, one student engaged in transition-related challenging behaviors that involved repeated verbal statements (i.e., saying "Go home"). As in other studies, those challenging behaviors were not labeled as transition difficulties; however, they undoubtedly were related to transitions and a lack of environmental predictability. Data were collected on the number of repetitive statements per last hour of participant's school day, during which he usually worked and/or took breaks. A multiple baseline

design across participants was used. In intervention phase, a Social Story that discussed appropriately working and taking break and indicated the time of dismissal, was used. Unfortunately, the intervention was ineffective for this participant, as evidenced by a high overlap between baseline and intervention phases. Overall, however, the intervention phase led to decreased levels of challenging behaviors and decreased behavior variability.

Mancil and colleagues (2009) examined the differential effectiveness of printed and computer-delivered Social Stories on physical aggression (i.e., pushing of peers while transitioning from class to lunch room) of three elementary students with ASD in a general education classroom. Generalization of effects was assessed by measuring the occurrence of pushing on a playground. A Social Story, entitled “Keeping my hands to myself” was used with all participants. An ABABCBC multicomponent design was used to evaluate the intervention effectiveness. The study resulted in overall reductions in the number of pushing behaviors. Results also pointed to a modest superiority of computer-delivered Social Stories over printed Social Stories. Generalization effects were not observed initially; therefore, prompting was introduced in the generalization settings (i.e., the teachers reminded participants about their Social Story), resulting in decreased frequency of pushing in this setting. Social validity assessment indicated that the intervention was viewed as efficient and acceptable by the participating teachers. Both teachers and students indicated that they preferred the computer-delivered Social Stories to the printed books. A major limitation of the study was the absence of counterbalancing of the two treatment conditions, which may have resulted in carry-over effects.

Finally, the targeted situation of one of participants in Schneider and Goldstein’s (2010) study involved transitioning from computer room back to the classroom. The participant was a 10-year-old student in a self-contained classroom. On-task behaviors, including getting jacket,



moving away from computer, and standing in line were targeted and described in his Social Story, which was illustrated by picture symbols. Although the Social Story resulted in increased on-task behaviors for this participant (i.e., from 29% in baseline to 50% in intervention), this increase was considered moderate and therefore an intervention package including the Social Story and an activity schedule was implemented, yielding additional increases in on-task behaviors (i.e., to 72% of intervals). In addition, the median time to leave computer reduced from 90 s in baseline to 70 s in intervention. The study was limited by its failure to assess maintenance and generalization as well as the absence of social validity information, and monitoring of treatment fidelity.

In summary, Social Stories have rarely been used in intervention research to address transition difficulties of children with ASD. Only two of the studies reviewed above (i.e., Ivey et al., 2004; Mancil et al., 2009) focused exclusively on transition difficulties. Other studies targeted transition difficulties in one of several participants (e.g., Schneider and Goldstein, 2010; Quilty, 2007) or suggested transition difficulties without specifically addressing them through a Social Story (i.e., Kuttler et al., 1999). Most of the studies, with an exception of the investigation of Ivey and colleagues (2004) addressed predictable transitions. In general, the interventions in the majority of those studies were successful (i.e., Kuttler et al., 1999; Mancil et al., 2009; Schneider & Goldstein, 2010). Results of the other two studies (i.e., Ivey et al., 2004; Quilty, 2007) were less compelling. However, a general lack of studies of Social Stories addressing transition difficulties represents a clear gap in current research literature, particularly given that transition difficulties represent an area of significant need in ASD and Social Stories seem to have a strong potential for effectively addressing transition difficulties.

## **Rationale for the Use of Social Stories in Transitions**

Although Social Stories were initially described and examined as an intervention to address social deficits of people with ASD, their other application is to “explain, reassure, and prepare for events” (Howley & Arnold, 2005), as well as to describe routines and variations in those routines (Gray, 2000). Thus, there seems to be a strong theoretical rationale for addressing transition difficulties of students with ASD.

According to the “predictability hypothesis” (Flannery & Horner, 1994) discussed above, individuals with ASD have a greater need for consistency and predictability. It is further suggested that the greater need for predictability is determined by their lack of awareness of the signals of upcoming change or the relevant aspects of contexts, routines, or situations. The need for predictability is addressed by Social Stories, which provide advance warning about activities or routines. In addition, they describe the relevant details of the situation, which may otherwise go unnoticed by people with ASD. Social Stories are repeatedly read prior to the problematic activity, and may alleviate anxiety and other negative emotions associated with transitions. In addition, Social Stories may be useful in explaining the meaning of a situation, activity, or concept, thereby addressing the difficulties stemming from the local processing bias (i.e., WCC).

Moreover, Social Stories have a strong practical rationale for addressing transition difficulties. Social Stories are viewed by many teachers and other individuals working with students with ASD as a feasible and effective intervention (Smith, 2001). Indeed, the philosophy and practice behind Social Story interventions are consistent with some of the current best educational practice. Specifically, Social Stories emphasize the importance of an individualized person-centered approach to planning and intervention, inclusion, and self-determination. Many elements of Social Stories make them similar to well-established interventions for transition

difficulties. Similar to visual activity schedules and visual cues, Social Stories are often presented in an illustrated format, thus having a potential to help students with ASD who are visual learners. Similar to priming, they provide an advance description of the problematic situation. Importantly, Social Stories have a potential for increasing participants' independence, as they stay with a child and may be used to monitor behavior independently of adult prompts. The intervention may bring predictability to environmental situations that can be confusing, overwhelming, or frightening to students with ASD. They are presented in a relaxed informal manner, thereby alleviating the anxiety associated with transitions. In general, Social Stories are a child-centered, user-friendly, individualized intervention characterized by the positive quality. Finally, Social Stories seem to be routinely used in school settings as an intervention to assist students in transitions. Recently, 39 teachers of students with ASD were surveyed on their use of Social Story interventions (Kokina & Kern, in preparation). Results indicated that the use of this intervention to assist students in transition was the most common (reported by 82% of teachers). Moreover, Social Stories written for transitions were perceived to have the highest effectiveness (compared, for example, to using them to teach social communication skills).

### **Rationale for the Present Study**

Difficulties that students with ASD have with transitions and routine changes present significant challenges for educators and parents (South et al., 2005) and interventions to address those difficulties are needed. A small body of research (e.g., Cihak et al., 2010; Dettmer et al., 2000; Dooley et al., 2000; Flannery & Horner, 1994; Schreibman et al., 2000), described above, examined the effects of antecedent interventions aimed at increasing environmental predictability with promising results. Nevertheless, surprisingly few studies specifically targeted challenging behaviors of individuals with ASD related to transitions and routine changes.

Furthermore, although Social Stories have a strong rationale for addressing transition difficulties and seem to be routinely used in this way by teachers of students with ASD (Kokina & Kern, in preparation), only a few studies to date used Social Stories to specifically address transition difficulties of students with ASD. Therefore, this study will contribute to the research literature by examining the use of Social Stories in transitional situations. For the purposes of this investigation, only predictable routine transitions will be targeted. Finally, as described earlier, teachers routinely use Social Stories to address transition difficulties; however, there are no formal data reporting whether this application of the intervention is viewed as acceptable by teachers and students. This study will examine social validity of Social Stories in addressing transition difficulties.

## Chapter 3

### Method

#### Participants and Settings

Participants in the study were three school-age children with diagnoses of ASD and intellectual disability (ID). The students attended a self-contained school for students with ASD in the Northeast of the USA. The school was part of a statewide program for students with ASD and served children ages two through 21 from several school districts. The enrollment in the school at the time of the study was 370 students. The classroom instruction and intervention was developed and delivered collaboratively, involving teachers, paraeducators, school psychologists/behavior specialists, speech and language pathologists, and other related service staff. Classroom strategies included a range of behavioral interventions, visual activity schedules, and visual communication systems. Classrooms were staffed by one teacher and one paraeducator for every 4-7 students.

**Participant selection.** To recruit potential participants, the researcher contacted the coordinator of the Statewide Autism Program, who made a request to the school principal. A written summary of the study was provided to the school administration and a meeting was held to explain the purposes and procedures of the experiment. After the meeting, school administrators distributed the information about the study via email to all teachers and school psychologists employed in the school. Interested teachers were contacted by the investigator and provided with additional information, including the goals of the study, participant inclusion criteria, and copies of informed consents. An individual meeting was then held with each interested teacher, and nominations of potential participants were obtained. The study also used

the chain sampling method (Patton, 1990), in which additional nominations for participation in the study were solicited from all the contacted individuals (i.e., administrators, teachers).

After student nominations were obtained, informal classroom observations and reviews of student records were conducted by the investigator to determine students' eligibility to participate in the study. The following inclusion criteria were used: (a) current medical or educational diagnosis of PDD or ASD as established by educational records; (b) age of 5-15 years; (c) at least beginning reading skills and the ability to comprehend a written story, as established by interviews with teachers and/or educational records; (d) absence of an effective existing intervention to address the behavior of concern; and (e) willingness to participate in the study, as established by the informed parental consent for participation and students' verbal assent. In addition, all participants had to demonstrate significant difficulties in transitions, as evidenced by at least 50% level of challenging behaviors (e.g., noncompliance, aggression, disruption, tantrum behaviors, protesting) over three consecutive observation sessions in pre-baseline. This was established on the basis of direct pre-baseline observations of participants' behavior in situations involving daily school transitions, wherein children were observed from the time when a prompt to transition was provided until the end of the transition. Students were excluded from the study based on the following: (a) low reading comprehension that could prevent them from understanding a story read to them, (b) an additional diagnosis of significant hearing or visual impairment, or (c) less than 50% of observation intervals with transition difficulties at pre-baseline.

Parents of students who met the inclusion criteria were contacted by classroom teachers, who sent them the information about the study and the informed consent forms. After that, the investigator contacted the parents to provide additional information about the study and to

answer any questions. Parents signed the consent forms and returned them to the researcher. Verbal assents were obtained from students prior to initiation of the study. The participant information presented below is based on the results of previously conducted psychological and behavioral evaluations obtained through the review of student records.

**Jason.** Jason was an 11-year-old Caucasian male with the diagnosis of autism. During a psychological evaluation conducted about 6 months before the study, Jason obtained a full-scale score of 64 on the Leiter International Performance Scale-Revised (Roid & Miller, 1997), a nonverbal standardized test of general cognitive performance. This score places Jason in a mild range of intellectual disability (see Table 3 for a summary of participants' characteristics). On Gilliam Autism Rating Scales–Second Edition (GARS; Gilliam, 2006), an assessment of behaviors and symptoms of ASD, Jason obtained the Autism Index score of 102, indicating a high probability of autism. Jason's adaptive functioning, documented by the Vineland Adaptive Behavior Scales-Second Edition (VABS; Sparrow, Balla, & Cicchetti, 1984), was low as suggested by the Adaptive Behavior Composite score of 54. He obtained similarly low scores on Communication and Socialization subscales of VABS, suggesting specific difficulty in those areas. Informal observations and interviews with teacher and school psychologist indicated that Jason had limited communication skills and had difficulty both in receptive and expressive skill domains. Although he was capable of communicating his wants and needs using simple phrases and sentences, he rarely did so and almost never engaged in reciprocal social communication. Perhaps as a result of his low receptive language skills, Jason had difficulty when information was presented to him verbally and benefited from visual cues and repeated modeling. He was a proficient user of his visual activity schedule. Although he performed below grade level in all

academic subjects, he had emerging number sense and math skills as well as improving reading comprehension. He was capable of reading simple written texts with assistance from adults.

Most relevant for the present investigation, Jason had significant difficulties in the RRB domain, as established by his high GARS scores for stereotyped behaviors (see Table 1).

Jason had a long history of engaging in challenging behaviors, which included protesting vocalizations, kicking furniture, physical aggression to staff, and pica. Those behaviors happened across a range of daily situations; however, the results of a previously conducted FBA indicated that the probability of their occurrence increased when his daily routines were changed, when he was denied access to a preferred activity, or when he was given a direction to complete a demand or task. Access to tangible items/activities and escape from unwanted tasks and demands were identified as the two most likely functions of his disruption. The problem behavior that was the most common was protesting vocalizations; school records estimated the average rate of 27 protesting behaviors per day. At the time of the study, he had a combined reinforcement/response cost system to address his challenging behaviors. As part of this system, he had 10 stickers at the beginning of each instructional period and lost one sticker every time he engaged in verbal protesting. He had an opportunity to earn cash-outs (i.e., short breaks with preferred items or activities) at least five times per school day, contingent on having at least one sticker remaining by the time of cash-out.

Transitions from cash-outs, during which Jason usually watched preferred videos or played video or computer games, to the less preferred academic activities (e.g., math, reading) were identified by his teacher as presenting a significant challenge, resulting in frequent noncompliance and protesting. Addressing transitions from cash-out was viewed as important by his teacher, as his protesting behaviors resulted in a loss of instructional time and emotional



stress. Protesting was rated as a “significant problem” at pretest (see the questionnaire in Appendix A), as it happened several times per day and each episode usually lasted for more than 6 min. According to Jason’s teacher, he appeared “somewhat distressed” in those transitions. In cases of noncompliance, Jason’s teachers repeated verbal prompts to transition and then would eventually physically prompt him. The study took place in Jason’s classroom that included three other students, a teacher, and a paraeducator. Jason’s teacher held a Master’s degree with certifications in Special Education and Autism and had over 20 years of experience teaching students with ASD. The intervention was implemented in the mornings or afternoons immediately prior to the opportunity for cash-out.

**Kate.** Kate was a 9-year-old Caucasian female with autism. A psychological evaluation was conducted with Kate 2 years 7 months prior to the start of the study; therefore, the documented test scores were likely lower than her present ability in the areas of social and language development. Her full-scale IQ score on Leiter-R (Roid & Miller, 1997) at the time of evaluation was 50, confirming the presence of a moderate intellectual disability. Kate obtained high composite scores on GARS as well as high scores on social and communication subscales, suggesting a strong probability of ASD. She also obtained a low composite score of Adaptive Behavior Assessment System (ABAS-II; Harrison & Oakland, 2003), a test of adaptive functioning, as well as low scores on all subtests of this test (e.g., conceptual, social, and practical). Informal observations and interviews suggested, however, that Kate was capable of performing many daily living tasks independently and was independent in following her visual activity schedule. As many children with ASD, Kate preferred to engage in solitary activities during her free time, tended to become preoccupied with certain preferred objects or interests (e.g., toys, videos, and dinosaurs), and manifested many atypical social behaviors (e.g., avoided

eye contact, would not return greetings addressed to her). At the same time, she engaged in pretend play with favorite toys, had very good receptive language skills and a relatively extensive vocabulary, and was able to communicate her wants and needs using complete sentences. Furthermore, Kate had beginning reading skills and relatively strong functional academic and problem-solving skills, and was capable of reading and comprehending a simple text with visual illustrations.

Results of an FBA conducted prior to this study suggested that, despite her relatively strong verbal communication skills, Kate frequently reverted to challenging behaviors to gain access to tangible items and/ or to access attention of staff. Specifically, the record reviews (i.e., behavior support plan) indicated that Kate engaged in disruption when denied access to preferred toys or activities, when transitioning from preferred activities (e.g., cash-out with toys), and during the low attention high demand situations. Her behavior support plan included several interventions aimed at addressing her disruptive behavior, including picture/word schedule to represent the sequence of activities, a reinforcement system, and task interspersal. As part of her reinforcement system, Kate's positive appropriate behaviors such as sitting quietly and listening to the teacher were reinforced on a variable schedule with pennies. She was allowed to have a break with favorite toys and activities after earning a total of five pennies.

Interviews with teacher and school psychologist, record reviews, and pre-baseline observations also suggested that any classroom transition that involved separation from preferred items and/or discontinuation of preferred activities was challenging for Kate. In particular, Kate frequently engaged in disruptive behaviors when prompted to finish her break and move to the next activity on the schedule. Her protesting occurred not only in transitions to non-preferred activities, but also to neutral (e.g., table play) or preferred contexts (e.g., recess, gym). During

the interview, Kate's teacher suggested that those behaviors presented a "significant problem," happened consistently, and caused significant distress. She was usually prompted verbally or physically until she calmed down. She also received a penny and verbal praise contingent upon transitioning from her breaks appropriately. The intervention was implemented in Kate's classroom, where two adults (a teacher and paraeducator) and three other students with autism were also present. Kate's teacher held a Master's degree with certifications in Special Education and Autism, and had less than 5 years of experience teaching children with ASD.

**Greg.** Greg was an 11-year-old Caucasian male with autism. Evaluation results conducted about six months prior to the study were available. He obtained a full-scale IQ score of 54 on Leiter-R (Roid & Miller, 1997), suggesting the presence of a mild intellectual disability. Results of GARS suggested high probability of ASD, with an Autism Index of 94. Greg's composite scores of adaptive functioning obtained on ABAS-II (Harrison & Oakland 2003), as well as scores on the subtests, suggested significant difficulty in adaptive functioning skills. Overall, Greg was described as capable of comprehending and mastering academic tasks. He was independent in following his visual activity schedule, had emerging literacy skills, and good self-help skills. Despite being capable of communicating his wants and needs using words and simple phrases, he rarely did so, and almost never engaged in social communication with adults or peers. He also engaged in echolalia as a way to communicate and/or calm himself. Results of record reviews further suggested that Greg became extremely distressed when classroom routines were altered. He also had numerous compulsions, rituals, and stereotypical motor behaviors, as well as having an extremely narrow focus of interests related to dinosaurs. He preferred solitary play and enjoyed repeatedly watching the same cartoons. He therefore required a highly structured learning environment and very predictable concrete schedule. He was

reluctant to try any new activities, and frequently resisted adult-directed demands and seemed to particularly dislike verbal redirections.

Greg's behavior support plan addressed a range of challenging behaviors, including temper tantrums with whining, crying, flailing arms, and dropping to the floor, which sometimes escalated to physical aggression such as hitting, kicking, and throwing his weight on another individual. The likely antecedents to those behaviors included transitions from one task to another, receiving a verbal instruction, request, or demand, or sudden changes in his schedule. Avoidance/escape of demand tasks, internal over-stimulation or anxiety, and gaining access to tangible items or activities were identified as possible causes of his challenging behaviors. The behavior strategies implemented in the classroom to address those behaviors included visual cues and visual activity schedules, task interspersal, the use of choice to promote independence, and reinforcement strategies (i.e., DRI wherein he was reinforced with edible items for displaying behaviors such as quiet voice and appropriate sitting/standing with still body). As part of his crisis intervention plan, when tantrum behaviors escalated, Greg was placed in a time out room.

Although transitions in general seemed to be difficult for Greg due to his high levels of anxiety and a lack of behavioral flexibility, he was referred to the study by his school psychologist for challenging behaviors including verbal protesting and noncompliance during transitions between daily tasks wherein he had to make a choice of a task. Choice making was listed as an antecedent intervention on his behavioral plan, and was implemented via the choice of a table top activity. Specifically, a generic "Work" icon was placed on his activity schedule. He had a menu of activities to choose from (e.g., puzzles, letter trace, sorting tasks) and was expected to replace the generic icon with a specific activity choice on his schedule. Informal classroom observations and interviews seemed to suggest that it was the choice making that was

responsible for his difficulty. For example, on several occasions during pre-baseline observations Greg was presented with similar activities chosen by his teachers, and did not engage in challenging behaviors.

As he typically took a very long time when faced with the need to choose an activity, a significant loss of an instructional time occurred. Moreover, his transition-related disruption was quite intensive, resulted in high levels of distress in all individuals involved, and ultimately led to the use of restrictive interventions (i.e., time-out). Therefore, the goal chosen for this intervention was viewed as important. Specifically, Greg's teacher indicated that his transition difficulties were presenting a significant problem. She stated that the behaviors happened somewhat inconsistently, although the transitions were presented several times a day. The duration and intensity of challenging behaviors was rated as very high. He was typically prompted verbally until he was calm, although sometimes due to high levels and intensity of his challenging behaviors demands were withdrawn. His classroom was staffed with a teacher and two paraeducators, and contained four other students. Greg's teacher had a Master's degree, was certified in Special Education and Autism, and had less than 5 years of teaching experience.

### **Experimental Design**

An ABAB reversal design (Baer, Wolf, & Risley, 1968) was used in the study. For each participant, baseline observations were conducted first. During baseline (A phase), typical classroom conditions and strategies remained in place, but no intervention was implemented. During the first B phase, the intervention was implemented. It was then withdrawn in the second A phase, while initial baseline conditions were implemented again. Finally, a return to the intervention condition (the second B phase) was conducted. Phase changes occurred when a

steady pattern of responding was established and/or changes in the targeted behaviors were observed.

### **Dependent Variables**

Social Stories were written in response to individually defined transition difficulties of participants in this study. Transitions were defined as any environmental change involving a termination of one classroom activity and moving to the next activity. All participants' transitions happened on a daily basis, were predictable, and were a constant source of difficulty.

**Primary variables.** Data were collected on the two main variables, disruptive behavior and on-task behavior, measured through direct observation. Two additional variables, latency to transition and duration of transition, also were calculated. Operational definitions for participants' disruption were created on the basis of individual interviews using the BFRS-R (Appendix B), the custom-made questionnaire (Appendix A), a review of students' behavior support plans, and informal observations.

Disruption was individually defined for each student (see Appendix C). Specifically, Jason's protesting behaviors were defined as protesting vocalizations and verbalizations, fake crying/whining, jumping up and down while shaking body and/ or head, darting (i.e., rapid running from one area of the classroom to another), pushing or kicking movements, or physical aggression directed at other individuals (e.g., pushing another person away). Kate's protesting and tantrum behaviors were defined as high-pitched loud screaming, protesting statements (e.g., "No", "Why", "No thank you") or sounds, whining, crying, jumping up and down, shaking body, and talking about preferred objects or activities. Greg's disruptive behaviors were defined as screaming, crying, protesting statements, tearing down materials, dropping materials including his individual schedule book on the floor; pushing furniture, dropping on the floor, kicking, and

shaking/twisting upper body. On-task was defined as behaving in a manner consistent with the expectations of the activity and/or teachers' directions; complying with the auditory and/or verbal cue to transition (see Appendix C).

For all participants, disruption and on-task behaviors were recorded as percentage of 10-s observation intervals with occurrence of behavior (see Appendix D for data coding sheet). A partial interval recording method was used for disruption, wherein behavior was recorded as present if it occurred at any point during the interval. On-task was recorded using the whole-interval method, wherein behavior had to be observed for the whole duration of the interval to be coded as present. The total duration of the observation varied from observation to observation and from participant to participant. The beginning of each 10-s interval was signaled by an auditory signal. At the end of each interval, data coders marked the occurrence of challenging behaviors and on-task with a plus sign if it was observed at any time during the interval, and put a minus whenever the behaviors were not observed. After that, the total percentage of intervals with occurrence of disruption and on-task was calculated by dividing the number of intervals coded as "+" by the total number of intervals.

Latency to transition was defined as time in seconds between the verbal cue to transition provided by teacher and student's first compliance with the request to transition (i.e., initiation of transition). Duration of transition was defined as time in seconds between student's first compliance with request to transition and his or her initiation of the new activity. Latency and duration were coded using a stopwatch.

**Secondary variables.** Several additional variables also were measured. Teacher prompting was defined as a verbal direction to transition provided by teachers to students. Only behavior-specific prompting was used (e.g., "Time to walk to your seat"); no prompting to use

the intervention (e.g., “Remember your Social Story”) was ever delivered. The number of verbal or gestural prompts was recorded throughout each observation period. After that, the rate of prompting per min was calculated for each baseline and intervention phase by multiplying the total number of prompts within a given phase by 60 s and then dividing the result by the total number of seconds.

***Behavioral flexibility.*** General behavioral flexibility was measured by the Behavior Flexibility Rating Scale-Revised (BFRS-R; Peters-Scheffer et al., 2008). The BFRS-R is a rating scale used to assess the degree of students’ behavioral flexibility in situations involving transitions and environmental changes. It has strong internal consistency, as indicated by Cronbach’s alpha of .90, and adequate reliability as established by average percentages of exact agreement of 74.6 (range, 68.6-88.6%) and 62.5 (range, 36.4-72.7%) for intra-rater and inter-rater reliability, respectively (Peters-Scheffer et al., 2008). The scale consists of 16 items, each accompanied by examples and descriptions of daily transitional situations such as: (a) an item is unavailable or may have been broken, moved, or misplaced; (b) a desirable event or activity is interrupted, cancelled, or delayed; (c) the person is subjected to unexpected sensory stimulation, (d) the person fails at a task; or (e) a task is left unfinished (e.g., some dirty dishes are left in the sink). The extent of difficulty is rated on a 3-item Likert scale from zero – situation is not at all a problem, to two - situation causes severe problems. The scores therefore range between zero and 32; a total score is a sum of individual item ratings. Scores pre-and post-intervention were compared for each participant.

***Treatment fidelity.*** A treatment fidelity checklist created for this study was used to ensure interventionist’s adherence to the treatment protocol. Audio recordings of all the reading sessions were conducted to examine treatment fidelity in addition to video recordings of data



collection sessions. Fidelity checklists (see Appendix E) established whether the interventionist read the Social Story, obtained child's attention prior to reading, asked comprehension questions, and followed procedures in addressing the possible challenging behaviors during transitions. Procedural fidelity checklist was filled out by data coders on the basis of audio recordings (i.e., Items 1-4) and video recordings (i.e., Items 5-6). The total score was calculated as percentage of steps during which the treatment protocol was followed (i.e., if all steps were followed, the treatment fidelity was 100%).

***Social validity.*** A modified version of the Intervention Rating Profile (*IRP-15*; Martens, Witt, Elliot, & Darveaux, 1985) was used to assess social validity of the intervention. The *IRP-15* is a 15-item teacher or parent report that assesses the acceptability of interventions, satisfaction with their outcomes, and probability of continued use. Reliability of the *IRP-15* using Cronbach's alpha is .98 (Martens et al., 1985; see Appendix F1). The highest score that can be obtained on the *IRP-15* is 90, and higher scores indicate greater acceptability. Mean total ratings above 52.50 are considered acceptable (Van Brock & Elliott, 1987). The *IRP-15* was modified slightly to fit the purposes of the study. Question 4 was added to examine teachers' evaluations of effectiveness specific to noncompliance. Question 15 was asked to evaluate teachers' perceptions of child reaction towards the intervention (i.e., Item 14). Those items were excluded from the final quantitative analysis. Social validity questionnaires were completed by participants' teachers. Note that although two participants (i.e., Jason and Greg) changed classrooms, Jason's teacher in the first classroom and Greg's teacher in the second classroom completed the social validity questionnaire, as those individuals were able to witness the implementation of Social Stories. A short simple questionnaire created for this study was used to assess students' opinions about the intervention (see Appendix F2).

## **Data Collection**

Participants' behaviors were video recorded by the investigator using a camera on the iPhone 4, which produced high definition-quality videos. The video files were then transferred to a laptop computer, and edited using the Windows Live Movie Maker software to include the interval numbers signaled by an audio recording. After that, direct observation and coding of the behaviors was conducted by several data coders, as described above. Data coders were doctoral students in Special Education with experience in behavioral observation. They were informed about the general purpose of the study, but were naïve to the specific hypotheses and condition changes. Data coders were trained by reviewing the definitions and coding a training video recording until at least 80% agreement with the model (i.e., investigator's) coding on each of the dependent main variables (i.e., on-task and disruption) was established. Individual training sessions, each about one hour long, were conducted. Most coders required coding of just one video probe to achieve the 80% level required for the study.

## **Interobserver Agreement**

Interobserver agreement (IOA) was calculated on at least 30% of observation sessions in each phase on each dependent variable. The index was obtained by two coders independently coding the same video recording. Agreement was calculated on an interval by interval basis, then the total number of intervals with agreement was divided by the total number of intervals (agreements and disagreements) and the result was multiplied by 100%. For latency and duration variables, IOA was calculated using the total agreement approach (Kennedy, 2005), by dividing the smaller number of total recorded responses by a larger number of total recorded responses (i.e., seconds), and multiplying the amount by 100%. The same method was used during coding of the level of teachers' prompting and the level of independence in transition, the two additional

analyses conducted for the study. In addition, at least 30% of the audio and video recordings of the intervention sessions were coded by the second observer to obtain the IOA index for ratings of treatment fidelity, which also was calculated using the interval method. In cases if the average agreement fell below the threshold of 80% on coding of the main variables (i.e., disruption and on-task), a booster session was conducted that consisted of the review of operational definitions and of error analysis conducted on the previously coded video probes.

### **Data Analysis**

Data were entered and graphed on an *Excel* spreadsheet and analyzed visually for changes in level, trend, variability, and immediacy of treatment effects. To supplement the visual analysis with a quantitative index of treatment outcomes, percentage of non-overlapping data (PND) scores (Scruggs, Mastropieri, & Casto, 1987) was calculated. PND is a nonparametric approach to summarizing the effectiveness of single-subject research that determines the magnitude of behavior change by calculating the percentage of overlapping data points between the baseline and the treatment phases. PND is calculated by dividing the number of treatment data points that exceed the highest or lowest baseline data point by a total number of treatment data points, and multiplying the result by 100%. PND is commonly used as a quantitative outcome metric in addition to visual analysis of the data patterns. Scruggs and Mastropieri (1998) suggest that PND scores above 90 represent a highly effective intervention, scores from 70 to 90 represent effective treatments, scores from 50 to 70 suggest outcomes that are questionable or low, and scores below 50 are ineffective.

### **Materials**

The investigator wrote an individualized Social Story for each participant. Social Stories were written according to the criteria proposed by Gray (1998, 2004). Specifically, they: (a)

contained descriptive, perspective, directive, cooperative, affirmative, and / or control sentences; (b) incorporated the “Social Story ratio” of one directive sentence per two or more sentences of other types; (c) presented information in the first-person perspective, as if narrated by the targeted student or the third-person perspective, as if in a “newspaper article” format; (d) had a title, an introduction, a main body, and a conclusion; (e) used objective and positive language; and (f) used the “flexible” vocabulary, including such words as “sometimes”, “usually”, and “possibly”.

Teachers reviewed the Social Stories prior to implementation to determine individual and age-appropriateness and assess familiarity with the vocabulary used in them (see checklist in Appendix G). Results of teacher reviews suggested that all three teachers viewed Social Stories written for their students as appropriate for students, as they answered “yes” to all items of the questionnaire. In addition, an independent rater, a graduate student in Special Education or School Psychology familiar with Social Story interventions conducted an “expert review” of all Social Stories prior to implementation to determine their adherence to Gray’s criteria delineated above (see Appendix H). Results of the expert review suggested that the Social Stories met all the requirements listed (e.g., included appropriate sentence types and the ratio between them, had an appropriate structure, used flexible vocabulary). For Jason’s Story, a ratio of 4 directives to 17 descriptive sentences was obtained. For Kate’s Social Story, the ratio was 4 to 23, and for Greg’s Story the ratio was 5 to 21 sentences. All types of sentences were used in every Social Story, with the exception of control sentences, which were never used.

Each Social Story was presented using computer media (i.e., Microsoft PowerPoint) on a laptop computer. Social Stories were accompanied by age appropriate illustrations such as picture symbols from the Boardmaker software and actual photographs of students, teachers, and

materials (see Appendix I1-I3 for examples of Social Stories). Social Stories provided a detailed and objective description of transitional activities, routines, and settings, people involved, and described the appropriate responses. Social Stories for Jason, Greg, and Kate consisted of 23, 27, and 26 sentences excluding title and comprehension questions, respectively. The total number of slides was 16 for Jason, 14 for Greg, and 16 for Kate. The 28-32 point font size was used for text and 40 point font size was used for headings. At the end of each Social Story, three to four comprehension questions were asked to check participants' understanding of the information. Factual open-ended questions directly pertaining to the content of Social Stories were asked with the goal of assessing comprehension, and no inferential or close-ended questions were asked.

## **Procedures**

**Pre-baseline.** The study was conducted in compliance with Lehigh University's procedures for the protection of human subjects and with the approval of the Institutional Review Board (IRB) of Lehigh University. It also received the approval of the Internal Review Committee of the school district. The study used a sample of convenience; only referred individuals were invited to participate and those who met the inclusion criteria described above constituted the final participant group. Parental consents and student verbal assents were obtained prior to the initiation of the study (see Appendices J1 and J2 for example forms). Only students with signed parental consents were eligible to participate. No video recordings were conducted at that time. Pre-baseline interviews with teachers and record reviews were conducted. In addition, pre-baseline observations were conducted in-vivo by the investigator to verify the information provided by teachers and to establish the frequency of the challenging behavior required for inclusion in the study.

**Baseline.** Data collection began in this phase. The existing classroom routines, activities, and interventions remained in place during baseline.

**Jason.** Jason was allowed to engage in an activity of his choice during cash-out. He usually chose computer games, cartoons, or video games. A digital timer was set for 15 min, and provided an auditory signal indicating the end of cash-out. The signal was paired with teacher-delivered verbal prompt (e.g., “Jason, cash-out is finished”). If challenging behaviors occurred following the delivery of a verbal cue to transition (e.g., student did not comply with the verbal prompt to transition and/or engaged in disruptive behavior), teachers were asked to wait for 30 s or more without interference before delivering the second verbal prompt. This was aimed at giving the student an opportunity to initiate the transition independently. The verbal prompt was repeated with the same frequency until the student complied. If noncompliance continued for over 2.5 min, teachers increased the level of prompting to gestural prompt (e.g. pointed to the switch button of a computer). After that, Jason was expected to finish cash-out (e.g., turn off computer, put materials away), walk to his desk, check his individual activity schedule book, replace the cash-out icon by a symbol representing the next activity (i.e., academic activities such as reading, typing, or math), verbally indicate the beginning of a new activity (e.g. read “It is time for typing”), and prepare for the beginning of a new activity. Teachers usually delivered a verbal praise contingent on transitioning with no protesting vocalizations.

**Kate.** Kate was observed during transitions from breaks with preferred toys and/ or activities. The items and activities of choice usually included Wii, toy snakes, toy animals, computer, video, and dinosaurs. Her teacher used an analog timer, which was typically set for 6-10 min, to facilitate transitions. The end of breaks was also signaled by a verbal cue provided by teachers (e.g., “Kate, break is finished” or “Kate, it’s time for...”). If noncompliance or

disruption occurred, teachers typically redirected Kate to the appropriate activity. Kate was expected to finish engaging in a cash-out activity, put the materials away (e.g. turn off computer), walk to her seat, take the icon representing a previous activity from her activity book, walk to her individual schedule posted on the wall to get the new icon, go back to her desk to place this icon on her activity book, and wait appropriately for the next activity to be presented to her. She received a penny for transitioning from her break back to her desk without disruption.

**Greg.** The third participant was observed during transitions to table play activity, when he had to make a choice of the activity to engage in. The menu of activity choices consisted of about 12 relatively easy tasks. The transition was initiated by a verbal prompt (e.g., “Math is finished”, or “Check your schedule”). After that, the teacher provided either a verbal or gestural prompt (i.e., pointed to the schedule) with the frequency of no more than one per 30 s. Greg’s protesting behaviors were ignored. As Greg’s behaviors tended to escalate to the level of major tantrum and physical aggression, teachers were instructed to follow the regular classroom crisis management procedures if this happened. In several cases when the behavior escalated, the request was withdrawn and the observation was therefore discontinued. Greg received verbal praise if he made a choice of an activity to engage in.

**Intervention.** During the intervention phase, Social Stories were introduced to participants. By that time, students had become familiar with the investigator and were cooperative. The introduction of Social Stories was done in a relaxed and informal manner (e.g., the interventionist said “I have a story for you to read”). Social Stories were read to most participants by the investigator in areas of the classroom free from distraction (e.g., desk in a quiet corner of the classroom). Because of Greg’s lack of flexibility with changes in environment, his Social Story was read to him at his usual desk. The interventionist first

established participants' attention (e.g., asked "Are you ready?"), after which the reading session began. Typically, the investigator read the Social Story, while participants followed. However, by the end of the intervention, Kate was reading along with the investigator. All participants had a very positive reaction to the reading sessions, and seemed to particularly enjoy the photographs and the computer presentation. Upon completion of the reading session, the interventionist asked students a set of pre-determined comprehension questions to check their understanding of the content and to assist them in comprehension whenever appropriate. If the participants failed to answer all the comprehension questions with 100% accuracy, interventionists assisted them by referring them to the relevant part or sentence in the Social Story. As most participants had limited expressive language skills, a verbal answer was not required. Instead icons with three word choices (one correct, two incorrect) were presented, and participants were allowed to point to them to get the answer correct. All reading sessions were audio recorded.

The reading sessions lasted between 3 and 8 min. Following each reading session, the transition was introduced; for example, the student was asked to engage in a cash-out or take a break. A maximum period of one hour was allowed between the reading session and the introduction of the transitional situation to participants. If more than that time passed, Social Stories were read again. Procedures for administration of the intervention were held constant across the trials.

One observation probe was conducted with the following exceptions when two probes were conducted within a single day: (a) for Jason, sessions 7 and 8, 11 and 12, 14 and 15, 16 and 17, 18 and 19; (b) for Kate, sessions 5 and 6, 11 and 12, 13 and 14, 17 and 18, 20 and 21; (c) for Greg, session 1 and 2, and 5 and 6. With Jason and Kate, three of those days fell into the intervention phase, resulting in higher intervention intensity (discussed below). In addition, three



observation probes were conducted on a single day during the follow-up phase for Kate. An examination of data patterns between the trials conducted on a single day (i.e., morning and afternoon) did not reveal any clear patterns of responding.

**Follow-up.** In the follow-up phase, baseline conditions were implemented to examine the extent to which intervention effects maintained. For all participants, a follow-up probe was conducted one week after the end of the study.

## Chapter 4

### Results

#### Interobserver Agreement

Interobserver agreement (IOA) was calculated during 35% of probes for Jason, 31% of sessions for Kate, and 32% of probes for Greg for all dependent variables (i.e., challenging behavior, on-task, latency, duration, as well as for teachers' rate of prompting). In addition, IOA was calculated on 38% of treatment fidelity sessions for Jason, 31% of sessions for Kate, and 40% of sessions for Greg. Average IOA coefficients of 80% and above were viewed as acceptable (Kratowill et al., 2010). Results of the IOA calculation for the dependent variables are summarized in Table 2. For Jason, mean IOA for disruption was 88% (range, 72-100%); for on-task, the mean IOA was 89% (range, 80-100%); for latency, the mean IOA was 94% (range, 86-100%); and for duration of transition, it was 89% (range, 62-94%). The IOA for Jason's rate of prompting was 100%.

For Kate, the mean IOA for disruption was 86% (range, 50-100%); for on-task, the mean IOA was 84% (range, 50-100%); for latency, the mean IOA was 85% (range, 14-100%); and for duration of transition, the mean IOA was 97% (range, 89-100%). The mean IOA for rate per min of prompting for Kate was 95% (range, 63-100%). One booster training session had to be conducted for the coding of Kate's disruptive and on-task behaviors when the average agreement fell below the threshold of 80%.

For Greg, the mean IOA for disruption was 97% (range, 89-100%); for on-task, the mean IOA was 97% (range, 90-100%); for latency to transition, the mean IOA was 89% (range, 48-100%); and for duration of transition, the mean IOA was 82% (range, 24-100%). The average

IOA on the rate of prompting was 91% (range, 43-100%). The average IOA on the level of independence was 91%.

Because the latency, duration, and prompting were coded retrospectively (i.e., the videos were viewed for the second time), the booster sessions were not conducted on individual sessions with lower agreement. However, low individual IOA coefficients were outliers as the majority of sessions were coded with high agreement. Furthermore, sessions with lower IOA scores were mainly obtained using the total agreement method, (i.e., on measures of duration, latency, and prompting). This could have been due to the fact that the total agreement approach to calculation of continuous data (e.g., duration, discrete events) used in this study may have been very conservative (see Mudford and Taylor, 2009). Overall, the results were viewed as acceptable as the average IOA never fell below the 80% threshold. The average IOA for treatment fidelity was 100% for all observations.

### **Direct Observation Data**

**Jason.** Figure 1 provides a graphic display of Jason's disruption and on-task behaviors. Table 3 presents the descriptive statistics calculated for those variables.

***Disruption and on-task.*** In baseline, the student engaged in variable levels of disruption, ranging between 0% and 57%, with a mean of 28% ( $SD=20$ ). His on-task behaviors were less variable, with an average occurrence of 36% ( $SD=11$ , range, 19-50%). Overall, the data pattern for disruption was curvilinear and for on-task the data patterns were cyclical, with a slight downward trend for the former variable and a flat trend for the latter variable. Although the data for disruption were variable and the patterns were not clear, a decision to implement the intervention was made on the basis of the last six data points of the phase, which showed an accelerating trend.

Overall, the intervention did not seem to have an effect on Jason's disruptive behaviors. His protesting occurred in an average of 41% of intervals ( $SD=21$ ; range, 6-66%). This represents a 13% increase from the mean baseline level. The disruption data remained highly variable in this phase, with a gradual downward trend. As the data seemed to be influenced by outliers, a pattern analysis was conducted without the last outlier data point in the intervention phase. When this point was dropped, a decreasing trend became more evident. However, there was a high degree of overlap in the data between the phases, as suggested by the visual analysis and the total PND of 0% obtained for the intervention. Although this score was clearly influenced by floor effects in baseline, it suggests that the intervention was lacking effectiveness.

The intervention effects on on-task behaviors were similarly weak. Jason was on-task during an average of 31% of intervals in the intervention phase ( $SD=16$ ), which represents a 5% decrease from baseline levels. His performance remained variable, with occurrence of on-task behaviors ranging between 0 and 56%. Furthermore, a decreasing trend was evident. There was only one non-overlapping data point in the intervention phase, resulting in the PND of 14%, suggesting an ineffective intervention.

A return to baseline resulted in decreased levels of disruption ( $M=5\%$ ,  $SD=10$ ). The data were less variable, with percentages ranging between 0 and 20%. The student changed classroom at session 20; this, however, did not result in any noticeable changes in behavior compared to those observed during the same phase in his previous classroom. The implementation of baseline conditions also resulted in a two-fold increase in on-task behaviors ( $M=60\%$ ,  $SD=14$ ), ranging between 50 and 80%. Flat trends were observed for both variables. Because the intervention did not provide the expected effects on Jason's behaviors and was associated with increased levels of disruption and decreased levels of on-task behaviors and because disruption decreased and on-

task behaviors increased in the second baseline, a decision was made not to return to the intervention phase.

A maintenance probe was collected at one-week follow-up. At this point, Jason did not engage in disruption and his on-task was at 100%. Informal observations also suggested that Jason's difficulties in the targeted transition decreased.

***Duration and latency.*** Figure 2 shows the direct observation data for latency and duration of Jason's transitions. The descriptive statistics are provided in Table 4. Latency was defined as the time it took a student to initiate the transition. In the first baseline, it took Jason an average of 55 s to initiate ( $SD=66$ , range, 6-174 s). Those data were highly variable and did not show a consistent pattern. The total average duration of transition (i.e., time from the moment transition was initiated until its end) was 61 s ( $SD=17$ , range, 43-90 s). Data also were variable with a flat trend.

With implementation of the intervention, the average latency to transition decreased by 1 s ( $M=54$  s,  $SD=61$ , range, 10-120 s). Latency remained highly variable with a cyclical data pattern. On average, it took Jason 55 s to complete his transitions ( $SD=14$ , range, 41-82 s), a 6 s decrease from baseline. There was a slight decelerating trend in the duration data. On one occasion, no latency and duration data could be obtained because transition was never initiated. In summary, the intervention did not produce any effects on latency or duration of Jason's transitions. The percentage of overlap between the baseline and intervention data was high, with PNDs of 0% and 25% obtained for latency and duration, respectively. Those data suggest that the Social Story intervention was unsuccessful in decreasing the latency and duration of transitions of the first participant.

A reversal to baseline coincided with a decrease in latency to transition to an average of 13 s ( $SD=18$ , range, 0-40 s). There was a simultaneous decrease in the average duration to 45 s ( $SD=8$ , range, 34-53 s). Both evidenced a slight decelerating trend. At follow-up, latency and duration remained similar to the second baseline, 14 s and 39 s, respectively.

**Kate.** Kate's direct observation data for disruption and on-task are presented in Figure 3. The descriptive statistics are presented in Table 5.

**Disruption and on-task.** During the first baseline condition, Kate engaged in high levels of disruption, with an average occurrence of 74% ( $SD=22$ ; range, 38-100%). Although the data were somewhat variable, most data points were above 50%, and at one point reached a 100% occurrence. Furthermore, there was an upward trend, indicating a progressive increase in disruption. On-task levels were variable at 30% ( $SD=17$ ; range, 9-50%), and the overall trend was flat with a cyclical pattern.

The implementation of the Social Story intervention coincided with a 53% overall decrease ( $M=21%$ ,  $SD=19$ , range, 0-42%) in disruption. There was an inverse curvilinear pattern in data, with a decelerating trend at the end of the first intervention phase. There was an immediate increase in on-task. The behavior increased to 71% ( $SD=36$ ) from 30% in baseline. However, the on-task data became even more variable than in the previous phase, ranging between 7 and 100%. There was a moderate overlap between the first baseline and the first intervention phase, as suggested by the PND score of 67% obtained for disruption and on-task in the first intervention phase.

The withdrawal of the intervention was associated with an increase in disruption to levels that were higher than those observed in the first baseline. The average percentage of disruption was 79% ( $SD=36$ ; range, 25-100%). There was an upward trend, suggesting a progressive

increase in the levels of disruption. During the last two observation sessions of this phase, disruption reached a 100% level of occurrence. On-task behaviors reversed to an average of 17% ( $SD=28$ ; range, 0-58%), with zero levels documented during the last two observation probes. There was little overlap, both in on-task and disruption data, between baseline and the second intervention.

When the intervention was introduced again, an immediate reduction in challenging behavior was observed. The average levels increased to a mean of 14% ( $SD=16$ ; range, 0-45%) In this phase, disruption remained highly variable, with an accelerating trend, which became flat when the outlier data point was removed. On-task behaviors increased to an average of 60% ( $SD=37$ ; range, 0-100%), a 53% increase from the second baseline. There was a decreasing trend in on-task data, with a cyclical pattern. There was low overlap in data for disruption in the second part of the intervention, as suggested by a PND of 86%. The PND obtained for the second half of the intervention was 29%, suggesting high overlap in data.

Three observations were conducted at one-week follow-up. Disruption was absent during those sessions, and on-task increased to 82% ( $SD=16$ ; range, 71-100%). Overall, the intervention was effective in decreasing Kate's disruption, as suggested by a total PND of 78%. The intervention effects on on-task were weaker, with a total PND of 46%.

***Latency and duration.*** Figure 4 provides a graphic representation of the direct observation data for Kate's latency and duration. The descriptive statistics are provided in Table 6. During the first baseline, it took Kate 13 s, on average, to initiate her transitions ( $SD=9$ ; range, 4-28 s). There was a slight downward trend in the latency data. The average duration of transitions was 77 s ( $SD=34$ ; range, 36-134 s). Those data were highly variable with a flat trend.

When the intervention was implemented, the average latency decreased to 6 s ( $SD=2$ ; range, 3-9 s), a 7-point decrease from baseline (see Table 6). Overall, Kate was consistently quick to initiate her transitions, as suggested by the low levels and flat trends in the latency data. The decrease in duration from baseline was minimal, to an average of 74 s ( $SD=50$ ; range, 25-144 s) and the data were characterized by a high degree of variability. The data pattern for duration was inverse curvilinear, beginning and ending in low data points. Finally, there was a high degree of overlap in the data between the first two phases, as suggested by visual analysis and by PND scores of 0% obtained for latency and 33% for duration. In summary, the first half of the intervention did not provide clear effects for Kate's latency and duration.

The return to baseline resulted in a 2 s increase in latency, up to a mean of 8 s ( $SD=3$ ; range, 5-11 s). Those data remained low and stable. The duration decreased to 62 s ( $SD=41$ ; range, 26-113 s) and remained highly variable, with a decelerating trend. Overall, the reversal was not evident. In the second intervention phase, latency increased by 3 s to an average of 11 s ( $SD=7$ ; range, 4-23 s). There were no trends in those data. Duration increased to an average of 66 s ( $SD=28$ ) and remained highly variable, ranging between 31 and 106 s. As in the first part of the intervention, the PND scores were extremely low (i.e., 0% for both variables), suggesting an ineffective intervention. At follow-up, the latency to transition was 16 s ( $SD=6$ ; range, 11-23 s). The average duration of transitions was 39 s ( $SD=18$ ; range, 19-45 s). There were no changes in the patterns of latency. Overall, the intervention did not have an effect on those variables. The total PND scores were 0% for latency and 15% for duration, suggesting low effectiveness.

**Greg.** Figure 5 presents the direct observation data for Greg's disruption and on-task and Table 7 summarizes the descriptive statistics.



***Disruption and on-task.*** During the first baseline phase, Greg engaged in high and variable levels of disruption ( $M=63\%$ ;  $SD=19$ ; range, 29-85%). A classroom change occurred at the fourth session; however, most of the contingencies remained the same in the new classroom, and there was no detectable change in Greg's behavior. His on-task behavior was very low and relatively stable, at 7% of intervals ( $SD=7$ ; range, 0-22%). As the data were stable and the disruption was high, both in level and intensity, a decision was made to implement the intervention.

When the intervention was implemented, there was an immediate decrease in Greg's disruption, with a phase average of 10% ( $SD=17$ ; range, 0-40%). This was a 53% decrease relative to baseline. The disruption data were stable, with the exception of one data point. Moreover, on three out of five intervention data collection sessions, Greg's disruption was absent. However, on-task behaviors increased slightly over the baseline ( $M=24\%$ ;  $SD=23$ ), and became more variable, ranging between 4 and 63%. The overlap in disruption data between the first two phases was minimal (i.e.,  $PND=86\%$ ), suggesting effective intervention. There was a substantial overlap for on-task data, however, with a  $PND=40\%$  suggesting low intervention effectiveness.

The withdrawal of the intervention did not produce the expected behavior reversal. The mean disruption remained low at 18% ( $SD=24$ ; range, 0-50%), an 8% increase over baseline. Furthermore, there was a decreasing trend for disruptive behaviors, and half of the data points remained at zero level. On-task increased slightly relative to the baseline to a mean of 38% ( $SD=15$ ; range, 20-60%), but there was a moderate decelerating trend in the data. Because of Greg's improved behaviors in the absence of the intervention, a decision was made not to reinstate the Social Story condition. An observation conducted at one-week follow-up suggested

the continued absence of disruption. The levels of on-task behaviors were similar to those in the second baseline (i.e., 27% of occurrence).

***Duration and latency.*** Duration and latency data for Greg are represented graphically in Figure 6, and the descriptive statistics can be found in Table 8. During the first baseline, it took Greg an average of 108 s to initiate his transitions ( $SD=140$ ; range, 10-354 s). The average duration of transitions was 159 s ( $SD=171$ ; range, 28-446 s). Those data were extremely variable, with an upward trend in duration and a slightly decelerating trend in latency. During three observation sessions, calculations of latency and duration were impossible, as transition was never initiated (and never completed) by the student.

During the intervention phase, the average latency increased to 143 s and remained highly variable, with a  $SD=104$  and a range between 15 and 227 s. The duration decreased dramatically and remained stable and flat throughout the intervention phase, with a mean of 24 ( $SD=13$ ; range, 8-37 s). A substantial overlap in the data was observed between the first two phases, with a PND of 0% for latency and 40% for duration.

With the return to baseline, Greg's latency decreased to a mean of 88 s ( $SD=97$ ; 8-281). With the exception of one outlier, those data remained stable. The average duration of transition was 27 s ( $SD=13$ ; range, 12-42 s). In summary, there was no evidence of behavior reversal in this baseline phase. However, a comparison of the two baseline conditions clearly points to a moderate reduction in latency, particularly if missing data indicating immeasurable latency and a significant reduction in duration relative to the initial levels are considered. Those improvements were still present during the follow-up probe. At that point, Greg's latency to transition was 12 s, and his duration was 103 s.

**Additional analyses.** For practical reasons, it was impossible to keep teachers naive to the condition changes. Therefore, it was of interest to examine the possibility that the intervention had an effect on their prompting behaviors. The total number of verbal or gestural prompts given by the teachers was recorded during each observation session and an average rate per minute was calculated for each phase. This permitted comparison across the phases (see Table 9). In addition, for Greg only, the level of independence in transitions was recorded for each session as follows: (a) independent (i.e., non-prompted) transition, (b) prompted transition (i.e., with at least one gestural or verbal prompt given per observation session), or (c) no transition (i.e., transition not completed because of behavior escalation and/or choice made for the student).

Results indicated that for Jason, the rate of prompting in Baseline 1 was about 1.6 per min. In the intervention phase, it increased slightly to 2 per min, but overall remained within the norm described in the treatment protocol. During the second baseline, the rate of prompting was 1.6 per min. For Kate, the rate per min of prompting was 1.8 in Baseline 1; this rate increased slightly to 2.5 in Intervention 1. The rates of prompting were 2.8 per min and 2.3 per min for Baseline 2 and Intervention 2, respectively. Finally, at follow-up, Kate was provided with 1.8 prompts per min. For Greg, the rate per min of prompting was 2.3 in baseline, 1.8 in the intervention phase, and 1 in the second baseline. With regard to Greg's independence levels, in Baseline 1, three transitions (37.5%) were incomplete and five (62.5%) were prompted. During the intervention phase, four transitions (80%) were prompted and one (20%) was independent. In the second baseline, there were four (67%) prompted transitions and two (33%) independent transitions.

## Questionnaire Analysis

The results of BFRS-R (Peters-Scheffer et al., 2008) and the custom-made screening questionnaire for teachers were analyzed to detect changes post-intervention. The questionnaires were administered prior to the intervention and after the follow-up observation. Although the BFRS-R does not specifically target the situations that were addressed in this study, it was used as a broad test of overall behavioral flexibility and to test for any possibility that the intervention had an effect on a range of untargeted situations. Results of the BFRS-R were analyzed by comparing the pre- and post-treatment scores for the sum of the items and for the individual items. The results of the screening questionnaire for teachers were analyzed qualitatively for any change in responses to items.

**Jason.** The total score obtained by Jason on the BFRS-R at pre-test was 25 (see Table 10). Most of the items received the highest severity ratings. At post-test, his total score reduced to 19. Seven items received lower ratings at post-test, suggesting improved behavioral flexibility. Those included Item 2 (“A planned event is delayed or cancelled”), Item 3 (“The person is required to move from their current location and go to another location”), Item 6 (“An object or some materials that the person was using breaks or malfunctions”), Item 12 (“Objects or materials are not returned to their proper place at the end of an activity”), and several others. However, Items 5 (“The person wants something that is not available”) and 14 (“An activity is interrupted before the person was able to finish the task”) received higher ratings at post-test than at pre-test. An examination of items from the screening questionnaire (see Appendix B) did not suggest any change from pre-test for Jason.

**Kate.** The total scores obtained on the BFRS-R by Kate before and after the intervention were identical (i.e., 19, see Table 10). Interestingly, most of the situations that received the

highest ratings were related to transitions involving preferred objects, items, or activities. The only two score changes were observed for Item 11 (“Another person is doing something annoying, for example, making noise”), with a one-point increase from pre-test, and Item 12 (“Objects or materials are not returned to their proper place at the end of an activity”), with a one-point decrease.

All items on the screening questionnaire received the same ratings as at pre-test, with the following two exceptions. First, when asked about the consistency of behavior (Item 4), the teacher response suggested decreased consistency, from “about every other transition” at pretest to “less frequently than every third transition” at post-test. Second, when asked to estimate the duration of each episode of transition-related challenging behavior, the teacher indicated the decreased duration, from “over 10 min” at pre-test to “1-6 min” at post-test.

**Greg.** Greg’s BFRS-R scores decreased by 6 points, from a total of 14 to 8. Two items, Item 2 (“The person wants something that is not available”) and Item 10 (“Materials run out, causing a premature end to an activity”), were given a rating of zero (i.e., “No difficulty”) rating instead of a rating of two (i.e., “Severe difficulty”), suggesting considerable improvements. Lower ratings were obtained at post-test for Item 3 (“The person is required to move from their current location and go to another location”), Item 6 (“An object or some materials that the person was using breaks or malfunctions”), Item 9 (“The person becomes momentarily separated from his/ her family or group”), and Item 15 (“A new activity is introduced into the person’s routine”). Ratings for two items, Item 7 and item 11, increased from zero to one.

Several changes were observed in teacher ratings on the screening questionnaire from pre- to post-test. Specifically, whereas at pre-test the teacher labeled Greg’s transition difficulties as a “significant problem,” she rated the same items as “no problem” at post-test. Furthermore,

her answers suggested decreased duration of disruption in transitions from “over 10 min” at pre-test to less than 1 min at post-test. The ratings of child’s distress in transitions also dropped from “very distressed” to “not distressed”. Finally, the teacher ratings seemed to suggest that Greg required less time to calm down, from 6-10 min at pre-test to less than 1 min at post-test.

### **Treatment Fidelity**

Treatment fidelity was calculated as percentage of steps that met the requirements of the treatment protocol. For Jason, the average treatment fidelity was 98% (range, 83-100%). All observations with one exception followed all the protocol steps. For Kate, the average treatment fidelity was 92% (range, 83-100%). For Greg, the average treatment fidelity was 97% (range, 83-100%), with only one session scoring lower than 100%. For all participants, lower individual scores were all due to the higher number of teacher prompts provided to transition than recommended for this study (i.e., Item 6 of the checklist, see Appendix E).

### **Social Validity**

Social validity ratings were obtained after the follow-up observation session from all three teachers and one student.

*Student ratings.* Jason and Greg failed to provide the answers to the questionnaire. Most likely, this was due to the fact that a longer time elapsed from the first withdrawal of Social Stories to the moment when they were surveyed. Kate responded by providing positive answers to all three questions. Specifically, she indicated that she liked reading her Social Story, that Social Stories helped her do better at school, and that she would like to read them in the future. Anecdotally, all three students seemed to enjoy reading the Social Story with the investigator. Most notably, Kate and Greg had a very positive affect when reading the Social Story. They were smiling, and seemed to particularly enjoy looking at the actual photographs on the Story.

On one occasion (outside the observation context) Kate was noticed reciting lines from her Social Story. Jason's reaction to Social Stories was similarly positive. He protested when he found out that the Social Story would not be read to him anymore in the second baseline.

**Teacher ratings.** The summary of the findings may be found in Table 11. All total scores were within the acceptable range of 52.5 suggested by Van Brock and Elliott (1987). For Jason, the total score was 83. His teacher provided the highest and second highest rating (i.e., "strongly agree" or "agree") to the majority of the items. The relatively lower ratings ("slightly disagree" and "slightly agree") were given to Items 3 and 4, respectively. Those items made statements about the effectiveness of the intervention in reducing disruption and increasing compliance of students in transitions.

Kate's teacher viewed the intervention as highly acceptable, having provided the highest rating (i.e. "strongly agree") to all questions with three exceptions, which received the second highest rating. Two of those items evaluated effectiveness (Items 3 and 4) and assessed the extent to which the intervention was consistent to those used in the classroom. The total score was 88, suggesting high acceptance of the intervention. Anecdotally, the teacher expressed satisfaction with the outcomes and the procedures of the intervention. After the follow-up observation, she expressed the desire to continue reading the Social Story with Kate, and requested a copy of the Story.

Greg's teacher provided relatively lower ratings, totaling to 74. None of the items received the highest rating. However, the teacher indicated that she would suggest the use of this intervention to other teachers and parents, that the intervention did not have negative effects for the child, and that it would be appropriate for a variety of children. The teacher was unsure whether most teachers would find the intervention appropriate for the transition difficulties of

their students. She also expressed doubts that the child's transition difficulties were severe enough to warrant the intervention. The rest of the items received a moderate rating (i.e., "slightly agree"). Anecdotally, Greg's teacher stated that she appreciated the use of familiar visual symbols in the Social Story. She also thought that the use of a computer presentation of the Social Story was beneficial as it kept the student engaged and motivated to read the Story.



## **Chapter 5**

### **Discussion**

Although transition difficulties of children with ASD are relatively well-documented and are viewed as a significant daily challenge by parents and educators (e.g., South et al., 2005; Stoner et al., 2007), the intervention research conducted to date is limited. Social Stories seem to be a promising intervention for addressing transition difficulties of some students with ASD. They are similar to many other strategies that have previously been found effective in addressing transition difficulties (e.g., visual activity schedules, previewing, and priming). Moreover, teachers and other practitioners seem to find them useful when preparing students with ASD for transitions (e.g., Howley & Arnold, 2005; Gray, 2000; Kokina & Kern, in preparation). Very few research studies, however, have examined the use of Social Stories in preparation for daily school transitions. Investigations that did attempt to focus on transition difficulties did not label them as such and/or addressed them only in a subsample of participants (e.g., Schneider & Goldstein, 2010; Quilty, 2007).

This study addressed the gap in the current intervention literature by examining the effectiveness of Social Stories in addressing transition-related difficulties of three children with severe ASD and moderate intellectual disability (ID). It provided preliminary evidence about the effectiveness of Social Stories in daily transitions in relation to a set of dependent variables, including disruption, on-task, latency to transition, and duration of time in transition. This section will provide a discussion of findings pertaining to each of the research questions, the limitations of this investigation, and its implications for research and for practice.

**Research Question 1: Does implementation of a Social Story intervention lead to decreased occurrence of challenging behaviors associated with transitions of children with ASD and ID?**

The main dependent variable of interest in this study was transition-related disruption. In general, Social Story interventions had mixed effectiveness with a high degree of between-subject variability. Overall, the intervention was ineffective for Jason, effectiveness was unclear for Greg due to problems establishing experimental control, and effective for Kate. This range of individual outcomes is common in Social Story intervention literature (e.g., Reynhout & Carter, 2011; Test et al., 2010).

Social Stories were ineffective in reducing Jason's transition-related disruption. High and variable rates of protesting persisted before and during the intervention. Surprisingly, his challenging behaviors improved as the intervention was discontinued, suggesting a lack of experimental control. A number of factors could have contributed to a lack of responsiveness to the intervention. Although Jason read his Story with the investigator's assistance and answered all the comprehension questions with 100% accuracy, it is possible that Jason's low receptive language skills prevented him from truly understanding the Social Story. Another possibility is that he understood the Social Story, but was unable to make a connection between its content and his own transitional situation. Social Stories are typically written from the first or third-person perspective, as if told by the individual. It is assumed that individuals will understand the relevance of the information presented in Social Stories for the situations they are facing; however, this may not be the case, particularly with participants with lower cognitive functioning. Furthermore, many children with ASD have a tendency for "stimulus overselectivity" - namely, a tendency to respond to only a restricted number of stimuli (Lovaas,

Schreibman, Koegel, & Rehm, 1971). As a consequence, generalized responding is an area of difficulty in ASD, which is specifically targeted in intervention programs (Koegel, Koegel, Harrower, & Carter, 1999). For that reason, Jason may have found difficult to generalize from the case of the Social Story to the situation at hand. It is possible that additional prompting could have helped Jason to make the connection between his Social Story and the transitional situation. For example, Social Stories could have been used as a permanent visual prompt to remind him of what was expected. In previous research (e.g., Mancil et al., 2009; Crozier & Tincani, 2005), teachers verbally prompted students to engage in the behaviors described in the Social Stories. However, in the current investigation it was of interest to examine the use of Social Stories in isolation from other interventions. Third, Jason had a long history of engaging in protesting behaviors, which were high in frequency, occurred in a variety of situations, and had a number of antecedents (e.g., presence of certain peers, loss of stickers as part of his behavioral system). Protesting vocalizations were most likely Jason's way of communicating and negotiating his environment. It may have been that because transitions were highly aversive and likely had a history of reinforcement, the Social Story intervention was not sufficient to reduce problem behavior. An alternative intervention, such as providing him with appropriate verbal responses, could have helped him in general and during transitional situations in particular. For example, it may have been beneficial to replace his protesting behavior with a verbal response such as "One more minute please." Finally, it is possible that results could have been different had the reading sessions been conducted by Jason's teachers rather than the investigator. Although Jason did not seem to have any difficulty during his interaction with the investigator, there is a possibility that the results could be improved with teacher-delivered Social Story.

With Kate, experimental control was demonstrated since the behavior decreased with the introduction of the independent variable, and increased in the absence of intervention. The effectiveness of the intervention in addressing Kate's disruptions was supported by a high PND score of 78%. Several factors could have contributed to this. First, Kate was slightly younger than the other two participants. Previous research (e.g., Kokina and Kern, 2010) suggests that Social Story interventions may have a higher effectiveness with younger (i.e., elementary grade) participants. Furthermore, Kate's expressive and receptive language skills were stronger than those of the other participants. Previous empirical research suggests that higher language skills may predict more positive intervention outcomes (e.g., Sallows & Graupner, 2005) and better long-term outcomes (Howlin, Mawhood, & Rutter, 2000). Related to that, her comprehension of the Social Story was likely higher compared to the other students. Although all participants successfully answered the comprehension questions at the end of their respective Social Stories, it was clear that Kate grasped the meaning of her Social Story very well. Moreover, compared to the other participants, Kate had the lowest level of social avoidance, which has also been described as a possible moderator of positive treatment outcomes in previous research (e.g., Koegel, Koegel, Shoshan, & McNerney, 1999). Second, although the FBA was not conducted specifically for this study, the causes of Kate's disruption were relatively well understood compared to those of the other participants. Specifically, the function of her behavior was access to tangible items. Therefore, the Social Story may have served as an antecedent intervention matched to the function of her disruption (see Kern & Clarke, 2005). In particular, because it was read just prior to transition, it could have provided her with an advanced warning of the upcoming separation with her favorite items. Third, although Kate's transition difficulties could easily be explained from the operant perspective as positively reinforced, her high anxiety in

separation from the desired objects could have been another factor that contributed to her challenging behaviors. In addition, although Kate's breaks were very frequent, she did not seem to be aware of their high probability. The Social Story provided her with a reassurance that she would have access to the desired objects on a regular basis. Finally, Kate received the highest dosage of intervention in terms of its total duration and the number of sessions. On three days, two intervention sessions were conducted with her, and the total duration of her intervention phases was higher relative to the other two participants. The intensity of the intervention, however, was an unlikely factor as Jason also received two readings sessions across three days. It is not clear whether duration of the intervention played a role in the outcomes. A meta-analysis of Kokina and Kern (2010) suggested that interventions of medium duration (i.e., 11-20 intervention sessions) were the most common; however, brief duration was associated with higher effectiveness. Additional research is needed to examine dosage combined with other variables (e.g., cognitive ability, intensity of behavior problems).

Social Stories were effective in initially addressing Greg's disruption; however, a lack of experimental control was evident as his behavior failed to reverse with the withdrawal of the intervention. There are several possible explanations. First, appropriate behavior could have been learned by the student during the first intervention phase. Greg's target behavior was slightly different from the behaviors of the two other participants. Specifically, the appropriate replacement behaviors for Jason and Kate consisted of complex chains of steps (e.g., switch off computer, put toys away, go back to seat). By contrast, the main component of Greg's transitions was choice-making, a simpler, discrete behavior, which was probably easier to learn and internalize. Corroborating this hypothesis, research by Kokina and Kern (2010) suggests that Social Stories are more effective when used to address simpler "singular" behaviors than

complex behavior “chains.” Second, it is possible that the internal validity of the study with Greg was compromised by history and/or maturation effects outside of the researcher’s control. It may also be that teachers unconsciously changed their behaviors by reducing the number of prompts in intervention and subsequent baseline. Greg, in particular, seemed to find verbal prompting unpleasant, as his behaviors escalated with additional prompting. Indeed, the rate of teacher prompting per minute for Greg evidenced a slight decrease from 2.3 to 1.8 prompts per min. Finally, an observation was made that during and after the intervention that he always chose the same activity for his table play. One reason for this restricted choice could be his general lack of behavioral flexibility and compulsive behaviors. Another possibility is that his Social Story specifically stated “I will try to choose one thing for my work,” a phrase that he may have interpreted quite literally. A possibility of literal interpretation of the content of Social Stories is a caveat discussed by Gray (1998).

**Research Question 2: Does implementation of a Social Story intervention lead to increased occurrence of on-task behaviors in transitions?**

Previous intervention studies of Social Stories (e.g., Norris & Datillo, 1999) as well meta-analyses (e.g., Kokina & Kern, 2010) suggest that the intervention may be more effective for behavior reduction than for behavior increase. This was the case in the current study. The effectiveness of Social Stories in addressing on-task behaviors was more modest than their effectiveness for disruption. However, across participants, the intervention had a similar effect for on-task behaviors and disruption, with the highest effectiveness obtained for Kate and the lowest for Jason. The individual results will therefore be discussed only briefly, and they will be followed by a general discussion of the findings pertaining to on-task behaviors.

First, the intervention was ineffective in improving Jason's on-task behaviors. His performance remained variable across the phases, and no functional relation between the independent and the dependent variables was evident. As with disruption, Jason's on-task behaviors improved in the second baseline. In general, although the classroom change did not lead to any major contingency changes (e.g., all classroom interventions remained the same), it seemed to have a positive effect on Jason's behavior (see also the discussion of BFRS-R results below). Second, although Kate's on-task data were quite variable, resulting in a PND score of 46%, the intervention was moderately effective in increasing her appropriate transitional behaviors. Finally, marginal improvements were observed for Greg's on-task behaviors, with further subsequent improvements in the second baseline. The PND scores obtained from the first baseline to intervention were low, suggesting an ineffective intervention. It is likely that his on-task performance was negatively correlated with his latency to transition (discussed in the next section). Specifically, Greg was very slow to initiate his transition, and it took him a long time to choose an activity to engage in, resulting in extended observation periods. By contrast, engagement in on-task behaviors (i.e., choosing an activity) was relatively brief, which could have resulted in a small percentage of the total observation intervals coded as on-task. To summarize, the hypothesis with regard to on-task behaviors was partially supported, with promising results obtained for one participant (i.e., Kate). The effectiveness of the intervention for on-task transitional behaviors of the other two participants was low (i.e., for Greg) or absent (i.e., for Jason).

It has to be noted that the definition of on-task behaviors used in this study was relatively conservative. Specifically, any interval where participant looked away for even a second was coded as off-task. Therefore, the overall levels of on-task behaviors across the conditions could

have been low due to this overly restrictive definition. If on-task behaviors were defined in terms of only the major components of appropriate transition (e.g., stops previous activity, puts toys away, chooses icon from the activity schedule, walks back to seat) and/ or allowed more tolerance for looking away from the target materials, the results could have been different. Moreover, the definitions of on-task used in this study may not have been closely aligned to the content of Social Stories used in the present study. For example, a Social Story for Jason specifically described stopping the cash-out activity, walking quietly, waiting for teacher, but did not describe the peripheral behaviors that were nonetheless part of the behavioral definition, such as looking at materials and staying focused. Future studies should consider using the operational definitions that are more closely linked to the content of Social Stories.

Finally, it is of interest to examine the results of this part of the investigation in the context of findings from previous studies. A recent study of Social Story interventions conducted by Schneider and Goldstein (2010) addressed one of their participants' on-task behaviors in transitional situations. The targeted situation was similar to Jason's since it involved a transition from computer to academic contexts. The definition of on-task behaviors, however, was less conservative than in the present investigation. Specifically, the participant was allowed to look at the computer as long as he did lean toward the screen without touching it. The rates of improvement obtained for that participant (i.e., a 30% improvement) were comparable to those obtained from baseline to the first intervention phase for Greg in this study. Therefore, the two studies are consistent in showing that Social Stories have at least a moderate effect on on-task behavior. Furthermore, the results obtained for Kate in the present study show that Social Stories can sometimes have a promising effect on on-task behavior.



Schneider and Goldstein (2010) also added an additional intervention, visual schedule, to Social Stories, resulting in a greater effectiveness of the interventions. It is possible that the use of additional interventions, similar to those used in Schneider and Goldstein's (2010) study, would further improve on-task behaviors in transitions. For example, children may benefit from adding a visual activity schedule for each transition, specifically describing the main steps that define the on-task behaviors. Future studies should examine this point.

**Research Questions 3-4. Does implementation of a Social Story intervention lead to decreased latency to transition and decreased duration of time in transition?**

It was hypothesized that the intervention would result in decreased latency to transition and decrease the time spent in transition. Overall, those hypotheses were not supported by results of the investigation, as the intervention did not produce any detectable changes in participants' transition times. It is important to note that the investigation primarily focused on disruption and on-task behavior (described above) and that the possible changes in latency and duration were viewed as incidental. As a result, the Social Stories written for participants in this study described the transitional situation and the appropriate behaviors in those situations, and did not specifically address the reduction in transition times (i.e., latency and duration). Therefore, when targeting transition times in future research, it may be necessary to specifically address those variables in the Social Stories and/or use additional interventions to improve the overall effectiveness in additional areas.

Two individual observations deserve further mention. First, unlike the other participants, Kate was very quick to comply with the request to transition - it took her between 6 and 16 s, on average, to initiate her transitions. Therefore, targeting her latency to transition was not warranted, in contrast to other participants, which speaks to the importance of selecting the

individualized goals when addressing transition difficulties of students with ASD. In contrast to Kate, Greg took a very long time both to initiate and to complete his transitions, and seemed to always insist on following the transitional sequence at his own pace. His latency in the intervention phase was higher than in the first baseline, suggesting no intervention effects. However, the intervention seemed to be more effective in decreasing his duration of transition, which could have been a result of his improved independence and reduced disruption. Specifically, Greg's disruption during the first baseline resulted in significant loss of instructional and transitional time. Moreover, on several occasions teachers chose activities for him, which resulted in escalation of behaviors and refusal to engage in the next activity. During a number of observations the transition was never completed. An additional examination of the level of Greg's independence confirmed that he made no independent choices in the first baseline. By contrast, in the intervention phase and the second baseline, due to his reduced challenging behaviors and increased independence, he was able to complete his transitions with minimal to no prompting. In summary, while the intervention had no effects on the transition times of students, it provided several interesting insights into the nature of transition difficulties, specifically the relationship between transition times (i.e., latency and duration) and other variables.

**Research Question 5. Do effects of a Social Story intervention on challenging behavior and on-task behavior maintain over time?**

Observations of the main dependent variables (i.e., on-task and disruption) collected at one-week follow-up suggested maintenance of the effects of intervention. However, those conclusions are limited by the fact that because of the time constraints of the study, all probes were collected within a single day. Observations conducted on several subsequent days and at

longer-term follow-up are required to confirm the maintenance of intervention effects on transition difficulties of students with ASD. In addition, failure to establish experimental control limits the ability to fully answer this research question.

**Research Question 6: Will Social Story interventions result in improved general behavioral flexibility, measured by BFRS-R and by a questionnaire for teachers created for this study?**

To assess whether the intervention had an effect on a wider range of situations and problems than selected for this study, two additional questionnaires were administered with teachers. With regard to BFRS-R results, there were no differences in the scores obtained pre- and post-test for Kate. This is somewhat counterintuitive, given the promising direct observation data obtained for Kate. It may be that this recently developed scale lacks sensitivity to possible treatment-related changes in behavior. Interestingly, there were quantitative differences in the scores obtained for Jason and Greg, with lower results obtained on the BFRS-R at post-test. This could have been a reflection of the continued overall improvements in the behaviors of those participants, as suggested by the direct observation data (e.g., in the second baseline).

With respect to the custom-made scale for teachers, which discussed the specific situations that were targeted in this study, no quantitative differences were obtained for Jason. For Kate and Greg, however, teachers noted improvements in targeted situations. Specifically, they indicated that those students engaged in transition-related behaviors less frequently and that the duration of their challenging behaviors decreased. In addition, the ratings of Greg's teacher suggested that transition-related behaviors were no longer a significant problem and that he was less distressed in targeted transitions. Overall, the hypotheses were partly supported since the post-test results obtained on each of the questionnaires improved for two out of three

participants; however, problems with experimental control limit conclusions regarding this research question.

**Research Question 7. Are Social Stories viewed by teachers and students with ASD and ID as an acceptable and effective intervention to address transition difficulties?**

This hypothesis was supported since the intervention was viewed as highly acceptable by the teachers. Although the IRP-15 ratings for individual items never fell below four, the average scores varied, with the lowest ratings obtained on items rating the effectiveness of Social Stories. Overall, teachers may have accurately captured the results of the present investigation, which suggested mixed effectiveness of Social Stories in addressing transition difficulties. Interestingly, all teachers stated that the intervention was consistent with those that were used in their classrooms, a surprising finding given that the interventions used in those classrooms were mostly behavioral. The teachers further commended the intervention for its use of visuals and a computer-mediated format. Indeed, the presentation of Social Stories on a laptop computer seemed to be a positive factor, which could have contributed to better understanding and kept participants' levels of engagement and motivation high during the reading sessions.

Social validity was assessed with one of the three students, Kate. She indicated that she liked the intervention and that she wanted to continue reading her Story. Other participants were unable to provide answers to the questionnaire; however, informal observations suggested that students liked their Social Stories and read them with pleasure.

**Research Question 8. Can intervention agents implement Social Story interventions with fidelity?**

The intervention in this study was implemented by the investigator, resulting in near-perfect integrity of implementation. The violations of the treatment protocol occurred when

teachers, whose role in the study was the introduction of the transition, engaged in excessive prompting. Prompting was not viewed as an additional intervention since it was part of the intervention systems that were already implemented in the classrooms and seemed to be ineffective. In an effort to keep rates of prompting constant, teachers were asked to provide about the same number of prompts both in baseline and during intervention. Although there were only minor between-condition differences in the rates of prompting, it was slightly higher for Jason and Kate and lower for Greg in the intervention phase. Prompting rates further increased in the second baseline for Kate. Therefore, whereas the hypothesis of the study related to treatment fidelity was supported, future studies should examine whether the natural intervention agents, such as teachers and paraeducators, would be able to carry out the intervention with similar fidelity as in the present study.

### **Limitations**

The primary limitation of this study was a lack of functional relation between the dependent and the independent variables evident for two participants, Greg and Jason. Although the intervention seemed to be initially effective for Greg, the effects did not reverse with the implementation of the second baseline. This suggests that the use of reversal (ABAB) single-case designs may be inappropriate when addressing transition difficulties, as some participants may learn the skills necessary for a successful transition. Future studies attempting to examine the use of Social Stories in daily school transitions should consider the use of other rigorous single-case designs, such as multiple-baseline across participants. Observational data suggested that the behaviors of all participants improved throughout the follow-up, a promising finding from the point of view of practice. Because of the continuously improving performance of Jason and

Greg, a reversal to the intervention phase was not implemented, as initially was planned, resulting in a loss of design.

Another limitation of this investigation was a lack of the direct assessment of skill generalization. Assessment of generalization was not conducted with Kate and Jason due to the situation-specific character of their transition difficulties. With Greg, practical limitations, such as time constraints and rigid classroom schedules, precluded the assessment of generalization. Generalization is defined as the use of skills under the circumstances or conditions different from those, in which they were taught. It may be argued that generalization in a broad sense was assessed in this study, as the children were expected to generalize the skill described during the reading sessions to the actual transitions. However, future studies should directly examine skill generalization from transition specifically targeted by Social Stories to novel transitions. . For example, the primary observation setting could be transition from lunch to classroom, whereas generalization may be assessed during transition from gym to library.

An effort was made in the study to adhere to quality indicators of single-case research described by Horner and colleagues (2005) by including the assessment of maintenance of intervention effects, examining the social validity of the intervention, and conducting a formal assessment of treatment fidelity. This is especially relevant when conducting studies of Social Story interventions, which have traditionally been characterized by poor methodological quality (e.g., Test et al., 2010). However, several limitations should be noted with respect to those components of the intervention in the present study. First, only short-term maintenance was assessed (i.e., at one-week follow-up) and all the follow-up probes were conducted within one day. Additional observations are warranted to establish the degree of maintenance effects in future studies of transition difficulties. Second, social validity of the intervention was only

assessed with one out of three students, Kate. The assessment was unsuccessful with the other two students due to their lower language skills and because a longer time elapsed between the assessment and the last administration of Social Stories. Although informal observations and teacher reports confirm high acceptability of the intervention for students, future research should seek to examine social validity of Social Story interventions with students by surveying them at the time of the intervention and using alternative methods suitable for students with lower cognitive ability. Finally, as noted above, the intervention was created and administered by the investigator. Administration by the investigator was probably related to high treatment fidelity obtained in this study. Although the steps of the treatment protocol were very simple, making it likely that natural intervention agents, such as teachers, would implement them with equal fidelity, this possibility was not examined. Therefore, future studies of Social Stories should make an effort to engage teachers in implementation of the intervention.

Finally, FBA was not formally administered in this study. Previous research studies of Social Stories have rarely, if ever, used FBA to inform the intervention. This is unfortunate, particularly because Social Stories have been described as an intervention that is supposed to address the underlying cause of the difficulty and is written from the perspective of the target child. If used in Social Stories, the FBA information would be likely to increase the probability of children relating to the Story and may increase their effectiveness. Supporting this point, meta-analytic studies (e.g., Kokina & Kern, 2010) concluded that Social Story interventions informed by FBA information were more effective than those that were not. This study used the results of previously conducted FBA and interviews with stakeholders to get an insight into the nature of participants' transition difficulties. However, an assessment conducted specifically for

the present investigation that informed the intervention could have yielded superior intervention outcomes. This possibility should also be examined in future studies.

### **Directions for Future Research**

Because children with ASD may require additional supports during daily school transitions, examinations of effective interventions that address transition difficulties are warranted. This study was the first one to examine the effectiveness of Social Story interventions in decreasing transition-related disruption and increasing on-task behaviors of children with ASD. The results may be considered promising for addressing disruptive behaviors of some students. Future studies should attempt to replicate those effects using different study designs.

The present study contributes to the literature by examining the effectiveness of the intervention with a group of children with severe ASD and moderate ID, a population underrepresented in the existing Social Story research (see Kokina & Kern, 2010; Reynhout & Carter, 2011). Although future studies should continue to address the needs of students with ASD and ID, there is a possibility that mixed effectiveness of the intervention in this study could have been due to lower cognitive and/or verbal skills of participants. This possibility was confirmed by the relatively superior results obtained for disruption of the participant with higher verbal skills, Kate. Therefore, future research should attempt to examine the use of Social Stories in transitions of children with higher cognitive and language skills. One possible caveat, however, is that transition-related disruption of “high-functioning” children with ASD may not be as consistent and/or high frequency as that of students with ID, creating constraints for researchers seeking to observe and address those difficulties. Several alternative operational



definitions of transition difficulties may be considered in such cases, such as percentage of daily independent transitions per day.

Many previous studies of Social Stories have been limited by the use of treatment packages, involving a combination of Social Stories with other interventions, such as prompting, reinforcement, activity schedules, and video modeling. The present investigation examined the effects of Social Stories in isolation from other interventions. Future studies, however, may examine the relative contribution of additional interventions to the effectiveness of Social Story interventions. Some of the interventions that hold promise for transition difficulties of children with ASD and may be used in conjunction with Social Stories are video priming (e.g., Schreibman et al., 2000), video modeling (e.g., Cihak et al., 2010), or visual activity schedules (e.g., Schneider and Goldstein, 2010). Moreover, additional prompting (i.e., referring student to Social Story or stating the appropriate behavior) may help students with lower receptive verbal skills (such as Jason in this study) make a link between the intervention and the real-life situations.

Related to the previous point, the role of the novel modes of Social Story delivery should be examined in the future. This study was one of the few investigations that used Social Stories delivered via a personal computer (i.e., in the form of a PowerPoint presentation). Other recent studies (e.g., Mancil et al., 2009) provided preliminary support for the superior effectiveness of computer-delivered Social Stories to those that were presented in a traditional printed book format. In the present study, the computer delivery seemed to contribute to acceptability of the intervention for students and teachers. The computer media, particularly the use of hand-held devices, holds particular promise for addressing daily school transitions, as those devices are highly portable and may be easily carried by students to a range of contexts.

Also with respect to methodological quality indicators, future research should examine generalization and maintenance of treatment effects, attempt to involve the typical intervention agents in the process of creating and implementing of Social Stories, and make an effort to engage students in the assessment of social validity. Finally, this study focused on predictable daily transitions of children with ASD. In the future, it seems important to examine the effectiveness of Social Stories in addressing unpredictable transitions, such as introduction of changes to the schedule or novel events. Although those situations are difficult to study as they rarely happen naturally, building additional flexibility in the behavior repertoire of students with ADS is an important goal that should be pursued in future studies.

### **Implications for Practice**

Transitions are an important part of any school day, and they require careful planning and selection of appropriate interventions. This is particularly important for teachers working with students with ASD, as the inherent characteristics of those children make transitions particularly challenging for them. Social Stories are a popular method used by teachers and parents to address a range of difficulties of children with ASD, including transitions. Although additional research is needed, this study provides preliminary evidence of the effectiveness of Social Stories for some students in daily school transitions.

A caveat should be made that at this point Social Stories do not represent an evidence-based practice due to a lack of rigorously controlled intervention studies (see Test et al., 2010). Evidence specific to the use of Social Stories in transitions is currently even more limited. However, an advantage of Social Stories is their ease of implementation and their time and cost-effectiveness. In the present study, Social Stories took about 5 min daily to administer, and cost nothing to create as they were developed as a PowerPoint computer presentation. Most

classrooms are equipped by computers so this intervention seems to be very accessible. Because of this and other factors, Social Stories seem to be an acceptable intervention. As research into effectiveness of Social Stories continues, it is likely that some teachers will continue using them in their classrooms, alone and in combination with other interventions.

Several additional suggestions for teachers willing to use Social Stories to address transition difficulties of students in their classrooms will be made next. First, due to the variable results obtained in this study, teachers are encouraged to consider their students' ability levels to make a decision regarding the individual appropriateness of Social Stories. Results of this study support previous findings that the intervention may be more effective for students with higher levels of skill development. Second, findings from this study suggest that teacher prompting may be a variable affecting students' performance in transitions. In Greg's case, decreased prompting coincided with decreased disruption and slightly improved his on-task behaviors. Although causal statements cannot be made, it is possible that for some students just taking a step back and letting them complete transitions at their own pace may help decrease the disruptive behaviors. Finally, whereas this study addressed predictable school transitions, practitioners willing to use Social Stories may consider targeting a broader range of naturally occurring daily transitions, including those that involve preparation for low-frequency events, such as novel situations and possible schedule changes. While doing this, it is important to use data-based decisions. For example, data may be collected on the extent of students' participation in the situations (e.g., similar to Ivey et al., 2004), their level of independence, and/or percentage of transitions that they engaged in without disruption.

## **Conclusion**

In summary, the study was the first one to specifically examine the effectiveness of Social Stories to address problem behavior of students with ASD during daily classroom transitions. Taken together, the results suggest mixed effectiveness of Social Stories, with promising results obtained for one out of three participants. Out of a range of dependent variables targeted, the intervention held promise for addressing disruptive behaviors. The effects of the intervention were minimal for on-task behaviors, and absent for latency to transition and duration of time in transition. Because this study was the first to systematically examine the effectiveness of Social Stories in addressing transition difficulties, the results should be viewed as preliminary. Future studies should examine the effectiveness of Social Stories for transition-related disruption, using additional study designs and with other participant populations.

Table 1

*Summary of Participants' Characteristics*

Assessment	Jason	Kate	Greg
Leiter Full Scale IQ	64	50	54
GARS Autism Index	102	87	94
GARS Social	10	8	7
GARS Communication	10	11	11
GARS Stereotypical	11	5	9
Adaptive functioning composite (VABS/ ABAS - II)	54	47	50
VABS Communication	56	NA	NA
VABS Daily Living	57	NA	NA
VABS Socialization	55	NA	NA
VABS Motor	59	NA	NA
ABAS Conceptual	NA	61	63
ABAS Social	NA	55	58
ABAS Practical	NA	45	49

*Key:* *Leiter* Leiter International Performance Scale-Revised, *GARS* Gilliam Autism Rating Scales–Second Edition, *VABS* Vineland Adaptive Behavior Scales-Second Edition , *ABAS* Adaptive Behavior Assessment System

*Note: standard scores*

Table 2

*Mean and Range of Percentage of Inter-observer Agreement for the Dependent Variables*

Participant	Target Behavior	<i>M</i> (%)	Range (%)
Jason	Disruption	88	72-100
	On-task	89	80-100
	Latency to transition	94	86-100
	Duration of transition	89	62-94
Kate	Disruption	86	50-100
	On-task	84	50-100
	Latency to transition	85	14-100
	Duration of transition	97	89-100
Greg	Disruption	97	89-100
	On-task	97	90-100
	Latency to transition	89	48-100
	Duration of transition	82	24-100

Table 3

*Descriptive Statistics for Jason's Disruption and On-task*

	Target Behavior	<i>M</i> (%)	<i>SD</i>	Range (%)
Baseline	Disruption	28	20	0-57
	On-task	36	11	19-50
Intervention	Disruption	41	21	6-66
	On-task	31	16	0-56
Baseline	Disruption	5	10	0-20
	On-task	60	14	50-80
Follow-up	Disruption	0	NA	NA
	On-task	100	NA	NA

Table 4

*Descriptive Statistics for Jason's Latency to Transition and Duration in Transition*

	Target Behavior	<i>M</i> (s)	<i>SD</i>	Range (s)
Baseline	Latency	55	66	6-174
	Duration	61	17	43-90
Intervention	Latency	54	61	10-120
	Duration	55	14	41-82
Baseline	Latency	13	18	0-40
	Duration	45	8	34-53
Follow-up	Latency	14	NA	NA
	Duration	39	NA	NA



Table 5

*Descriptive Statistics for Kate's Disruption and On-Task*

	Target Behavior	<i>M</i> (%)	<i>SD</i>	Range (%)
Baseline	Disruption	74	22	38-100
	On-task	30	17	9-50
Intervention	Disruption	21	19	0-42
	On-task	71	36	7-100
Baseline	Disruption	79	36	25-100
	On-task	17	28	0-58
Intervention	Disruption	14	16	0-45
	On-task	60	37	0-100
Follow-up	Disruption	0	0	0
	On-task	82	16	71-100

Table 6

*Descriptive Statistics for Kate's Latency to Transition and Duration in Transition*

	Target Behavior	<i>M</i> (s)	<i>SD</i>	Range (s)
Baseline	Latency	13	9	4-28
	Duration	77	34	36-134
Intervention	Latency	6	2	3-9
	Duration	74	50	25-144
Baseline	Latency	8	3	5-11
	Duration	62	41	26-113
Intervention	Latency	11	7	4-23
	Duration	66	28	31-106
Follow-up	Latency	16	6	11-23
	Duration	39	18	19-54

Table 7

*Descriptive Statistics for Greg's Disruption and On-Task*

	Target Behavior	<i>M</i> (%)	<i>SD</i>	Range (%)
Baseline	Disruption	63	19	29-85
	On-task	7	7	0-22
Intervention	Disruption	10	17	0-40
	On-task	24	23	4-63
Baseline	Disruption	18	24	0-50
	On-task	38	15	20-60
Follow-up	Disruption	0	NA	NA
	On-task	27	NA	NA

Table 8

*Descriptive Statistics for Greg's Latency to Transition and Duration in Transition*

	Target Behavior	<i>M</i> (s)	SD	Range (s)
Baseline	Latency	108	140	10-354
	Duration	159	171	28-446
Intervention	Latency	143	104	15-227
	Duration	24	13	8-37
Baseline	Latency	88	97	8-281
	Duration	27	13	12-42
Follow-up	Latency	12	NA	NA
	Duration	103	NA	NA

Table 9

*Total Rate per Minute of Teachers' Prompting by Condition*

Condition	Jason	Kate	Greg
Baseline 1	1.6	1.8	2.3
Intervention 1	2	2.5	1.8
Baseline 2	1.6	2.8	1
Intervention 2	NA	2.3	NA
Follow-up	1	1.8	1

Table 10

*The Summary of the BFRS-R Teacher Ratings*

Item	Jason		Kate		Greg	
	Pre	Post	Pre	Post	Pre	Post
1. A commonly used object is misplaced and cannot be found	2	2	2	2	1	1
2. A planned event is delayed or cancelled with little warning because of unforeseen circumstances	2	1	2	2	1	1
3. The person is required to move from their current location and go to another location	1	0	1	1	1	0
4. An object in the environment has been moved or repositioned from its usual location or position	1	1	1	1	0	0
5. The person wants something that is not available	1	2	2	2	2	0
6. An object or some materials that the person was using breaks or malfunctions	2	1	2	2	1	0
7. A usual routine is altered or changed, for example, the parent takes a new route home from school	1	1	1	1	0	1
8. An unexpected interaction occurs with another person, for example, a stranger tries to talk to a person	1	0	0	0	0	0
9. The person becomes momentarily separated from his/ her family or group	1	0	1	1	1	0
10. Materials run out, causing a premature	1	0	2	2	2	0

end to an activity						
11. Another person is doing something annoying, for example, making noise	2	2	0	1	0	1
12. Objects or materials are not returned to their proper place at the end of an activity	2	1	1	0	0	0
13. A new object, item, or person has been added to the environment	2	2	0	0	1	1
14. An activity is interrupted before the person was able to finish the task	1	2	1	2	1	1
15. A new activity is introduced into the person's routine	2	2	1	0	2	1
16. Another person tries to use favorite possessions of the person	2	2	2	2	1	1
Total	25	19	19	19	14	8

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*Note:* 0- no problem, 1- mild problem, 2 –severe problem

Table 11

*A Summary of the Social Validity IRP-15 Teacher Ratings*

N	Item	Jason	Kate	Greg	<i>M</i>
1	This was an acceptable intervention for the child's transition difficulties.	5	6	4	5
2	Most teachers would find this intervention appropriate for the transition difficulties of their students.	6	6	3	5
3	This intervention was effective in reducing child's disruptive behaviors	3	5	4	4
4	The intervention was effective in increasing compliance during transitions	4	5	4	4.3
5	I would suggest the use of this intervention to other teachers/parents	5	6	5	5.3
6	The child's transition difficulties were severe enough to warrant use of this intervention.	5	6	3	4.67
7	Most teachers would find this intervention suitable for a variety of transition difficulties	6	6	4	5.3
8	I would be willing to use this intervention in the classroom setting.	6	6	4	5.3
9	This intervention would not result in negative side effects for the child.	6	6	5	5.67
10	This intervention would be appropriate for a variety of children	6	6	5	5.67
11	This intervention is consistent with those I have used in the classroom settings	5	5	5	5
12	The intervention was a fair way to handle the child's transition difficulties	6	6	5	5.67
13	This intervention was reasonable for the transition difficulties of this child	6	6	5	5.67



14	I liked the procedures used in this intervention.	6	6	5	5.67
15	The child liked the intervention (i.e., reading the Social Story )	6	6	5	5.67
16	This intervention was a good way to handle this child's transition difficulties.	6	6	4	5.33
17	Overall, this intervention would be beneficial for the child.	6	6	4	5.33
Total (a sum of all ratings except Items 4 and 15)		83	88	74	81.6

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*Note:* 1=strongly disagree 2=disagree 3=slightly disagree 4=slightly agree 5=agree 6=strongly agree

Figure 1. Jason's Disruption and On-Task Behaviors

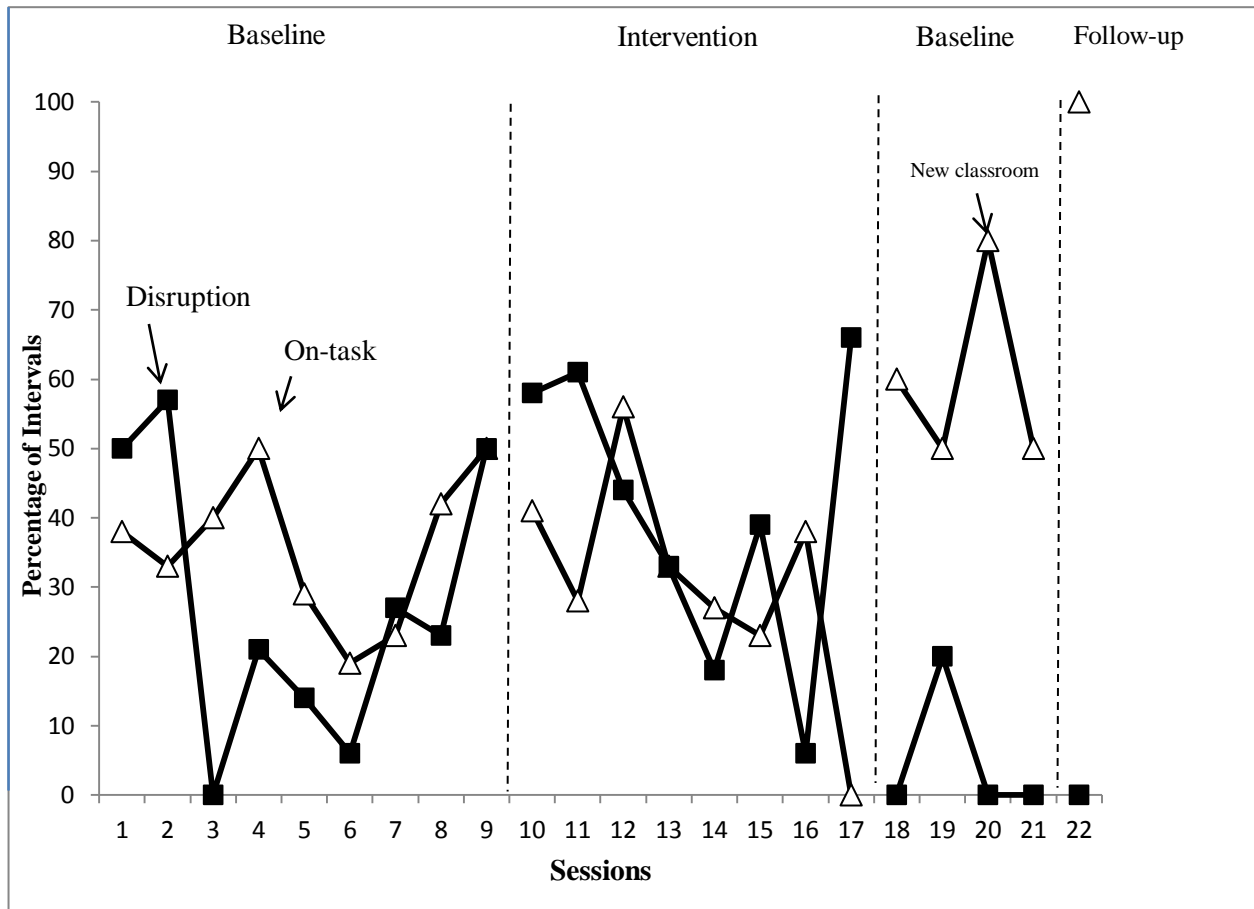


Figure 2. Jason's Latency to Transition and Duration of Transition Data

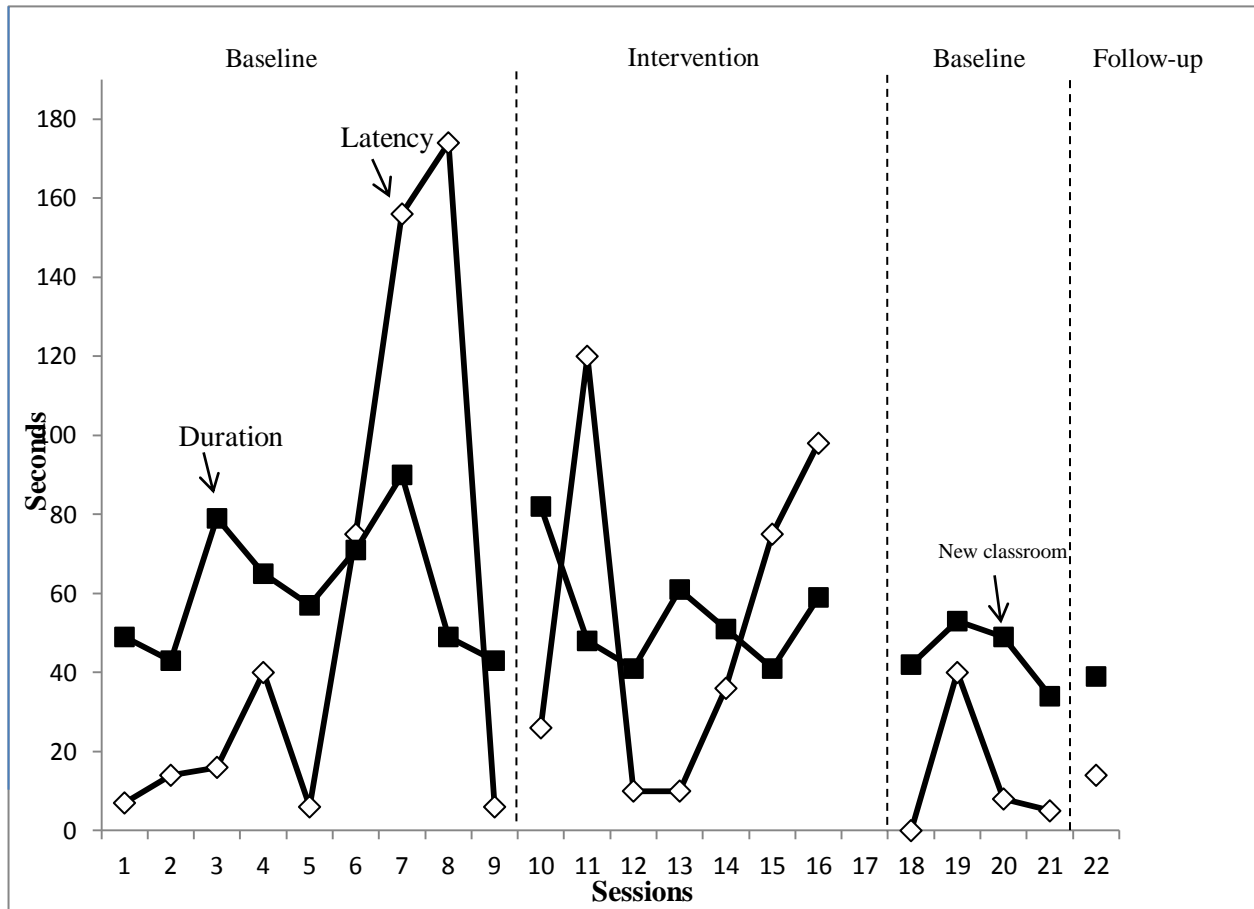


Figure 3. Kate's Disruption and On-Task Behaviors

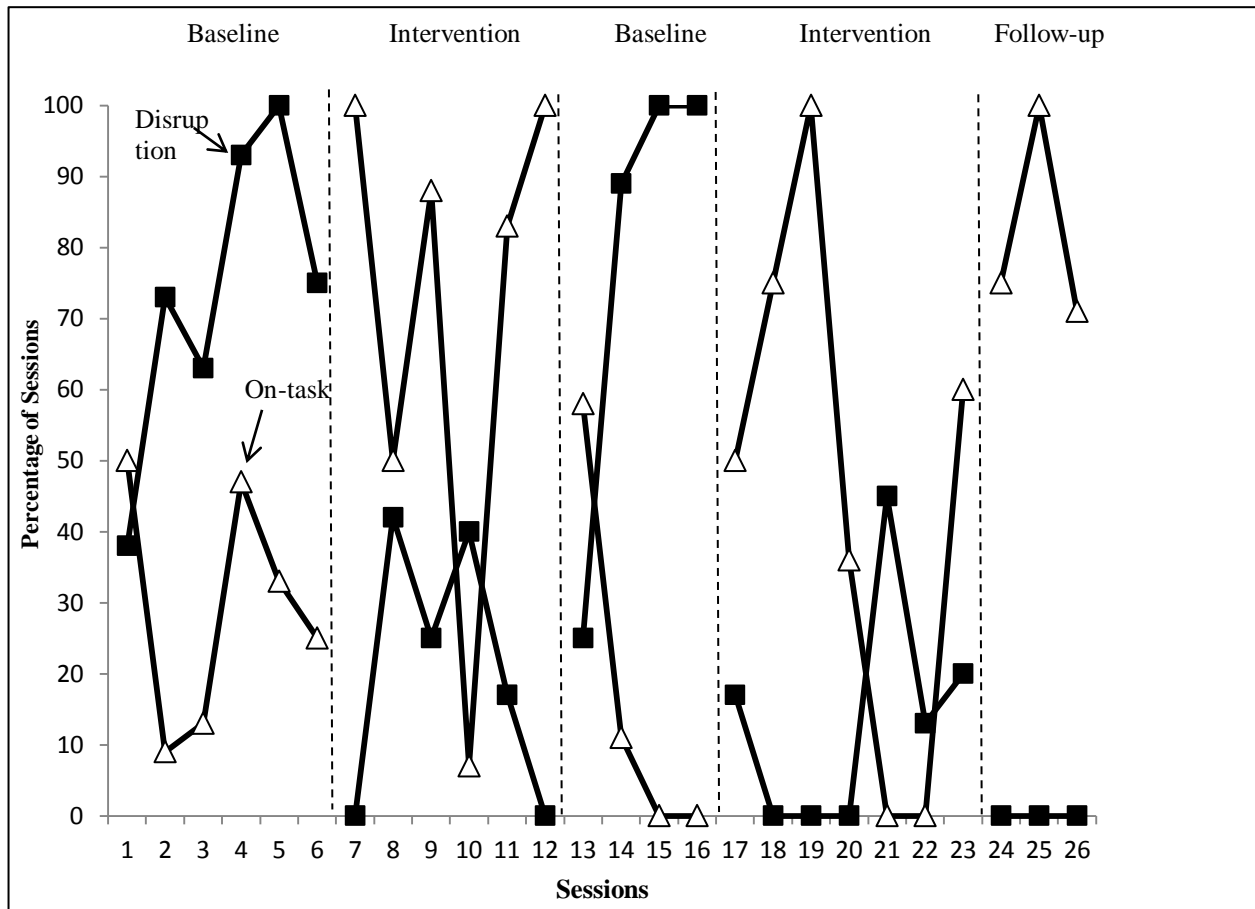


Figure 4. Kate's Latency to Transition and Duration of Transition Data

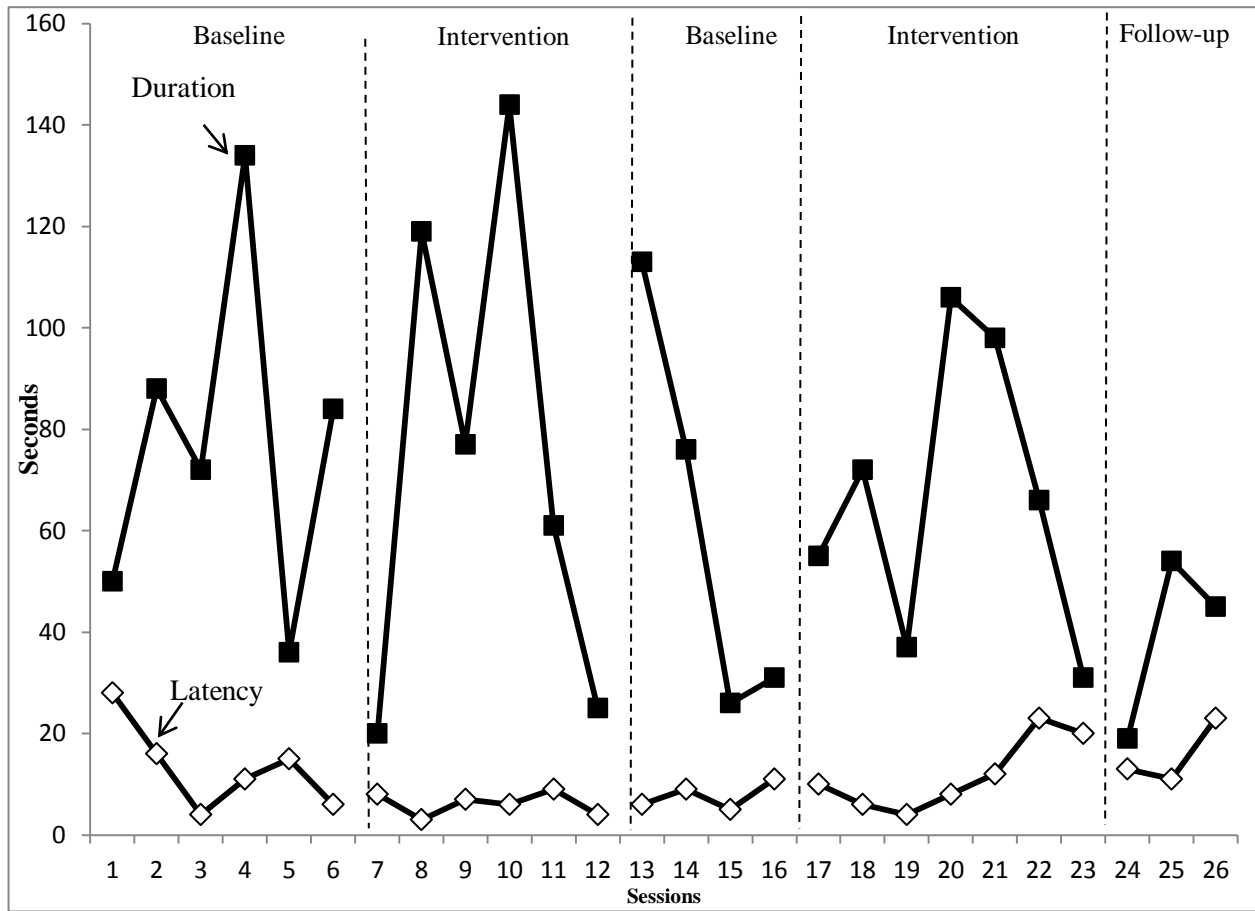


Figure 5. Greg's Disruption and On-Task Behaviors

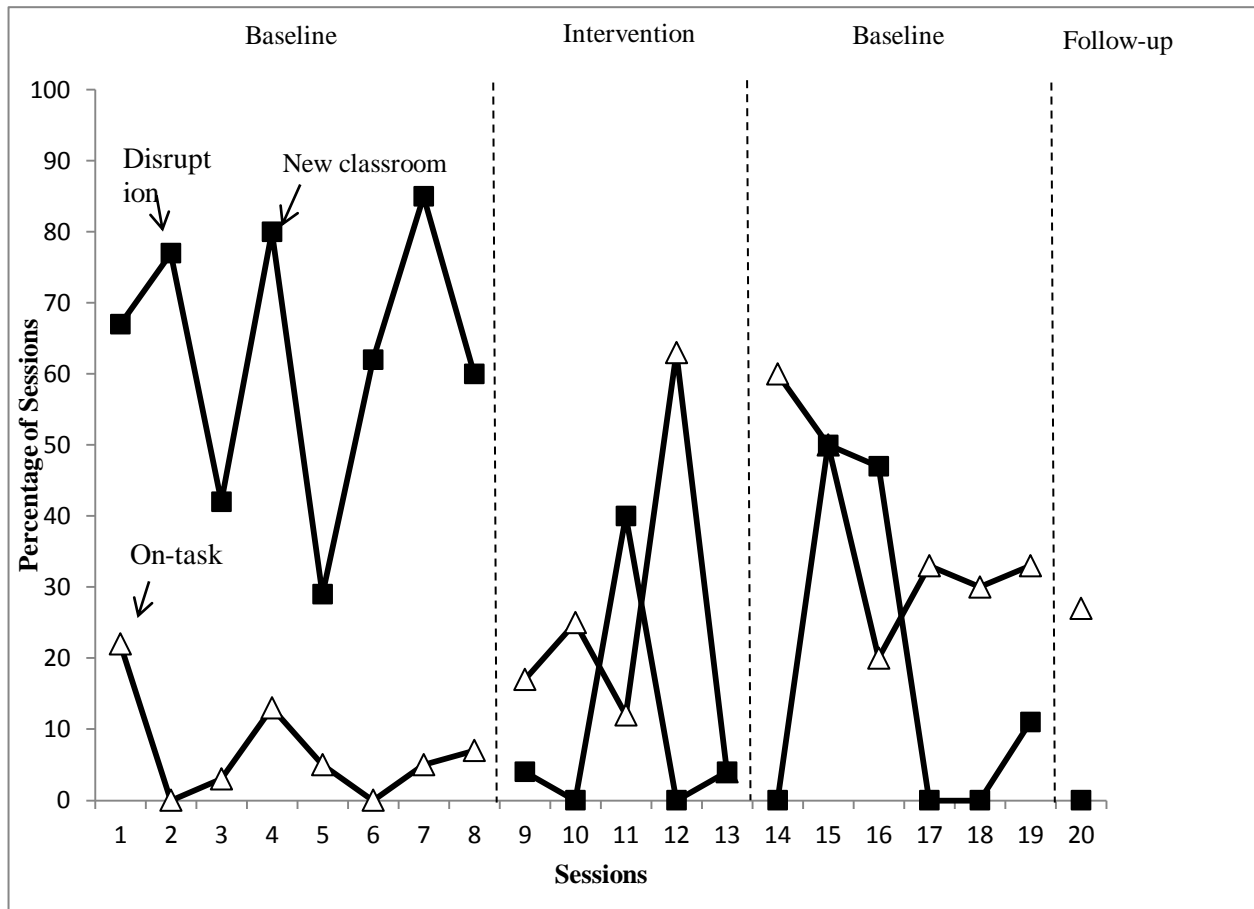
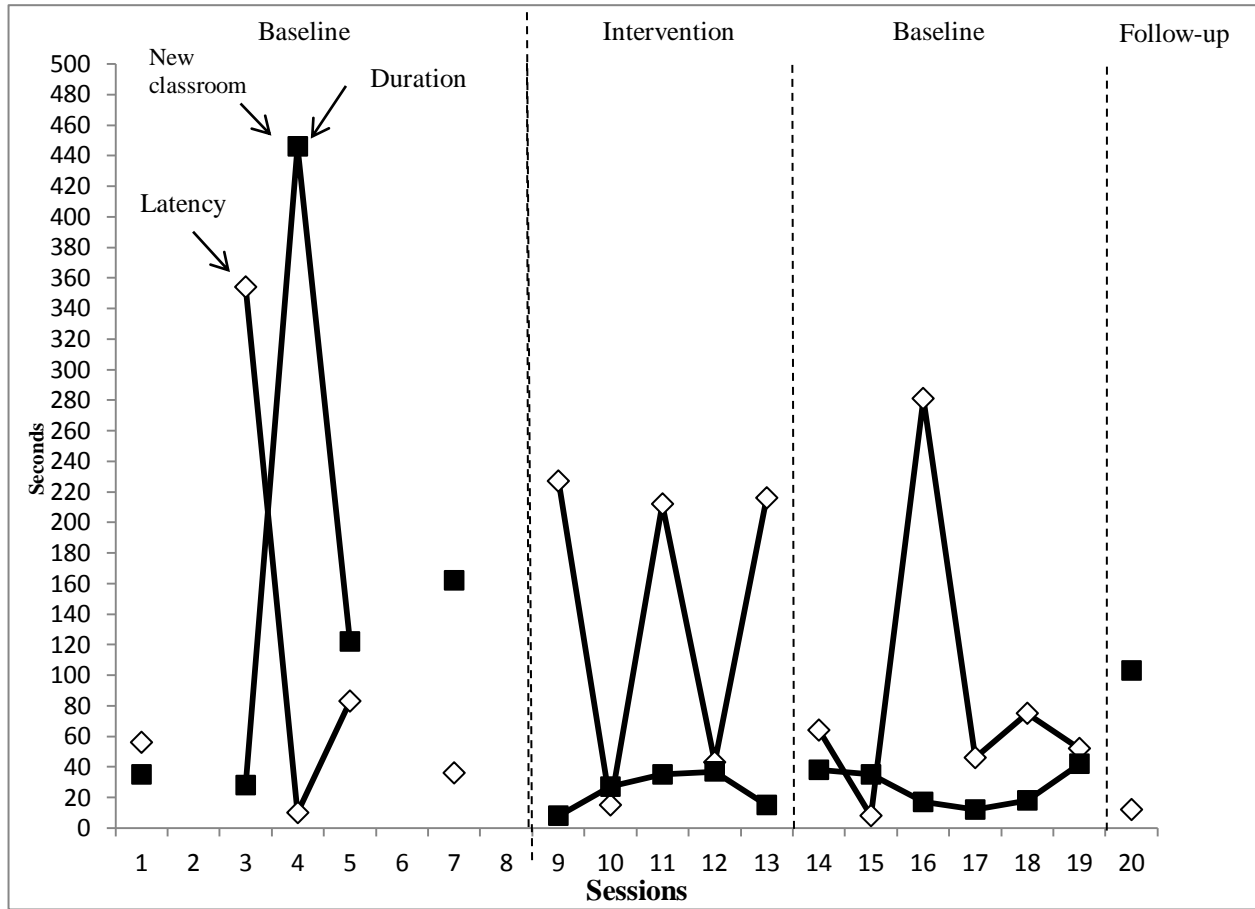


Figure 6. Greg's Latency to Transition and Duration of Transition Data



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## Appendix A

### Questionnaire for Teachers

1. Describe the “transition difficulty” (challenging behavior) of your child/ student. Does it include any of the following:
  - Noncompliance (passively resisting transition)
  - Verbal protest (saying “I don’t want)
  - Crying
  - Whining
  - Screaming
  - Falling on the floor
  - Physical resistance
  - Physical aggression
  - Verbal aggression
  - Other \_\_\_\_\_
  
2. Describe the transitional situation (i.e., the situation in which the behavior of concern is commonly observed). Does it include any of the following:
  - Interruption of the current activity or task and leaving it unfinished to move to another
  - Introducing of modifications to the existing order of events, activities, or tasks
  - Introducing a new event to the existing routine
  - Other (describe) \_\_\_\_\_
  
3. To what extend the behavior is a problem?
  - Not a problem

- Somewhat a problem
  - Significant problem
4. Given the introduction of a transitional situation (e.g., change in a routine), what is the consistency of behavior occurrence?
- Less frequently than every third transition
  - About every third transition
  - About every other transition
  - Every time a transition is introduced
5. About how often are the transitional situations (described by you above) introduced in the classroom environment?
- Once a month
  - Once a week
  - Several times a week
  - Every day
  - Several times a day
6. Following the introduction of a transitional situation, about how long does the challenging behavior last?
- More than 10 min
  - 6-10 min
  - 1-5 min
  - Less than 1 min
7. How distressed does the child appear to be in the targeted transitional situation?
- Not distressed

Somewhat distressed

Very distressed

8. After the request to transition is withdrawn, about how long does it take the child to calm down?

More than 10 min

6-10 min

1-5 min

Less than 1 min

9. What do you usually do when the behavior happens?

Verbally prompt the child until he/ she complies with the request

Physically prompt the child

Withdraw the request to transition

Other (describe)\_\_\_\_\_



Appendix B

**Behavior Flexibility Rating Scale-Revised (BFRS-R; Peters-Scheffer et al., 2008)**

To what extent is each of the following situations a problem for the person?	Severity of the problem		
	No (0)	Mild (1)	Severe (2)
1. A commonly used object is misplaced and cannot be found			
2. A planned event is delayed or cancelled with little warning because of unforeseen circumstances			
3. The person is required to move from their current location and go to another location			
4. An object in the environment has been moved or repositioned from its usual location or position			
5. The person wants something that is not available			
6. An object or some materials that the person was using breaks or malfunctions			
7. A usual routine is altered or changed, for example, the parent takes a new route home from school			
8. An unexpected interaction occurs with another person, for example, a stranger tries to talk to a person			
9. The person becomes momentarily separated from his/ her family or group			
10. Materials run out, causing a premature end to an activity			
11. Another person is doing something annoying, for example, making noise			
12. Objects or materials are not returned to their proper place at the end of an activity			
13. A new object, item, or person has been added to the environment			
14. An activity is interrupted before the person was able to finish the task			
15. A new activity is introduced into the person's routine			
16. Another person tries to use favorite possessions of the person			

## Appendix C

### Operational Definitions

Begin coding as prompted by interval signals on video clips; finish coding when child initiates a new activity.

Interval recording:

#### 1. On-task (whole interval)

- On task (OnT) behaving in a manner consistent with the expectations of the activity and /or teachers' directions; complying with the auditory and/or verbal cue to transition
- Examples: stands up; moves from target activity to the desk or to the location of a new activity; checks activity schedule for the next activity; makes a choice of the next activity, gets materials for next activity; looks at materials; sits appropriately while teacher sets up next activity, begins engaging in the activity.
- Non-examples: does not move following teacher's prompt; makes initial movement but then stops; shuffles through activity schedule pages or materials while looking away; fixes items on schedule.

#### 2. Disruptive behaviors (partial interval)

- J- protesting behaviors: protesting vocalizations (e.g., "grrrr", "anana"); fake crying; whining; jumping up and down while shaking body; shaking head; darting; pushing air with arm ; kicking air; saying "No thank you".
- K – protesting and tantrum behaviors, including screaming, protesting statements or sounds (e.g., "No", "Grrr"), whining, crying, making statements about preferred objects or activities (including, but not limited to: wii, snake, computer/ video, dinosaurs), jumping up and down, shaking body.

- G - protesting and tantrum behaviors: including screaming; protesting / frustrated statements (e.g., “No”, “No way”, “Why”, “Oh man”), tearing down materials from wall, dropping materials including his individual schedule book on the floor; pushing furniture; dropping on the floor; kicking; shaking/ twisting body; crying.

### Duration recording

#### **1. Latency to transition**

- Time between the verbal cue provided by teacher and student’s first compliance with the request to transition. See examples of on-task above.

#### **2. Total duration of transition**

- Time between student’s first compliance with request to transition and his initiation of the new activity, as indicated on the schedule or as prompted by teacher.
- Examples of initiation of new activity: sets materials for the new activity on desk and begins engaging in new activity (takes pencil, takes materials).
- Nonexamples: looks at materials without using them; consults schedule to see what’s next; shuffles through pages of schedule

Appendix D

**Data Collection Form**

Participant's initials \_\_\_\_\_

Date of recording \_\_\_\_\_ Probe number \_\_\_\_\_

Coder's initials \_\_\_\_\_ IOA + / - \_\_\_\_\_

Circle Dis + for disruptive behavior and Dis – for absence of disruption (partial interval: code as + if observed at any point in the interval)

Circle OnT + for on-task behaviors (whole interval: code as + if student is on-task during the entire interval; if student is off-task at any time, the interval is marked as OnT -)

Put “v” next to VPR in every interval where student was given a verbal prompt to transition from target activity

1 Dis + - OnT + - VPR	2 Dis + - OnT + - VPR	3 Dis + - OnT + - VPR	4 Dis + - OnT + - VPR	5 Dis + - OnT + - VPR	6 Dis + - OnT + - VPR
7 Dis + - OnT + - VPR	8 Dis + - OnT + - VPR	9 Dis + - OnT + - VPR	10 Dis + - OnT + - VPR	11 Dis + - OnT + - VPR	12 Dis + - OnT + - VPR
13 Dis + - OnT + - VPR	14 Dis + - OnT + - VPR	15 Dis + - OnT + - VPR	16 Dis + - OnT + - VPR	17 Dis + - OnT + - VPR	18 Dis + - OnT + - VPR
19 Dis + - OnT + - VPR	20 Dis + - OnT + - VPR	21 Dis + - OnT + - VPR	22 Dis + - OnT + - VPR	23 Dis + - OnT + - VPR	24 Dis + - OnT + - VPR
25 Dis + - OnT + - VPR	26 Dis + - OnT + - VPR	27 Dis + - OnT + - VPR	28 Dis + - OnT + - VPR	29 Dis + - OnT + - VPR	30 Dis + - OnT + - VPR

Total occurrence of Dis / total intervals coded\*100%=

Total occurrence of ONT / total intervals coded\*100%=

Latency to transition (in seconds) =

Total transition time (in seconds) =

Appendix E

**Treatment Fidelity Checklist**

Reading session:

1. Social Story was read to child

Yes            No

2. Child attention was established prior to reading (i.e., teacher says “Are you ready?” etc.)

Yes            No

3. Interventionist asked comprehension questions after reading a Social Story

Yes            No

4. If child was unable to answer one or more comprehension questions, interventionist referred him/ her back to the relevant passage of Story, explained / re-read if necessary, then asked the same set of questions until correct answers were given

Yes            No

Observation session:

5. Verbal cue (e.g., “It’s time for X “ / “Y is finished” / “Check your schedule”) or gestural cue was provided to introduce transition

Yes            No

6. If child did not comply/ engage in challenging behavior teacher waited for at least 30 s. without interference before repeating the verbal cue; repeated sequence maximum 5 times if needed

Yes            No

Appendix F1

**Social Validity Rating Scale - Teachers**

Adapted from Intervention Rating Profile –15 (IRP-15) Martens, Witt, Elliot, & Darveaux, 1985

The purpose of this questionnaire is to obtain information regarding your acceptance of the intervention. Such information will aid in future selection of classroom interventions for students with autism spectrum disorders. Please circle the number that best describes your agreement or disagreement with each statement using the scale below.

1=strongly disagree 2=disagree 3=slightly disagree 4=slightly agree 5=agree 6=strongly agree

This was an acceptable intervention for the child’s transition difficulties.

1      2      3      4      5      6

Most teachers would find this intervention appropriate for the transition difficulties of their students.

1      2      3      4      5      6

This intervention was effective in reducing child’s disruptive behaviors

1      2      3      4      5      6

The intervention was effective in increasing compliance during transitions

1      2      3      4      5      6

I would suggest the use of this intervention to other teachers/parents

1      2      3      4      5      6

The child’s transition difficulties were severe enough to warrant use of this intervention.

1      2      3      4      5      6

Most teachers would find this intervention suitable for a variety of transition difficulties

1      2      3      4      5      6

I would be willing to use this intervention in the classroom setting.

1      2      3      4      5      6

This intervention would not result in negative side effects for the child.

1      2      3      4      5      6

This intervention would be appropriate for a variety of children.

1      2      3      4      5      6

This intervention is consistent with those I have used in the classroom settings

1      2      3      4      5      6

The intervention was a fair way to handle the child's transition difficulties.

1      2      3      4      5      6

This intervention was reasonable for the transition difficulties of this child.

1      2      3      4      5      6

I liked the procedures used in this intervention.

1      2      3      4      5      6

The child liked the intervention (i.e., reading the Social Story)

1      2      3      4      5      6

This intervention was a good way to handle this child's transition difficulties.

1      2      3      4      5      6

Overall, this intervention would be beneficial for the child.

1      2      3      4      5      6

Please leave any comments in the space below. Thank you!

Appendix F2

**Acceptability Rating –Student**

1. I liked reading the Social Story



2. Social Stories helped me do better at school



3. I would like to read Social Stories again in the future





Appendix G

**Individual Appropriateness of Social Stories -Checklist for Teachers**

After reading the Social Story, please check the appropriate box to indicate whether the statements below are true or false. Comment in the provided space.

1. The Social Story is appropriate for the student's reading level

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain) \_\_\_\_\_  
\_\_\_\_\_

2. The format of the Social Story is appropriate for the student's chronological age

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain) \_\_\_\_\_  
\_\_\_\_\_

3. The content of the Social Story is appropriate for the student's chronological age

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain) \_\_\_\_\_  
\_\_\_\_\_

4. Both content and format of the Social Story are appropriate for the student's individual preferences, interests, likes and dislikes

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain) \_\_\_\_\_  
\_\_\_\_\_

5. The Social Story has a positive and reassuring quality

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain) \_\_\_\_\_  
\_\_\_\_\_

Please leave any additional suggestions for modifications to the Social Story format and / or content below. Thank you!

\_\_\_\_\_

Appendix H

**Social Story –Expert Review Checklist**

1. The Social Story contains the following sentence types (indicate number of each type)

Descriptive \_\_\_\_\_

Perspective \_\_\_\_\_

Directive \_\_\_\_\_

Affirmative \_\_\_\_\_

Cooperative \_\_\_\_\_

Control \_\_\_\_\_

**Total Directive and/ or Control \_\_\_\_\_ / Total Other \_\_\_\_\_**

2. The Social Story incorporates the “Social Story ratio” of one directive sentence per two or more sentences of other types

\_\_\_\_\_ Yes

\_\_\_\_\_ No

3. All the descriptive sentences objectively describe the situation or concept

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain)

4. All the directive sentences identify an appropriate response and guide behavior

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain)

5. All the perspective sentences describe the reactions, feelings, and responses of others

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain)

6. All the affirmative sentences enhance the meaning by expressing values or opinions common in a given culture

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain)

7. All the cooperative sentences identify what others will do to assist

\_\_\_\_\_ Yes

\_\_\_\_\_ No (explain)

8. All the control sentences identify the individual's personal strategies to recall and apply information  
\_\_\_\_\_ Yes  
\_\_\_\_\_ No (explain)
9. Information in the Social Story present information in the first-person the third-person perspective  
\_\_\_\_\_ Yes  
\_\_\_\_\_ No
10. The Social Story has a title, an introduction, a main body, and a conclusion  
\_\_\_\_\_ Yes  
\_\_\_\_\_ No (explain)
11. The Social Story uses objective and positive language  
\_\_\_\_\_ Yes  
\_\_\_\_\_ No
12. The Social Story uses "flexible" vocabulary such as "sometimes", "usually", "possibly".  
\_\_\_\_\_ Yes  
\_\_\_\_\_ No

Provide additional comments in the space below. Thank you

## Appendix I1

### Jason's Social Story

Having Cash-out is Fun!

My name is Jason. I am 11 years old. I go to X School. My teachers are L and V. Sometimes, I have cash-out at school. A cash-out means a fun break. I can choose an activity for cash-out. Sometimes, I may choose computer. Other times, I choose a video game. Cash-outs usually last for 15 minutes. My teacher will set the timer before I begin. When the timer goes off, I will hear beeping noise. This means that cash-out is finished. My teacher may say "Jason, cash out is finished." Then, I will know that it is time to stop. I will try to walk to my seat quietly and remain calm. I will remember that there will be another cash-out. Then, I will check my schedule to see what's it time for next. I will quietly wait for the new activity. It's a good idea! L and V are happy when I am quiet and calm. They say "Good job, Jason"!

Comprehension Questions

What is cash-out? (A fun break)

Usually, how long is cash out? (15 min)

How should I walk to my seat when cash out is finished? (Quietly)

## Appendix I2

### **Kate's Social Story**

#### Learning and Playing at School

My name is Kate. I go to X School. My teachers are Ms. A and Ms. B. A school is a place where I learn and play. Sometimes, it is time to learn. Other times, it is time to play. My picture schedule will tell me what to do. Pictures for Work, Reading Mastery, and Language for Learning will tell me it is time to learn. I can choose the special things I can work for. If I work hard, I can earn 5 pennies. Then I can play with those special things during my break! Breaks are fun! Sometimes, my break is over. I will know that when my teachers says "*Kate, break is finished*". Then I will try to stop playing, put my toys away, and quietly walk to my seat. I can check my schedule. I can also ask my teacher what to do. This is a smart thing to do! Sometimes, I feel sad that the break is over. I may not want to say good-bye to my toys. It's ok. I will try to be quiet. I will remember that there will be another break later. Then I can play again! My teachers are happy when I am quiet and do a good job at school. They say: "Great job, Kate!"

#### Comprehension Questions:

Pictures for Work, Reading Mastery, and Language for Learning will tell me it is time for (learn)

How many pennies do I earn to take a break? (5 pennies)

When my break is over, how should I walk to my seat? (Quietly)

If I feel sad, what should I remember? (Break later)

## Appendix I3

### Greg's Social Story

#### Making Choices at School

My name is Greg. I go to X School. My teachers are Ms. D, Ms. S, and Ms. F. People have to make choices every day. Sometimes, I choose what to wear, what to play, and what to eat. Sometimes, I make choices at school. My picture schedule shows me what to do. When it's time for Work board, I see a picture that says "Work" on my schedule. I can choose what to do for Work board activity. There are many things I can choose for Work board Usually, I need to pick just one thing .For example, I can choose ABC sort, Elephant Puzzle, Number Sequence, Parquetry, or Straw Sort. If I don't like any of those choices, I can choose something else. This is ok! My teacher may ask me: "Greg, *what do you want to do?*" Choices are fun! But sometimes, choices can also be difficult. I may like all the choices. I may not like any. I may feel confused or angry - it's ok. I will try to remain calm and quiet. I will try to choose one thing for my Work board. I will quietly walk to my desk and begin working and playing. My teachers can help me. They will be very happy and proud of me when I am making choices. They say "Great job Greg!"

#### Comprehension Questions

When it is time for Work board, I see a picture that says (work)

When I have to make a choice for my Work board, I usually pick how many things (one)

After I make a choice, how should I walk to my seat? (Quiet)

## Appendix J1

### **Informed Consent Form**

This letter is to request your child's participation in a research study conducted by Anastasia Kokina, a doctoral candidate in Special Education at Lehigh University (PA). Your child was asked to participate based on the referral from \_\_\_\_\_. Below please find the information about the study that should help you make a decision regarding your child's participation. If you have any questions about the study, please contact the author of the study using the contact information below.

#### **Title of the Study:**

Social Story Interventions: Mechanisms of Change in Addressing Transition Difficulties of Students with Autism Spectrum Disorders (ASD)

#### **Purpose of the Study:**

The purpose of this study is to examine effectiveness of Social Story in addressing transition difficulties of students with ASD. It will specifically aim to determine whether the use of Social Stories will lead to improved behavior during transitions.

#### **Rationale for the Study:**

Many students with ASD have difficulties associated with transitions between activities, are inflexible, insist that things are done the certain way all the time, and get distressed if their routines are changed. This poses multiple challenges to parents and teachers who have to deal with transition difficulties on a daily basis. Social Stories are a well-known intervention, commonly used to improve social skills of students with ASD. Its other use, to describe routines and variations in those routines, and to prepare students for transitions, is much less explored. Although many teachers report using Social Stories to address transition difficulties of their students, only one published research study has addressed this use.

#### **Criteria for Inclusion:**

You child may be eligible to participate in the study if:

- He/ she has a high level of transition difficulties, as evidenced in challenging behaviors (protest, resistance, distress, screaming, aggression), when presented with the need to introduce changes into existing routines
- Those difficulties are associated with one of the following:
  - o Interruption of the current activity and leaving it unfinished before moving to a new
  - o A new event or activity introduced into the existing sequence
  - o Changes introduced into the established order of activities or events
- He/she has an full-scale and verbal IQ of 70 and above
- He/ she can comprehend a story

### **Procedures**

- The study will be conducted in your child's school
- One Social Story will be created to address transition difficulties of your child. It will describe the transitional situation, the possible variations in this situation, and explain its meaning.
- Social Stories will be read to your child/student every day
- The child's records will be reviewed prior to the study; specifically, child's age and IQ will be used in the study.
- Behavior of the child/ student will be recorded using a video camera
- This will happen on a daily basis
- Also, observation will be conducted once after the intervention is discontinued
- Finally, the teacher will conduct an audio recording of the daily readings of Social Stories.
- The total expected time of the intervention will range between 2-4 weeks
- Each reading of a Social Story with the student/ child will take about 5-10 min per day

### **Benefits and compensation**

- You/ your child will receive a gift (a \$20 gift card from the store of your choice) contingent on your child's participation in the study
- Benefits for your child should be increased flexibility and coping skills, decreased anxiety, and increased participation in a variety of daily situations.



- Your participation and participation of your child in the study should lead to the increased scientific knowledge related to transition difficulties of children with ASD, and will help other families and teachers develop effective interventions to address those difficulties

### **Risks**

There are no risks anticipated in relation to this study. If the child experiences any discomfort during the reading of a Social Story, the task will be immediately discontinued.

### **Confidentiality**

By agreeing to participate in this study, you will grant your permission to review the student's records and to conduct a video recording of his/ her behavior. The records of this study will be kept private. In any sort of report we might publish, no identifying information will be included. Research records and video tapes will be stored under a lock in a locked office, and only the primary investigator will have access to the records. Video and audio recordings will be coded by graduate students in Special Education or School Psychology, who will be unaware of any identifying participant information and will not disclose any information related to the assessment. All video and audio records will be destroyed 3 years after the completion of the study.

### **Voluntary participation**

Your decision to participate is completely voluntary; you may also withdraw from the study at any time.

### **Contacts and Questions**

The researchers conducting this study are Anastasia Kokina, M.Ed. and Lee Kern, Ph.D. If you have questions, **you are encouraged** to contact the Principal Investigator Anastasia Kokina at 610-758-6939 or by email [ank205@lehigh.edu](mailto:ank205@lehigh.edu). Please feel free to contact the Co-Principal Investigator Dr. Lee Kern at [lek6@lehigh.edu](mailto:lek6@lehigh.edu).

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact to Ruth Tallman or Susan Disidore at (610) 758-3021 (email: [inors@lehigh.edu](mailto:inors@lehigh.edu)) of Lehigh University's Office of Research and Sponsored Programs. All reports or correspondence will be kept confidential.

## Statement of Consent

I have read the above information. I have had the opportunity to ask questions and have my questions answered. I consent to participate in the study.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of parent or guardian: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

Appendix J2

**Informed Assent Form**

I agree to participate in the study “Social Story Interventions: Mechanisms of Change in Addressing Transition Difficulties of Students with Autism Spectrum Disorders” conducted by Anastasia Kokina at Lehigh University (PA). The goal of the study is to help children with ASD be more flexible and cope with difficult situations.

As part of this study, my teacher will read a Social Story to me once a day. This session will be audio recorded. During the study, some parts of my school day will be video recorded.

All information in this study will remain confidential. It means that all the records will be kept safe under the lock and my name will never be mentioned in any reports associated with this study.

Student (verbal) \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of witness: \_\_\_\_\_ Date: \_\_\_\_\_

**Anastasia Kokina**  
415 Brighton St., Apt. 11, Bethlehem, PA 18015  
[ank205@lehigh.edu](mailto:ank205@lehigh.edu)

**EDUCATION**

January 2012 (anticipated)	Ph.D.	Lehigh University Special Education Advisor: Dr. Lee Kern
2003	M.Ed.	Rutgers, the State University of New Jersey Social and Philosophical Foundations of Education
2000	B.A.	Ivanovo State University (Russia) Linguistics and Foreign Languages Education Teacher certification
1999	Diploma	Ivanovo Teacher Training Institute ( Russia) Educational Psychology

**PROFESSIONAL EXPERIENCE**

08/2011 – present	Graduate Research Assistant for Dr. Bambara
09/2009 – 08/2011	Graduate Assistant, Autism Service, Education, Research, and Training (ASERT) Regional Center at Lehigh University; funded by the PA Bureau of Autism Services, a collaborative project of Lehigh University, University of Pennsylvania, and Drexel University; Supervisors: Dr. Bambara and Dr. Cole  <u>Responsibilities:</u> participated in development, implementation, and evaluation of a tiered training model on Positive Behavior Support for service providers and families; participated in development of a manual for service providers on employment and community inclusion for adults with autism; participated in research study involving review of the intervention literature on community inclusion of adults with autism
09/2006 – 08/ 2009	Graduate Assistant, Project REACH, National Survey for Students with Intensive Social, Emotional, and Behavioral Needs; funded through the Department of Education, Office of Special Education Programs; Supervisor: Dr. Kern

Responsibilities: conducted phone interviews of State Directors of Special Education in the 50 states to identify effective programs nationwide; conducted phone interviews of directors of programs for students with emotional and behavioral disorders to evaluate programs and select the final pool for site visits; conducted site visits to five effective programs for students with emotional and behavioral disorders to provide detailed case studies

09/ 2005 – 06/ 2006

Graduate Research Assistant, Project ACHIEVE, a five-year longitudinal study funded by the National Institutes of Mental Health for children with Attention Deficit Hyperactivity Disorder and their parents; Supervisors: Dr. Kern and Dr. DuPaul

Responsibilities: conducted and scored standardized and criterion-based assessments and observations of children with ADHD in early education settings and in the homes; assisted with data entry

10/ 2003 – 07/ 2005

Educational and Training Programs Assistant, National Society for the Prevention of Cruelty to Children, the Assistance to Russian Orphans (ARO-2) program (USAID-funded program), Moscow, Russia

Responsibilities: participated in development and implementation of professional training and educational programming for grantees and program partners; coordinated logistics and administration of seminars, trainings, and conferences in five Russian regions on issues of child abandonment prevention (children with disabilities, families in crisis, integration, foster families); in a 10-month period, provided 54 training, educational, and professional internship opportunities for over 740 participants

01/ 2003 – 07/ 2003

Program Assistant, The Russian Children's Welfare Society (non-profit organization assisting disadvantaged Russian children) New York, NY

Responsibilities: participated in implementation of educational programs; conducted research for the scholarship program for disadvantaged Russian children; wrote a proposal for the program that solicited initial funding of \$10,000

05/ 2002 – 08/ 2002

Teacher Assistant, Douglass Developmental Disabilities Center,

New Brunswick, NJ

Responsibilities: taught adolescents and young adults with students with autism using methods of Applied Behavior Analysis; provided individual instruction to a student with autism; assisted staff in all aspects of work with students

02/ 1999 – 05/ 2001

Child Psychologist, Center of Psychological Help for Family and Children, Ivanovo, Russia

Responsibilities: conducted group social skills training for children with ADHD; worked with a group of children with autism and Down syndrome; conducted individual consultations for parents of children with ADHD / Emotional and Behavioral Disorders; developed and implemented class management seminars for teachers of students with behavioral difficulties

**Additional experience:**

2008

Research assistant for fellow graduate student's dissertation research, Easton School District, PA

Responsibilities: assessed competence in mathematics of young children in kindergarten classrooms

2008

Research assistant for fellow graduate student's dissertation research, Easton School District, PA

Responsibilities: conducted behavioral observations of four elementary and middle school students with Emotional Behavior Disorders in behavior support classrooms

2007-2008

Research assistant for fellow graduate student's dissertation research, Allentown School District, PA

Responsibilities: conducted assessment of choice-making with elementary-aged children with and without disabilities in general and special education classrooms

**TEACHING EXPERIENCE**

**Graduate classes:**

Summer 2010

Autism Spectrum Disorders, guest lecturer for Dr. Brenna Wood, Lehigh University

Fall 2008	Applied Behavior Analysis, Fall 2008 co-taught with Dr. Christine Cole, Lehigh University
Fall 2008	Assessment of Individuals with Disabilities, co-taught with Dr. Nanette Fritschmann, Lehigh University
Fall 2008	Advanced Methods for Inclusion, co-taught with Dr. Natalie Sokol, Lehigh University
Fall 2008, 2007	Diversity and Multicultural Perspectives, guest lecturer for Dr. Iveta Silova, Lehigh University
Fall 2007	Academic and Curricular Strategies for Individuals with Disabilities, co-taught with Dr. Nanette Fritschmann, Lehigh University
Spring 2006	Education and Inclusion of Individuals with Disabilities, co-taught with Dr. Emily Solari, Lehigh University

**Professional development trainings:**

January – June 2010	Instructor: Positive Behavior Support Team Leader Training, series of trainings for service providers working with individuals with autism, ARCH of Lehigh Valley
January – March 2010	Instructor: Series of trainings on Positive Behavior Support and Functional Behavior Assessment for parents of children with autism, ARCH of Lehigh Valley

**GRANTS AND AWARDS**

2011	ASSSIST (Autism Spectrum Social Stories in Schools Trial) grant; Co-applicant with researchers at Hull York Medical School (UK) Health, Technology, Assessment Program of the National Institute for Health Research (£530,937)
2010-2011	Global Supplementary Grants Program, Open Society Institute (\$4,000)
2009-2010	Global Supplementary Grants Program, Open Society Institute (\$1,500)
2009	Graduate Student Senate Travel Grant, Lehigh University (\$150)
2008-2009	Global Supplementary Grants Program, Open Society Institute (\$5,000)

- 2005 SCOUT Special Project Grants, a program of the Bureau of Educational and Cultural Affairs of the US Department of State and Open Society Institute for Publication, Presentation and Distribution of Methodology Manuals on Contemporary Methods of Intervention for Children with Autism (\$6,000)
- 2001-2003 Muskie /FSA Graduate Fellowship, a Program of the Bureau of Educational and Cultural Affairs of the U.S. Department of State (stipend, tuition and fees, and travel funds to support graduate studies during 2 years at Rutgers University)

## **PUBLICATIONS**

- O'Dell, S., Vilaro, B., Kern, L., Kokina, A. et al. (2010). Journal of Positive Behavioral Interventions ten years later: An analysis of critical PBS features in intervention studies. *Journal of Positive Behavioral Interventions, online first.*
- Kokina A., & Kern, L. (2010). Social Stories for students with Autism: A meta-analysis. *Journal of Autism and Developmental Disorders, 40 (7), 812-826.*
- Kern, L. & Kokina, A. (2008). Using positive reinforcement to decrease challenging behavior. In J. K. Luiselli, D. C. Russo, & W. P. Christian (Eds.): *Effective Practices for Children with Autism: Educational and Behavior Support Interventions that Work*. New York: Oxford University Press.
- Kokina, A. (2003). Individualized instruction of ADHD students as a component of the American and Russian teachers' professional skills. In V.P. Gryshin (Ed.), *Professional skills*. Chelyabinsk, 73-81 (in Russian).
- Kokina, A. (2000). The influence of teacher – student communication on ADHD students' classroom behavior. *Young Science, 3, 226-228 (in Russian).*
- Esenina, E., Shtrygal, D., & Kokina, A. (1998). Psychotherapy and correction of Attention-Deficit Disorder. *Psychology and practice, 4 (2) (in Russian).*

## **Manuscripts in progress**

- Bambara, L., Cole, C., Kokina, A., Kunsch, C., McCurdy, E., Papay, C, (in preparation). Interventions for Adults with Autism: A synthesis and evaluation of research
- Kokina, A. & Kern, L. (in preparation). Social Story interventions for students with Autism Spectrum Disorders: A teacher survey.
- Kokina, A., Kern, L., & Panahon, A. (in preparation). Effective programs for students with Emotional and Behavioral Disorders (EBD): Stakeholders' Perspectives.



## CONFERENCE PRESENTATIONS

- Bambara, L., Kokina, A., & Papay, C. (December, 2010). Got teams? A training model to develop teaming in Positive Behavior Support. Presented at TASH 35<sup>th</sup> Annual Conference, Denver, CO
- Kokina, A. (November, 2010). Social Stories for students with Autism: A meta-analysis. Invited presentation at Autism2010 – AWARES international online autism conference
- Bambara, L., McCurdy, E., & Kokina, A. (June, 2010). Community inclusion of adults with autism: A review of the intervention literature. Presented at the National Conference of Autism Society of America, Dallas, TX
- Kokina, A., & Kern, L. (June, 2010). Social Stories for students with Autism: A meta-analysis and teacher survey. Presented at the National Conference of Autism Society of America, Dallas, TX
- Kokina, A., & Kunsch, C. (May, 2010). Collaborative teaming in PBS: Development of and reflections from training for professionals. Presented at the Autism Training Conference of the State Bureau of Autism Services, Lancaster, PA
- Kokina, A., Kern, L., State, T., & Panahon, A. (March, 2010). Effective programs for students with Emotional and Behavioral Disorders: Stakeholders' perspectives. Presented at the Seventh International Conference on Positive Behavior Support, St. Louis, MO
- Kokina, A., & Kern, L. (April, 2009). Social Stories for students with autism: A meta-analysis and teacher survey. Presented at the Council for Exceptional Children Annual Convention and Expo, Seattle, WA
- Kern, L., Vilardo, B., O'Dell, S., Kokina, A., & Carr, T. (March, 2009). JPBI ten years later: An analysis of critical PBS features in intervention studies. Presented at the Sixth International Conference on Positive Behavior Support, Jacksonville, FL
- Kokina, A. & Kern, L. (March, 2009). Social story interventions for students with autism. Presented at the Sixth International Conference on Positive Behavior Support, Jacksonville, FL
- Hilt-Panahon, A., Kokina, A., & Kern, L. (November, 2008). Services for students with EBD: A national survey of promising practices. Presentation at the Teacher Educators for Children with Behavior Disorders Conference, Tempe, AZ
- Hilt-Panahon, A., Kokina, A., & Kern, L. (March, 2008). Services for students with EBD: A national survey of promising practices. Presented at the Fifth International Conference on Positive Behavior Support, Chicago, IL
- Kokina, A. & Esenina, E. (April, 2001). Teacher training and its influence on teacher – ADHD student interactions. Presented at Ivanovo State University's conference of young researchers, Ivanovo, Russia.

Kokina, A. & Esenina, E. (April 2000). Teacher – student interactions and their influence on school achievement and behavior of students with ADHD. Presented at Ivanovo State University’s conference of young researchers, Ivanovo, Russia

Esenina, E., Shtrygal, D., & Kokina, A. (1999). Psychotherapy and correction of Attention-Deficit Disorder. Presented at the meeting of the Russian Psychological Association, Yaroslavl, Russia

Kokina, A., & Esenina, E. (1999). Individual differences of ADHD students. Presented at Ivanovo State University’s conference of young researchers, Ivanovo, Russia

## **SERVICE**

Reviewer for *Journal of Autism and Developmental Disorders* and for *European Education*  
Graduate Student Senate representative (Lehigh University, 2008-9)