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**Mitigate and Cope: A Context-based Approach to Intervention for Problem  
Behavior in Home and Community Settings**

A Dissertation Presented

by

**Mara Victoria Ladd**

to

The Graduate School

in Partial Fulfillment of the

Requirements for the Degree of

**Doctor of Philosophy**

in

**Clinical Psychology**

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Abstract of the Dissertation

**Mitigate and Cope: A Context-based Approach to Intervention for Problem**

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Problem behavior is a major barrier to good quality of life for families who have children with developmental disabilities. Therefore, much research has focused on identifying the contextual factors associated with such behavior so that interventions can be systematically developed. The present study explored whether interventions aimed at mitigating problematic contexts and teaching skills to effectively cope with these contexts would result in a reduction in problem behavior and an overall improvement in family quality of life. Nine children with developmental disabilities (Autism Spectrum Disorder or Down Syndrome) who displayed problem behavior participated. The Contextual Assessment Inventory (CAI) was administered to parents of the participants to identify multiple problem contexts at home. Intervention techniques were then developed collaboratively with parents to mitigate the context or teach the child to effectively cope with the context. A multiple baseline experimental design was used to demonstrate intervention effects for specific high priority contexts. Subsequent to the experimental demonstration, a clinical extension of the intervention methodology was applied to the remaining problem contexts. Following intervention, there were significant improvements in problem behavior, activity completion, and overall family quality of life. We discuss the value of conceptualizing problem behavior as a function of context with respect to facilitating assessment and increasing the number of available intervention options.

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## Introduction

Children with autism and other developmental disabilities frequently engage in problem behaviors such as aggression, tantrums, and self-injury. Prevalence studies of these behaviors have indicated rates that vary from 10% to 89% of the population (Emerson et al., 2001; Qureshi & Alborz, 1992). Problem behavior has been shown to be among the leading causes of institutionalization and reinstitutionalization (Bruininks, Hill, & Morreau, 1988). It has also been associated with social rejection and exclusion from neighborhood schools (Koegel, Koegel, & Dunlap, 1996) and, in adulthood, has been a major barrier to successful employment (Bruininks et al., 1988). Such behavior has also been associated with increased stress and lower quality of life for family members (Lucyshyn, Dunlap, & Albin, 2002). For all these reasons, much research and clinical effort has focused on developing interventions. Importantly, the published literature has demonstrated that intervention is about twice as likely to succeed if it is based on a careful assessment of the factors controlling problem behavior than if it is not (Carr et al., 1999; Didden, Duker, & Korzilius, 1997). Therefore, linking assessment with intervention has become a best practice in the field.

Linkage has been facilitated by using a conceptual model, first proposed by Skinner (1938) and Kantor (1959), referred to as the four-term contingency. This model, extended to the realm of applied behavior analysis by Bijou and Baer (1961) and later, by Michael (1982), delineates how context (setting events and discriminative stimuli) and consequences (reinforcers) interact to control behavior. A discriminative stimulus is an event in whose presence a response is reliably reinforced (Skinner, 1938). The presence of a discriminative stimulus thus predicts that reinforcement will occur contingent on

performance of the response. Therefore, the response is more likely to be exhibited (triggered) in the future whenever the discriminative stimulus is present. A setting event is a variable that alters ongoing discriminative stimulus-response relationships (Bijou & Baer, 1961; Kantor, 1959). Specifically, an individual's response to a given discriminative stimulus may differ depending on the presence or absence of a setting event. This model can be illustrated by considering the following elements that constitute the four-term contingency: a setting event (physical illness), a discriminative stimulus (demand from a parent, "You need to take a bath"), a behavior (aggression), and a consequence (demand withdrawn when the child becomes aggressive). Observation may show that aggression is closely associated with a particular context (physical illness plus bath demands) but not other contexts (e.g., absence of illness and/or absence of bath demands). In this example, the setting event (illness) is thought to function as an "establishing operation" (Michael, 1982), that is, a variable that increases the aversiveness of the demand, thereby strengthening any behavior (e.g., aggression) that reliably allows the child to escape from having to comply with the demand. In other words, aggression is negatively reinforced to a greater degree when the setting event is present than when it is not. Hence, over time, escape-motivated aggression becomes more and more closely associated with a particular context (illness plus bath demands). This example makes clear how "problem contexts" may be created through the influence of a four-term contingency. The critical role that context plays in the control of problem behavior has been increasingly recognized by researchers in the field (Luiselli & Cameron, 1998; McGill, 1999; Smith & Iwata, 1997) and is, in fact, the basis for the central idea of the present series of studies: *Problem contexts produce problem behavior;*

*therefore, by focusing intervention efforts on problem contexts, we should be able to reduce or eliminate problem behavior.*

There is an emerging research literature that suggests the value of focusing on contexts. For example, Clarke, Dunlap, and Vaughn (1999) designed a context-based intervention to improve the behavior of a 10-year-old boy diagnosed with Asperger's Disorder during the morning routine of getting dressed. Assessment revealed that the boy exhibited problem behavior such as tantruming when given demands or a time limit to complete an activity. The investigators incorporated interventions such as a visual schedule depicting the morning tasks, modifications to the child's clothing to make getting dressed less time consuming, and a choice chart to allow the child the opportunity to pick a preferred reinforcer once the routine had been completed. Implementation of this context-based intervention resulted in a significant reduction in disruptive behavior and improvement in routine completion. Similarly, Vaughn, Dunlap, Fox, Clarke, and Bucy (1997) designed a context-based intervention to address problem behavior exhibited by a 9-year-old boy diagnosed with Cornelia DeLange Syndrome. These behaviors occurred while waiting in line at the bank, at a restaurant, and at a store. Interventions, such as providing noncontingent access to preferred toys and developing schedules that included pictures depicting the routine, significantly decreased problem behavior across all three settings.

Clearly, a context-based approach to problem behavior, carried out on a case-by-case basis, shows much promise as an intervention strategy. However, research has also demonstrated that the number of potential contexts associated with problem behavior is extremely large (see Luiselli & Cameron, 1998). Therefore, from the standpoint of

efficiency, it may be useful to group contextual factors into categories that can then be explored more systematically. Most researchers describe one category of biological variables and one or more categories of environmental variables (e.g., Carr, Reeve, & Magito-McLaughlin, 1996). The three categories of context most thoroughly discussed in the literature (McAtee, Carr, & Schulte, 2004; Carr, Ladd, & Schulte, in press) are activities/routines (e.g., disliked activities), social (e.g., being reprimanded), and biological (e.g., medication side effects). Clearly, given the multiplicity of problem contexts, it would be particularly useful to develop a generic strategy that could be applied across contexts, with appropriate modifications, to address the specifics of each context directly. In response to this need, the purpose of the present series of studies was to develop a systematic approach to assessment and intervention for problem behavior in home and community contexts that consisted of two generic strategies: *mitigate* and *cope*.

Mitigate and cope have one common element: They both involve the introduction of stimuli that evoke nonproblem behavior that, in turn, compete with those stimuli inherent in the problem context that evoke problem behavior. The nature of mitigate and cope is, of course, tailored to the specifics of the problem contexts being modified with the result that many intervention variations can be generated.

In illustration, mitigation can include introducing stimuli for nonproblem behavior using strategies involving (but not limited to): behavioral momentum, visual activity schedules, embedding, and visual representations of time (i.e., timer, calendar). Behavioral momentum is a procedure in which the presentation of difficult tasks is interspersed among easy tasks. This strategy allows the individual to experience success before attempting challenging (difficult) tasks and leads to a reduction in problem

behavior (Ducharme & Worling, 1994). Visual activity schedules involve visual representation of activities that will occur throughout the day. These are reviewed with the individual and then posted. The added predictability in the individual's daily schedule is associated with reductions in problem behavior (Schmit, Alper, Raschke & Ryndak, 2000). Embedding involves providing access to preferred activities intermixed with disliked activities. This mitigation strategy has been shown to be associated with significant decreases in problem behavior of individuals with developmental delays (Blair, Umbreit, & Bos, 1999). Visual representation of time has been shown to be a useful tool for increasing predictability and decreasing problem behavior in individuals with developmental disabilities (Dettmer, Simpson, Myles, & Ganz, 2000).

In the case of mitigation, it is the *adult* (e.g., parent, teacher) who acquires skills that result in the introduction of stimuli for nonproblem behavior that compete with the stimuli associated with problem behavior in a given context. In the case of coping skills, in contrast, it is the *child* who acquires skills that eventually result in the introduction of stimuli for nonproblem behavior in a given context. In illustration, a child could cope with a problem context by acquiring skills involving (but not limited to) communication (Carr & Durand, 1985), relaxation (Mullins & Christian, 2001), and choice (Bambara, Koger, Katzer, & Davenport, 1995). Each of these skills can impact the problem context by eventually generating stimuli for nonproblem behavior. For example, a child who communicates "It's too noisy" in response to a loud environment may influence his/her parent to alter the problem context (e.g., by lowering the sound level or moving the child to a quieter setting thereby providing new stimuli that evoke appropriate, nonproblem behavior). At a conceptual level, every mitigate and/or cope procedure has one thing in

common: The procedure introduces, into the problem context, directly or indirectly, stimuli that evoke nonproblem behavior.

### *Overview*

Three studies were conducted to assess problem contexts and develop interventions for three generic categories of contexts associated with problem behavior. Each study involved three participants. The first study focused on contexts involving common activities and routines; the second, on social contexts; and the third, on biological contexts. Within each generic category, one specific priority context was identified for each of three different participants. Within the activity and routine category, the specific priority contexts identified were: (1) transitions between activities and settings, (2) termination or lack of access to a preferred activity, and (3) activities or routines that are difficult, frustrating, disliked, or boring. Within the social category, the specific priority contexts identified were: (1) parental denial of access to what the child wants, (2) lack of attention from parents, peers, or others, and (3) recent history of being disciplined or reprimanded. Within the biological category, the specific priority contexts identified were: (1) medication side effects, (2) feeling frightened, worried, anxious, or agitated, and (3) feeling hungry or thirsty.

Each of the three studies had six components. First, participants were selected based on predetermined inclusion criteria. Then, many specific contexts were identified for each participant by his/her mother using the Contextual Assessment Inventory (discussed shortly). A list of *priority* contexts was then constructed; detailed information on the specific highest priority context was gathered; functional hypotheses were developed; and global measures of family quality of life were administered. Second,

baseline sessions (direct observation) were conducted to confirm the presence of problem behavior in the identified highest priority context. Third, an intervention package was developed, collaboratively, with each set of parents, based on the assessment information. The intervention agents (parents) were trained to implement the package. *Although many intervention options were possible across various contexts, and even for the same context, the intervention options eventually selected were the ones endorsed by parents, during a collaborative problem-solving process, in which parents identified those options that they perceived were best suited to the unique characteristics of their family situation.* Fourth, the intervention package was delivered; intervention fidelity checks were conducted to assess the integrity of intervention implementation; and data were collected (direct observation) on behavioral outcomes. Fifth, interventions were developed and implemented in an additional two to five contexts (i.e., “clinical extension”) identified by parents as negatively impacting family quality of life, and intervention fidelity was assessed in these contexts as well. It is important to note that for each participant in each of the three studies, the experimental context reflected one of the three generic contexts of interest (i.e., activity, social, or biological). However, the clinical extension contexts could be selected from any or all of the three generic context categories. Sixth, the global measures of family quality of life were administered again.



## STUDY 1: ACTIVITIES AND ROUTINES AS A CONTEXT FOR PROBLEM BEHAVIOR

### Method

#### *Overview*

Participants, who were identified by a local agency that served individuals with developmental disabilities, were required to meet the following inclusion criteria: (1) diagnosis of a developmental disability made by a psychiatrist, psychologist, and/or neurologist, (2) currently residing at home with family of origin, (3) history of problem behavior (e.g., aggression, self-injury, property destruction, tantrums, noncompliance) in the home and/or community as confirmed by clinically significant scores on the Irritability subscale (that focuses on serious problem behavior) of the Aberrant Behavior Checklist - Community (ABC-Community, Aman & Singh, 1994; Appendix A), (4) the family reported that problem behavior restricted family lifestyle (e.g., family was unable to engage in typical home and community activities or complete normal daily routines), and (5) the child and parent had to be available to participate in sessions two times a week.

The Contextual Assessment Inventory for Families (CAI), a short version of the CAI for adults with developmental disabilities (McAtee, Carr, & Schulte, 2004; Carr, Ladd, & Schulte, in press; Appendix B) was administered to each participant's parents to make a preliminary identification of contexts associated with problem behavior. The CAI is a 24-item inventory that assesses the association between contexts and the display of problem behavior. Each context item is rated on a 5-point Likert scale ranging from "not likely" to "very likely" to be associated with problem behavior. Items on the CAI that

parents nominated as “very likely” to be associated with problem behavior (i.e., a score of 4 or 5 on the 5-point Likert scale) were subsequently targeted during the intervention phase. From the lists of items nominated as “very likely,” families were asked to select one item that constituted their top priority. In other words, they were asked to nominate the context that produced the greatest disruption for the family and harmed quality of life the most.

To measure overall family quality of life, we asked families to complete several additional questionnaires both pre- and post-intervention. Specifically, the assessment questionnaires included the Irritability subscale of the ABC-Community that measured global perception of the level of serious problem behavior; the Resident Lifestyle Inventory (Kennedy, Horner, Newton, & Kanda, 1990; Appendix C) that measured family involvement in community events such as attending religious services, going to a movie, attending family outings, visiting friends, etc.; the Home Situations Questionnaire (Barkley, 1981; Appendix D) that measured the extent to which the child’s problem behavior disrupted common home situations such as mealtime, bathtime, etc.; the Parental Locus of Control Scale (Campis, Lyman, & Prentice-Dunn, 1986; Appendix E) that measured the degree to which parents felt in control of their children; and the Parenting Stress Index (Abidin, 1997; Appendix F) that measured the amount of stress that parents felt in their daily lives.

For each of the families, a follow-up assessment was carried out, based on the results of the CAI, using the format described by O’Neill, Horner, Albin, Storey, and Sprague (1997; Appendix G). The purpose of this follow-up assessment was to identify, in greater detail, the specific events and situations that predicted the occurrence of

problem behavior in the top priority (experimental) context. For example, if a family nominated “transitions between settings or activities” as the most problematic context, follow-up questions assessed the specific activity involved in the transition (e.g., leaving the house to go to run errands in the community), with whom problem behavior was most likely to occur during this transition (e.g., mother), in what setting this transition was most likely to be associated with problem behavior (e.g., from home to car), the time of day that this transition was most likely to be associated with problem behavior (e.g., after school), the parental response to the problem behavior (e.g., family stayed home or made arrangements for someone to stay at home with child while the errand was run), and, finally, the child’s reaction to the parental response (e.g., child no longer displayed problem behavior). These follow-up questions produced detailed assessment information useful in developing a multicomponent intervention package.

For each of the families, baseline observations were conducted in the identified (top priority) context. Recall that this situation was referred to as the experimental context and distinct from the clinical extension contexts described shortly. Baseline observations were conducted to assess the number of task steps successfully completed in that context, latency to problem behavior, and session duration. After baseline observations had been completed, parents met with the first author to develop context-based interventions.

Following guidelines for best practice, parents were included in creating context-based interventions for their child (e.g., Lucyshyn, Albin, & Nixon, 1997; Vaughn et al., 1997) since they are most knowledgeable about what is feasible within their particular family situation. A problem-solving approach to intervention development was used

(D’Zurilla & Nezu, 2001; Stiebel, 1999). During a single session, family members and the researchers worked their way, systematically, through a problem-solving template (Appendix H) applied to each context of interest. The final list of intervention strategies developed can be found in Appendix I (discussed shortly). In illustration, during the problematic context of transitions between the home and the family van, one family suggested that their child walk to the family van with his handheld videogame. They noted that their child almost always displayed appropriate behavior in the van when given the opportunity to use the game. Therefore, we incorporated that discriminative stimulus for appropriate behavior (i.e., the handheld videogame) into the problematic context of transitioning to the van. In sum, because this strategy represented a good fit to the typical family routine, it was included as part of the intervention.

The intervention strategies discussed involved both mitigation and coping procedures. Mitigation strategies were defined as procedures in which *parents* were taught to introduce stimuli associated with appropriate (nonproblem) behavior into the problematic context. Coping strategies were defined as procedures in which the *child* was taught to behave in a way that resulted in the introduction of stimuli associated with appropriate behavior into the problematic context. Another important element of the intervention design involved efforts to determine whether each suggested intervention was compatible with existing family ideals, values, and goals (Albin, Lucyshyn, Horner, & Flannery, 1996), that is, the goodness-of-fit of the intervention (described shortly).

Following the problem-solving session, the parents of each child were trained to implement each component. Typically, training was 1 to 2 sessions in duration. Decision

rules as to when training with the researcher was to be discontinued are shown in Appendix J and described in detailed later.

A multiple baseline design across the three participants (Hersen & Barlow, 1976) was carried out to examine the impact of mitigation and coping strategies on problem behavior that occurred during problematic (experimental) activities and routines. After each family had successfully run three intervention sessions without researcher assistance, an independent variable integrity check was conducted by the researcher. Once each family had successfully implemented all interventions in the experimental context, other contexts that had been identified as “very likely” to be associated with problem behavior were reviewed and selected, in consultation with the parents, for inclusion in the clinical extension phase of the study. Problem-solving techniques (described previously) were employed with each family and additional mitigation and coping strategies were developed. Families were trained to implement these strategies in the same manner as in the experimental context; however, no data were taken on measures of latency to problem behavior or duration of session. This procedure was followed since families, in previous research, had informed us that detailed data taking in multiple contexts was disruptive to family life and not acceptable to them. However, intervention integrity measurements were taken at two randomly chosen points in time. It is important to note that interventions continued to be implemented in each experimental context while clinical extension contexts were identified and intervened upon. Once intervention integrity data were collected during two sessions for each clinical extension context, the entire intervention was considered to have been completed and the CAI as well as all ancillary quality of life measures were administered to each family.

As noted for the three children in Study 1, each set of parents identified one priority (experimental) context to be included in the intervention. The contexts were: for John, “transitions between settings or activities,” for Gregory, “when a preferred activity ends or is no longer possible,” and for Robert, “routines or activities that are difficult, frustrating, disliked, or boring.”

### *Participant and Context Selection*

#### *Participant 1: John*

John was a 6-year-old boy diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) (estimate of Mild Mental Retardation using DSM-IV-TR narrative criteria), who was placed in a special education class and lived at home with his mother, father, older brother, and maternal grandmother. He communicated through the use of complete, short sentences. On the CAI, his parents identified “transitions between settings or activities” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, John’s parents indicated that John was most likely to exhibit problem behavior at home when asked to transition from home to community settings. Specifically, his parents reported that John frequently engaged in problem behavior (e.g., tantrums, aggression) when asked to leave the house to run errands with his parents after returning home from school. Typically, the family would alter their plans and either stay home or have John stay at home with his grandmother while his parents left the house. Once plans were changed; that is, the parents withdrew the demand to leave the house, John no longer displayed problem behavior. Therefore, it was hypothesized that John’s problem behavior served an escape function.

*Participant 2: Gregory*

Gregory was a 3.5-year-old boy diagnosed with PDD-NOS (estimate of Mild Mental Retardation using DSM-IV-TR narrative criteria), who received early intervention services through a local agency for children with developmental disabilities and also attended an after-school program with typically developing peers. He lived at home with his mother and his maternal grandparents. He communicated through the use of single words and gestures. On the CAI, his mother identified “when a preferred activity ends or is no longer possible” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Gregory’s mother indicated that Gregory was most likely to exhibit problem behavior when car rides (the preferred activity) ended. Specifically, his mother reported that Gregory engaged in problem behavior (e.g. tantrums, noncompliance) when asked to get out of his mother’s car when he arrived home after he was picked up from his after-school program. In response to his problem behavior, Gregory’s mother would often engage in a physical struggle with him that would ultimately result in him being able to stay in the car longer. At that point, his problem behavior stopped. Therefore, it was hypothesized that Gregory’s problem behavior functioned to obtain an activity reinforcer (access to car rides).

*Participant 3: Robert*

Robert was a 5-year-old boy diagnosed with Autistic Disorder (Full Scale IQ = 49, Leiter International Performance Scale – Revised), who was placed in a special education kindergarten class and lived at home with his mother, father, and younger brother. Robert was nonverbal and communicated through the use of gestures and limited

use of a Picture Exchange Communication System (Bondy & Frost, 1994). Robert was also diagnosed with ulcerative colitis, an acute or chronic inflammation of the membrane lining the colon. On the CAI, Robert's parents identified "activities or routines that are difficult, frustrating, disliked, or boring" as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Robert's parents indicated that Robert was most likely to exhibit problem behavior at home during the dinnertime routine. Specifically, his parents reported that Robert often engaged in problem behavior (e.g., tantrums, aggression, self-injury) when asked to eat disliked foods at the kitchen table with his family. Food selectivity has been shown to be a common difficulty in children diagnosed with developmental disabilities (Levin & Carr, 2001; Williams, Gibbons, & Schrek, 2005). In response to his problem behavior, Robert's parents would withdraw the disliked food, make a separate meal for him, and follow him around the house in order to feed him. At that point, his problem behavior stopped. Therefore, it was hypothesized that Robert's problem behavior served an escape function (i.e., termination of disliked meals).

#### *Baseline Observations*

During this component, the investigator, and when possible, a second observer (e.g., the child's parent) directly observed the contexts identified by the CAI and follow-up assessment to confirm the occurrence of problem behavior. A task analysis was developed to measure each child's completion of the problematic context. Recall that John's priority problem context was "transitions between settings or activities." Thus, for John, the sequence of transition steps was defined as follows: (1) John prepared to leave the house (e.g., put on shoes, coat); (2) John exited the house; (3) John entered the family



van; and (4) John did not engage in problem behavior for at least 3 min in the van. For Gregory (problem context, “when a preferred activity ends”), upon termination of the car ride, the sequence of steps was defined as follows: (1) Gregory exited the car within 1 min after his mom opened up his door and asked him to exit; (2) Gregory walked up his driveway; and (3) Gregory entered his house. For Robert (problem context, “activities that are disliked”), the sequence of dinnertime routine steps was defined as follows: (1) Robert came to the dinner table within 3 min of being called; (2) Robert independently fed himself; and (3) Robert ate at least ½ of the meal prepared.

To ensure the safety of the child and the parent, we terminated a session contingent upon the display of problem behavior defined as either: (1) the occurrence of a single instance of “untolerated” problem behavior, namely, aggression (i.e., kicking, hitting, dropping to the floor) or self-injury (i.e., hitting head, biting hand), or more than 5 sec of screaming (Carr & Carlson, 1993), or (2) three instances of “tolerated” problem behavior, defined as brief episodes (i.e., less than 5 sec) of screaming, verbal protests, and/or stomping feet on the floor. Tolerated problem behavior was seen as less serious by the parents and, therefore, up to three instances of such behavior were allowed prior to session termination.

### *Response Recording*

During baseline and intervention sessions, data were collected to measure several dependent variables: (a) percentage of task steps completed, (b) latency to session termination due to the occurrence of problem behavior or successful completion of the activity, and (c) number of sessions terminated due to problem behavior. Percentage of task steps completed prior to termination of the session (i.e., due either to the occurrence

of problem behavior or successful completion of the activity) was divided by the total number of steps required to complete the routine for each child, multiplied by 100 to yield a percentage of task steps completed. Latency to session termination was defined as the amount of time that elapsed between the first step in the task analysis for each child and termination of the session (i.e., due to either the occurrence of problem behavior or successful completion of the activity).

### *Development of the Intervention*

The purpose of this phase was to use the assessment information about each of the problematic contexts to design an intervention package that included techniques to mitigate the impact of the contexts on problem behavior and teach coping skills to the child so that he/she could successfully deal with the problematic context. Following implementation of the intervention package for the identified (experimental) problematic context, several other intervention techniques were implemented with additional problematic contexts (clinical extension) for each family. As noted previously, the decision rules for initiating, continuing, and terminating intervention in the experimental and clinical extension contexts are outlined in Appendix J. The rationale for implementing each component of the intervention package for participants in all three studies is shown in Appendix I.

In all three studies (including Study 1), although each problem context was addressed by means of mitigation and coping strategies, the exact nature of each strategy was dictated by the specific properties of a given problematic context plus feedback from the parents using the problem-solving approach outlined in Appendix H. Parental feedback was structured with respect to considerations of user-friendliness, feasibility,

and comfort level with suggested procedures using the goodness-of-fit assessment developed by Albin et al. (1996) and shown in Appendix K.

*Participant 1: John*

*Mitigation Strategies for Transitions.* Research has shown that transitions between settings and/or activities can evoke problem behavior (Schmit et al., 2000). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed this situation as a problem context for John. Some research has suggested that the lack of predictability associated with transitions is instrumental in evoking problem behavior (Flannery & Horner, 1994). A *visual schedule of upcoming events* has been shown to be useful for dealing with difficulties in transitions because such a schedule reduces the unpredictability associated with transitions (i.e., the child is now informed about the upcoming sequence of events), and, further, children with Autism Spectrum Disorders (ASD) are often described as visual learners (McClannahan & Krantz, 1999). Finally, some data have suggested that visual schedules do, indeed, reduce problem behavior during transitions (Mesibov, Browder, & Kirkland, 2002). Therefore, to ensure the predictability of John's transition, we constructed a visual schedule of the settings to which he was to transition. John was presented with a portable board that had pictures and printed words representing locations he would be traveling to in the community as well as anchor pictures of his home on each end of the schedule. Following the last picture, John was allowed to choose another picture to represent an activity of his choice to engage in once he arrived back home.

A *visual representation of time* has also been shown to be a useful tool for increasing predictability and decreasing problem behavior when individuals with

developmental disabilities are required to transition between activities (Dettmer et al., 2000). Therefore, in addition to providing a visual schedule, John's parents set an egg timer 3 min prior to the transition and showed the time to John. This procedure allowed John to see the amount of time he had left before the transition began.

John had a long learning history in which problem behavior elicited by the demand to transition was reinforced by the family changing their plans, thereby removing the demand (i.e., escape-motivated problem behavior). Therefore, upon any demand to transition, John almost immediately displayed problem behavior. Some research has suggested that incorporating an individual's personal preferences early in an activity sequence can create a *behavioral momentum* in which the appropriate behavior displayed during a preferred activity will carry over into the less preferred activity (Ducharme & Worling, 1994). Therefore, the implementation of the intervention package was sequenced so that John's initial transition was from home to a highly preferred location (i.e., McDonald's) and then, only later, to other, less preferred locations (i.e., the grocery store). After two weeks of successful implementation, errands were once again gradually introduced according to the daily needs of the family; that is, the family went to those community locations that were necessary to meet their needs.

*Coping Skills for Transitions.* Including opportunities for *choice* in activities is an intervention that has been shown to decrease problem behavior in individuals with developmental disabilities (Shogren, Faggella-Luby, Jik Bae, & Wehmeyer, 2004). Therefore, to increase his compliance with the request to transition, John was given the opportunity to choose the activity he would engage in after returning home (i.e., the skill of choice-making was taught). For instance, prior to leaving the house, John was

presented with two pictures representing preferred activities (i.e., pool, video game) and was asked to choose an activity. The visual representation of the chosen activity was then placed at the end of his visual schedule to cue John about the reinforcer that would be available following the successful transition sequence and community outing.

Research has also shown that providing access to a preferred object during a nonpreferred activity decreases problem behavior in individuals with developmental disabilities (Cameron, Luiselli, McGrath, & Carlton, 1992). The preferred object constitutes a discriminative stimulus for appropriate behavior (nonproblem behavior) that competes with the stimuli present in the context associated with problem behavior. Therefore, while transitioning, John was also prompted to ask for an object to carry during the transition (i.e., the skill of *functional communication*). This object, namely, a handheld videogame, was a preferred object that evoked appropriate (nonproblem) behavior involving game playing.

*Clinical Extension.* John's parents had also identified five other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. As noted previously, for John and the other two children, while no experimental demonstration was included in this portion of the study, additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior. Specifically, John's parents identified (a) "denied access to what he wants," (b) "when a preferred activity ends or is no longer possible," (c) "activities that are difficult, frustrating, disliked, or boring," (d) "changes in routine or has to deal with new and unfamiliar situations," and (e) "having to wait" as being highly likely to be associated with problem behavior. Visual representation of time has been shown to be effective in

decreasing problem behavior in individuals with developmental disabilities because it increases predictability in the environment (Dettmer et al., 2000). Therefore, again, an egg timer was included as an intervention strategy in all of the problem contexts except changes in routine/new situations. The egg timer functioned as a visual representation of time that allowed John to predict when a nonpreferred activity would end (i.e., denied access, disliked activity, waiting), when a preferred activity would begin again (i.e., denied access), and when a preferred activity would end (i.e., preferred activity ends). In addition, research has suggested that visual schedules increase predictability and are associated with a decrease in problem behavior in individuals with developmental disabilities (Mesibov et al., 2002). Therefore, after consultation with the family, a visual schedule was also included to increase predictability in two contexts, namely, activities that were disliked and changes in routine/new situations. Finally, social stories (Gray & Garand, 1993) were also used to address changes in routines. These stories depicted, visually, the sequence of events involved in a change in routine and appropriate behavior relevant to the routine, thereby decreasing unpredictability and providing a model for socially acceptable behavior.

*Participant 2: Gregory*

*Mitigation Strategies for When a Preferred Activity Ends.* Research has shown that termination of a preferred activity can evoke problem behavior (Mace, Shapiro, & Mace, 1998). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed a specific situation (i.e., termination of the car ride) as a problem context for Gregory. Some research has shown that the loss of access to a preferred object and/or activity is aversive because it involves the removal of positive reinforcement and

this event evokes problem behavior (Durand & Crimmins, 1988). *Providing access to a new preferred object* and/or activity to replace the loss of the old preferred object and/or activity has been shown to be a useful tool for decreasing problem behavior (Cameron et al., 1992). Therefore, Gregory was given access to a preferred object at the completion of the activity. Through a preference assessment interview with Gregory's mother (Matson, Bielecki, Mayville, Smalls, Bamburg, & Baglio, 1999), it was determined that light machines were highly preferred objects. Based on this information, Gregory was presented with a small, battery-operated light machine by his mother when the family car was turned off and she opened the door for him to exit. The new preferred object and/or activity compensated for the loss of the old preferred object and/or activity and, therefore, plausibly, "ending the preferred activity," was not as aversive.

In addition to the loss of a preferred object evoking problem behavior, research has also found that individuals with developmental disabilities exhibit higher rates of problem behavior when changes in their environment are unpredictable (Flannery & Horner, 1994). To decrease the unpredictability associated with termination of the preferred activity, the use of *verbal warnings* at regular time intervals (i.e., to indicate that a preferred activity is about to end) has been associated with a decrease in problem behavior (Mace et al., 1998). Therefore, to increase predictability for Gregory, a verbal warning was given to him at approximately 5 min and 1 min prior to the end of the car ride to signal when the preferred activity would end as well as to cue him that the loss of the preferred activity (car ride) would be compensated for with a new, preferred object (i.e., the light machine). Specifically, his mother gave the following verbal warning, "Five (or one) more minute(s) and then the car ride is all done and you get the light."

*Coping Strategies for When a Preferred Activity Ends.* Replacing problem behavior with *functionally equivalent communication* skills has been shown to reduce problem behavior (Carr & Durand, 1985). Therefore, upon termination of the preferred car ride activity, Gregory was prompted to use his communication skills to ask for his preferred object, the battery-operated light. He was taught to independently ask for this object at the termination of the car ride using a verbal prompt by his mother that was faded over time, thereby giving him a method to cope with the upcoming problematic context.

*Clinical Extension.* Gregory's mother had also identified three other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) "activities that are difficult, frustrating, disliked, or boring" (b) "changes in routine or has to deal with new and unfamiliar situations," and (c) "hurried or rushed." Both disliked activities and changes in routine have been shown to be associated with increased problem behavior in individuals with developmental disabilities (Clarke et al., 1995; Flannery & Horner, 1994). As noted earlier, research has suggested that visual representations of routines increases predictability and is associated with decreases in problem behavior in individuals with developmental disabilities (Mesibov et al., 2002). Therefore, a visual schedule was included as part of the intervention for both problematic contexts, namely, activities that were disliked and changes in routine/new situation. Pictures cued Gregory as to when a disliked activity was about to take place as well as what to expect (i.e., a sequence of pictures) when a change was made in his daily routine. Research has also



found that verbal warnings increase predictability and are associated with reductions in problem behavior (Mace et al., 1998). Therefore, verbal warnings were also included to mitigate the impact of contexts involving activities that were disliked. For example, at 5 min and 1 min prior to taking a bath (a disliked activity), Gregory's mother would provide verbal warnings about the upcoming activity such as, "In five (or one) minute(s), it is bathtime."

Research has also suggested that being hurried or rushed is associated with problem behavior in individuals with developmental disabilities (Kennedy & Itkonen, 1993). Being hurried increases the unpredictability of the individual's environment. Providing verbal cues (warnings) that indicate the sequence of upcoming steps or events has been shown to make the environment more predictable and less likely to be associated with problem behavior (Schmit et al., 2000). Thus, for example, when Gregory's mother was running late during the morning routine, she specified to Gregory the upcoming events (i.e., "First we'll eat breakfast; second we'll brush our teeth," etc.) that were needed to complete the routine.

### *Participant 3: Robert*

*Mitigation Strategies for a Disliked Routine.* Research has shown that disliked routines can evoke problem behavior (Clarke et al., 1995). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed that dinnertime was a disliked routine that constituted a problem context for Robert. Some research has suggested that problem behavior exhibited during a disliked routine likely functions as a means of terminating the aversive routine (Foster-Johnson, Ferro, & Dunlap, 1994).

*Embedding a preferred activity into a disliked activity (routine)* has been shown to be

associated with a decrease in problem behavior, plausibly because it reduces the aversiveness of the activity (Blair et al., 1999). Research has suggested that television viewing can be a preferred activity that may also serve as a discriminative stimulus for appropriate eating behavior (Blass et al., 2006). Since the kitchen had become a discriminative stimulus for Robert's problem behavior, Robert was initially allowed to eat dinner at a small children's table in the family's living room (rather than kitchen) while at the same time watching a preferred video on the television set. Thus, *changing the location of the meal* was also part of the mitigation strategy. The video remained on contingent on Robert's eating. If Robert did not engage in eating behavior such as scooping food, placing it in his mouth, or chewing it for 10 s, the video was turned off. When Robert resumed eating behaviors, the video was immediately turned on. Since the ultimate goal of the family was to have Robert join them at the kitchen table during dinner, Robert's chair was gradually moved closer to the kitchen table provided that three consecutive sessions had occurred in which the video needed to be turned off only once or not at all during his meal. Each time that Robert met these criteria, his chair was moved 0.33 m closer to the kitchen table. Eventually, his chair was situated at the kitchen table and he no longer required the use of the television video in order to complete his dinnertime routine (i.e., the presence of the television video was gradually faded out).

To increase Robert's repertoire of food eaten, we employed a strategy of slowly introducing small pieces of nonpreferred foods (*introduction of new food*) into the preferred foods he already ate (Ahearn, 2003). Prior to intervention, Robert consumed only pureed chicken and sweet potatoes, a food selectivity problem. Research has found that consuming highly textured foods may be aversive to individuals with developmental

disabilities and that consumption of textured foods can be increased through the systematic addition of denser textures (Shore, Babbitt, Williams, Coe, & Snyder, 1998). Therefore, as part of the introduction of new foods, each dinner would contain an additional food item (e.g., corn) that would be mixed into the preferred foods. A new food would be added on a rotating basis. For example, meals would contain meats other than chicken (e.g., turkey, ham, or beef) and vegetables other than sweet potatoes (e.g., white potatoes and yellow squash). Throughout the intervention, each food item became increasingly larger in size, eventually leading to Robert consuming separate whole pieces of each food item. The food related intervention just described took place concurrently with the location of meal/video intervention describer earlier.

*Coping Strategies for a Disliked Routine.* Replacing problem behavior with *functionally equivalent communication* skills has been shown to reduce problem behavior (Carr & Durand, 1985). Therefore, upon meal completion, Robert was also prompted to present an “all done” card to his mother. Robert had previous experience with this card and used it accurately in other settings (i.e., school). This behavior would signal that he was finished with his meal and he would then be allowed to leave the dinner table. When Robert had eaten ½ of his dinner, an “all done” card was made available for him to use. Robert was encouraged to independently signal that he was finished with his meal, thereby giving him an appropriate (nonproblem) behavior to signal others that he had finished his dinner.

*Clinical Extension.* Robert’s parents had also identified four other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and

implemented to reduce problem behavior in the contexts of (a) “transitions between settings or activities,” (b) “medical appointments or medical settings,” (c) “activities that are too noisy and/or crowded,” and (d) “feeling tired.”

As previously noted, visual representations of time have been associated with increased predictability, and consequently, decreased problem behavior in individuals with developmental disabilities (Dettmer et al., 2000). Therefore, an egg timer was included as a mitigation strategy in the transition context. One of Robert’s parents would set an egg timer to ring 5 min prior to the transition and present the timer to Robert so that he would have a warning of the upcoming transition.

Social stories have been shown to be associated with increased predictability regarding upcoming events and decreased levels of problem behavior (Gray & Garand, 1993; Sansosti, Powell-Smith, & Kincaid, 2004). Therefore, social stories were included as a mitigation strategy to address difficulties with medical appointments. Three days prior to the appointment, Robert’s parents would review a social story depicting the steps of the medical appointment. The social story consisted of pictures showing arriving at the appointment, meeting with the doctor, and physical exam procedures to be conducted. In addition, pictures depicting Robert engaging in appropriate behavior and the response of his parents to his appropriate behavior were also included in the story. This review would take place when Robert was calm. The presentation of the stories occurred from two to five times per day.

Noisy environments have also been found to be associated with problem behavior in individuals with developmental disabilities (O’Reilly, Lacey, & Lancioni, 2000). So that he could effectively deal with noisy environments, Robert was taught a coping

strategy, namely, the use of sign language to indicate “break.” Following procedures outlined by (MacDuff, Krantz, & McClannahan, 2001), teaching occurred in a naturalistic setting in which the environment was noisy. Using a most-to-least prompt hierarchy, Robert was prompted to make the sign using a full manual prompt and then was allowed to leave the area and move to a quieter location. When he displayed 100% accuracy with this sign over three consecutive opportunities, a partial prompt was provided to Robert (i.e., prompt at his wrists only). After meeting the same criteria outlined for the full manual prompt, Robert was prompted using a gestural prompt and then the gestural prompt was faded until Robert could make the sign independently, thereby undermining the necessity for escape-motivated problem behavior.

Sleep disturbances and resulting daytime fatigue have also been shown to be associated with problem behavior in individuals with developmental disabilities (Durand, 2003). Bedtime routines and sleep restriction have been shown to be successful in eliminating bedtime disturbances and nighttime wakings in children with developmental disabilities and sleep problems (Christodulu & Durand, 2004). To address the context of “feeling tired,” we implemented mitigation strategies to help Robert avoid feeling tired. Initially, baseline measurements were taken to assess the average amount of sleep that Robert got each night as well as the bedtime routine that was in place. Assessment revealed that Robert slept a mean of 6.80 hours per night with a mean of 2.76 wakings each night. Additionally, assessment revealed that there was no consistent bedtime routine; therefore, Robert fell asleep at variable times in the living room. In conjunction with Robert’s parents, a clear bedtime routine was developed in which Robert went upstairs, took a bath, put on his pajamas, got in bed, and was allowed to watch his

favorite video. Each night this routine was started at 9:00 p.m. and Robert was reported to be asleep by 10:00 p.m. Robert was awoken each morning at 6:00 a.m. to help maintain a consistent wake/sleep cycle. If Robert awoke during the night and entered his parents' room, he was redirected back to his room with minimal verbal interaction and his favorite video was turned back on for him to watch.

### *Intervention Fidelity*

An intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity in the experimental context (see Appendix L, that shows the intervention components for the experimental contexts in all three studies). In 100% of the baseline sessions and 50% of the intervention sessions for John, in 25% of the baseline sessions and 82% of the intervention sessions for Gregory, and in 46% of the baseline sessions and 50% of the intervention sessions for Robert, the investigator and each of the respective mothers recorded whether each intervention component was implemented. That is, the investigator completed the fidelity checklist by recording a checkmark whenever a specific component of the multicomponent intervention package was implemented by the parent. The parent completed the same checklist.

Another intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity for the clinical extension contexts (see Appendix M, that shows the intervention components for the clinical extension contexts in all three studies). Since these were considered “spot checks” and not part of the formal experimental demonstration, the investigator only observed two sessions of each of the clinical extension contexts for each participant. The

investigator completed the fidelity checklist by recording a checkmark for each specific component of the intervention package used as the intervention was being implemented by the parent. The parent completed the same checklist.

#### *Interrater Reliability*

A binary reliability index was used to assess agreement on intervention fidelity (in both the experimental and clinical extension contexts) and, for the experimental contexts only: percentage of context steps completed, latency to session termination, and reason for session termination. Thus, for each session, reliability was scored as either perfect agreement or no agreement. Agreement was defined as both observers recording the implementation of the intervention, the same number of context steps completed, latency measures that were within 5 s of one another, and agreement on the reason for session termination (i.e., occurrence of problem behavior versus successful completion of activity). For the clinical extension contexts, a binary reliability index was used to assess agreement on intervention fidelity only.

#### *Participant 1: John*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 100% of the baseline sessions and 50% of the intervention sessions. Agreement on number of context steps completed was noted in 100% of the baseline sessions and 95% of the intervention sessions. Agreement on intervention fidelity, latency to session termination, and reason for session termination was noted in 100% of both the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 2: Gregory*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 25% of the baseline sessions and 82% of the intervention sessions. Agreement on intervention fidelity, percentage of context steps completed, latency to session termination, and reason for session termination was noted in 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 3: Robert*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 46% of the baseline sessions and 50% of the intervention sessions. Agreement on intervention fidelity, the percentage of context steps completed, latency to session termination, and reason for session termination was noted in 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

Results

*Intervention Fidelity*

In baseline, a mean of 0% of the intervention components were implemented by each respective parent for all contexts. During intervention, for the experimental contexts, a mean of 100% of the intervention components were implemented by each respective parent. During intervention for the clinical extension contexts, a mean of 100% of the intervention components were implemented by each respective parent.



### *Percentage of Steps Completed*

The percentage of activity/routine steps completed for each participant is shown in Figure 1. In baseline, John completed a mean of 0% of the steps that constituted the transition from home to community settings. However, during intervention, he completed a mean of 100% of the steps. In baseline, Gregory completed a mean of 8.3% of the steps associated with a preferred activity ending. However, during intervention, he completed 100% of the steps in 15 out of 17 sessions and 66% of the steps in the remaining two sessions. In baseline, Robert completed a mean of 0% of the steps that constituted engaging in a disliked activity. However, during intervention, he completed 100% of the steps in 10 out of 14 sessions and 66% of the steps for the remaining four sessions.

### *Latency to Problem Behavior*

Figure 2 presents data on the amount of time that elapsed before the session was terminated (due to problem behavior or successful completion of the activity) for the three participants. For John, the mean latency to problem behavior in baseline was 2 s. During intervention, John did not display problem behavior and the mean latency for successful completion of the transition was 4 min, 33 s. For Gregory, the mean latency to problem behavior after the preferred activity ended (i.e., leaving the car) in baseline was 1 min, 26 s. During intervention, mean latency to problem behavior in the two sessions that were terminated was 5 min, 30 s and mean latency to successful completion of preferred activity ends (15 out of 17 sessions) was 5 min, 13 s. For Robert, the mean latency to problem behavior in baseline was 52 s. During intervention, mean latency to problem behavior in the four sessions that were terminated was 2 min, 30 s and, mean

latency to successful completion of the disliked dinnertime routine (10 out of 14 sessions) was 11 min, 58 s.

### *Number of Sessions Terminated*

Figure 2 shows that sessions could be terminated due to the presence of intolerated problem behavior (solid black bars), tolerated problem behavior (grey bars), or successful completion of problematic activity context (open bars). For each participant in baseline, all sessions were terminated due to the presence of intolerated problem behavior. Following intervention for John, zero out of 20 sessions were terminated due to problem behavior. Thus, 20 sessions were terminated because the transition was successfully completed in the absence of problem behavior. For Gregory, only 2 out of 17 sessions were terminated (due to tolerated problem behavior, as indicated by grey bars), and for Robert, only 4 of the 14 intervention sessions were terminated (due to tolerated problem behavior). In sum, following intervention, no session had to be terminated, for any of the children, due to intolerated (serious) problem behavior.

## STUDY 2: SOCIAL INTERACTION AS A CONTEXT FOR PROBLEM BEHAVIOR

### Method

#### *Overview*

All the procedures described in the Overview section of Study 1 were repeated in Study 2 for a new group of families. This process resulted in the selection of three participants. Each set of parents indicated that their child was very likely to show

problem behavior during specific *social* contexts, namely, for Jeana, “denied access (by an adult) to what she wants,” for Victoria, “not enough attention from parents, peers, or others,” and for Jeffrey, “recently disciplined or reprimanded.”

In Study 2, a multiple baseline design across three participants (Hersen & Barlow, 1976) was conducted to examine the impact of mitigate and coping strategies on problem behavior that occurred during social interactions.

### *Participant and Context Selection*

#### *Participant 1: Jeana*

Jeana was a 4-year-old girl diagnosed with PDD-NOS (Full Scale IQ = 67, Stanford-Binet Intelligence Scale, Fifth Edition), who received early intervention services through a local agency for children with developmental disabilities. She lived at home with her parents and younger sister. She was verbal and communicated through the use of complete sentences. On the CAI, her parents identified “denied access to what she wants” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Jeana’s mother indicated that Jeana was most likely to exhibit problem behavior when she was denied access to short-sleeved shirts by her mother in the context of getting dressed for school in the morning. Specifically, her mother reported that Jeana engaged in problem behavior (e.g. tantrums, aggression) when asked to put on a long-sleeved shirt because it was cold outside. When her mother attempted to dress her in a long-sleeved shirt, Jeana went to her box of clothes and chose a short-sleeved shirt. Her mother would then put the short-sleeved shirt on Jeana and Jeana became calm (i.e., problem behavior ended). Therefore, it was

hypothesized that the purpose of Jeana's problem behavior during the social interaction was to gain access to a particular item (tangible function).

*Participant 2: Victoria*

Victoria was a 4-year-old girl diagnosed with Down Syndrome (IQ = 58, Battelle Developmental Inventory, Cognitive Domain, Second Edition), who received early intervention services through a local agency for children with developmental disabilities. She lived at home with her parents, an older brother, age 5, and a younger brother, age 2. Victoria communicated through the use of single words, word approximations, and gestures. On the CAI, her parents identified "not enough attention from parents, peers, or others" as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Victoria's mother indicated that Victoria was most likely to exhibit problem behavior (i.e., tantrums, property destruction) while eating breakfast, during which time her mother had to attend to her brothers (i.e., low level of attention). Once Victoria displayed these problem behaviors, her mother attended to her and Victoria no longer displayed problem behavior. Therefore, it was hypothesized that Victoria's problem behaviors were maintained by attention from her mother.

*Participant 3: Jeffrey*

Jeffrey was a 5.5-year-old boy diagnosed with Autistic Disorder (Full Scale IQ = 67, Wechsler Preschool and Primary Scale of Intelligence, Third Edition), who was placed in a special education class and lived at home with his adoptive parents and adopted older brother. Jeffrey was verbal and communicated through the use of complete sentences. On the CAI, his parents identified "being disciplined or reprimanded" as the

most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Jeffrey's mother indicated that Jeffrey was most likely to exhibit problem behavior (i.e., tantrums) when corrected while completing his spelling homework assignments with his mother. Jeffrey's mother corrected his homework, as he worked, by delivering the correction prompt (i.e., "No, that's wrong") after a given problem had been done incorrectly. When Jeffrey displayed problem behavior, the homework session was immediately terminated and he became calm. Therefore, it was hypothesized that his problem behavior served an escape function.

#### *Baseline Observations*

As outlined in Study 1, during baseline, the investigator and when possible, a second observer (e.g., the child's parent), directly observed the contexts identified to confirm the occurrence of problem behavior. To document the occurrence of a particular social context, we identified a verbal discriminative stimulus that would signal the beginning point for each social context. For Jeana, the verbal discriminative stimulus delivered by her mother was "Time to get dressed." For Victoria, the verbal discriminative stimulus delivered by her mother was "Eat breakfast." For Jeffrey, the verbal discriminative stimulus delivered by his mother was "No, that's wrong." A latency to problem behavior measure or latency to successful completion of the activity measure was taken after the delivery of the verbal discriminative stimulus.

A task analysis was also developed to measure each child's completion of the task within the problematic social context. For Jeana (problem context, "denied access"), the sequence of dressing steps was defined as follows: (1) Jeana took off her pajama shirt; (2) Jeana chose a long-sleeved shirt; and (3) Jeana put on a long-sleeved shirt. For Victoria

(problem context, “insufficient attention”), the sequence of breakfast routine steps was defined as follows: (1) Victoria retrieved her breakfast from the counter and took it to the kitchen table; (2) Victoria ate her breakfast; and (3) Victoria placed her dirty dishes in the sink. For Jeffrey (problem context, “being reprimanded”), the sequence of homework routine steps was defined as follows: (1) Jeffrey placed spelling homework on the kitchen table; and (2) Jeffrey completed his spelling assignment.

The interaction that made up a given social context was considered complete when each child met individual criteria. Thus, for Jeana, the social context was considered complete when she put on a long-sleeved shirt. For Victoria, the social context was considered complete when she placed her dirty dishes in the sink. For Jeffrey, the social context was considered complete when he finished one worksheet of spelling homework without errors.

To ensure the safety of the child and the parent, we terminated a session contingent upon the display of problem behavior defined as either: (1) the occurrence of a single instance of “untolerated” problem behavior, namely, aggression (i.e., kicking, hitting, dropping to the floor) or self-injury (i.e., hitting head, biting hand), or more than 5 s of screaming (Carr & Carlson, 1993), or (2) three instances of “tolerated” problem behavior, namely, brief episodes of certain behaviors (i.e., less than 5 s of screaming, verbal protests, and/or stomping feet on the floor). Tolerated problem behavior was viewed as less serious and, therefore, up to three instances of such behavior was allowed prior to session termination.

### *Response Recording*

Data collection procedures were similar to those outlined in Study 1. Data were collected on (a) delivery of the verbal discriminative stimulus, (b) percentage of task steps completed, (c) latency to session termination due to the occurrence problem behavior or successful completion of the task associated with the social context, and (d) number of sessions terminated due to problem behavior.

### *Development of the Intervention*

As outlined in Study 1, the purpose of this component was to use assessment information about each of the problematic social contexts to design an intervention package that included techniques to mitigate the impact of the problematic social context on problem behavior and teach coping skills to the child to deal with the problematic social context. Following implementation of the intervention package for the identified (experimental) problematic context, several other intervention techniques were implemented with additional problematic contexts (clinical extension) for each family. As noted previously, the decision rules for initiating, continuing, and terminating intervention in the experimental and clinical extension contexts are outlined in Appendix J. The rationale for implementing each component of the intervention package for participants in all three studies is shown in Appendix I.

### *Participant 1: Jeana*

*Mitigation Strategies for Denied Access.* Research has shown that when a child is denied access to what he/she wants, he/she is likely to display problem behavior (Vollmer, Borrero, Wright, VanCamp, & Lalli, 2001). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed that this outcome occurred for Jeana when she was denied access to short-sleeved shirts. Some research has

suggested that being denied access is aversive to the child and therefore evokes problem behavior that functions to access the tangible items being denied (Durand & Crimmins, 1988).

One strategy that can be useful in mitigating the negative impact of being denied access to desired tangibles involves *embedding preferred stimuli* within the problematic social context. Research has shown that providing preferred stimuli within such contexts significantly decreases aggressive behavior of students with developmental delays (Blair et al., 1999). Therefore, the application of this technique would give Jeana an opportunity to access a preferred stimulus without avoiding the problematic social context in which access to a different preferred stimulus was being denied. A preference assessment checklist (Matson et al., 1999) was administered to Jeana's mother to determine Jeana's most highly preferred activities. The activity identified was watching television.

Therefore, prior to presenting the demand to get dressed, Jeana's mother allowed Jeana to watch television. Television constituted an embedded preferred stimulus. While Jeana was watching television, Jeana's mother presented her with two long-sleeved shirts and asked her to pick one. The rationale for this additional procedure is described shortly. Jeana chose a shirt and her mother proceeded to put it on her along with the rest of her clothing.

As noted earlier, children with autism spectrum disorders are often described as being visual learners. Further, visual representations of actual items can be helpful in increasing predictability (McClannahan & Krantz, 1999). The increased predictability, in turn, is associated with decreased problem behavior (Mesibov et al., 2002). Therefore, to increase the predictability of when Jeana would have access to a short-sleeved shirt (i.e.,



no longer denied access), we developed a *visual schedule*. A generic visual schedule was reviewed each morning with Jeana to show her when a short-sleeved shirt was available for her to wear, namely, when she returned home from school in the afternoon and remained inside where it was not cold.

*Coping Strategies for Denied Access.* As mentioned earlier, to increase Jeana's compliance with the request to put on a long-sleeved shirt, we gave her the opportunity to choose which long-sleeved shirt she would wear for the day. Research has suggested that *allowing a child to make choices (express preferences)* in aversive contexts can increase compliance and decrease problem behavior (Clarke et al., 1995). Therefore, each morning, Jeana's mother presented her with the choice of wearing one of two long-sleeved shirts, one of which constituted a preferred stimulus. Specifically, one shirt had long-sleeves and had a preferred color and/or had a preferred cartoon character on the front. The other shirt had long-sleeves and had a nonpreferred color and/or had a nonpreferred cartoon character on the front. As previously noted, including opportunities for choice in an intervention package has been shown to decrease problem behavior in individuals with developmental disabilities (Shogren et al., 2004). Thus, the skill of expressing preferences (making choices) was taught as a coping skill.

*Clinical Extension.* Jeana's parents had also identified five other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. As in Study 1, no experimental demonstration was included in this portion of the study. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) "transitions between settings or activities," (b) "preferred activity ends or is no longer possible," (c) "having to wait," (d)

“activities that are difficult, frustrating, disliked (sleep), or boring,” and (e) “feeling tired.” Visual representations of time have been shown to be effective in decreasing problem behavior in individuals with developmental disabilities because they increase predictability in the environment (Dettmer et al., 2000). Therefore, an egg timer was included as a mitigation strategy in contexts that included transitions, preferred activity ends, and having to wait. The egg timer functioned as a visual representation of time and allowed Jeana to predict when a transition was about to occur (i.e., transitions from setting or activities), when a preferred activity would end (i.e., preferred activity ends), and when a preferred activity would begin (i.e., waiting is over).

As previously noted, sleep disturbances and the resulting daytime fatigue have been shown to be associated with problem behavior in individuals with developmental disabilities (Durand, 2003). Bedtime routines and sleep restriction have been successful strategies for eliminating bedtime disturbances and nighttime awakenings in children with developmental disabilities and sleep problems (Christodulu & Durand, 2004). Therefore, to address Jeana’s problem behavior associated with going to sleep (a disliked routine), we developed a clear bedtime routine and implemented it consistently. At 8:00 p.m. each night, Jeana’s mother escorted Jeana to the bathroom. While in the bathroom, Jeana was prompted to use the toilet and brush her teeth. Once she finished brushing her teeth, she was prompted to go to her room where she changed into her pajamas and got into bed. Jeana’s mother then read one story to her from a chair next to her bed, kissed her goodnight, turned off the light, and closed the door. In addition to the bedtime routine, Jeana’s parents also redirected her back to her room during nighttime wakings. When Jeana awoke in the middle of the night and came to her parents’ room, she was

immediately escorted back to her room and her parents did not verbally engage with her. She was put back in bed and her door was closed. Jeana was woken up at 6:45 a.m. each morning and was not allowed to nap during the day. Along with establishing a clear routine for a disliked activity (bedtime routine), these strategies were also clearly relevant to alleviating her problem behavior that was associated with the fatigue that typically occurred the following day.

*Participant 2: Victoria*

*Mitigation Strategies for Insufficient Attention.* Research has shown that insufficient attention from others can evoke problem behavior (Durand & Crimmins, 1988). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed that this outcome occurred for Victoria when she received insufficient attention from her mother during morning breakfast routine. *Providing access to a preferred object* when attention is not available has been shown to be associated with a reduction in problem behavior (Dixon & Cummings, 2001; Hanley, Piazza, & Fisher, 1997). Therefore, Victoria was given access to a preferred object while eating breakfast. Through a preference assessment checklist (Matson et al., 1999) administered to Victoria's mother, it was determined that books were highly preferred objects. Based on this information, Victoria was presented with a children's book that she could look through while eating breakfast.

Research has also shown that reinforcement delay (e.g., delay of attention) can be better tolerated when potential access to reinforcement is signaled than when it is not (Vollmer, Borrero, Lalli, & Daniel, 1999). Therefore, to appropriately gain access to individual adult attention, Victoria was given the opportunity to earn *scheduled attention*

through a “magic bracelet.” The “magic bracelet” was a rubber bracelet that functioned as a discriminative stimulus to signal that individual attention was to be given to Victoria, later in the day, contingent upon her successful completion of the morning routine. That is, the bracelet served as a visual signal throughout the school day that she would receive 20 min of uninterrupted individual adult attention when she arrived home from school.

In addition, to increase the predictability of the morning routine, we posted a *visual schedule* on the family’s refrigerator outlining the sequence of tasks that needed to be completed by each child in the family. Research has suggested that a visual representation of routines is associated with decreased levels of problem behavior (Mesibov et al., 2002). Each task (i.e., getting dressed, taking vitamins, eating breakfast, using the bathroom, getting coat and backpack, getting on bus) was represented by a picture icon displayed across the board. Each child’s photograph was moved under each successive picture associated with the tasks that he/she was currently completing. When the task was completed, the child was prompted to move his/her photograph to the next task. All children were provided with praise for moving through the morning routine. Victoria was also given individual attention from one of her parents if she completed her morning breakfast routine without displaying problem behavior prior to getting on the bus.

*Coping Strategies for Insufficient Attention.* Replacing problem behavior with *functionally equivalent communication* skills has been shown to reduce problem behavior (Carr & Durand, 1985). Therefore, to teach Victoria to evoke adult attention appropriately, we prompted her to use the word “Look” to gain her mother’s attention during the morning routine. Initially, each time that Victoria verbalized “look,” attention

was immediately provided. Over several days, the level of attention was faded from continuous to intermittent; that is, Victoria was redirected to her book and attention was provided only for every third communicative request on average.

In conjunction with the mitigation strategy involving presentation of a preferred object, Victoria was allowed to choose the preferred book that she would look at while eating breakfast during the time when individual adult attention was not available. Including opportunities for *choice* (i.e., the skill of indicating preferences) in an intervention package has been shown to decrease problem behavior in individuals with developmental disabilities (Shogren et al., 2004). Thus, each morning, Victoria was given the opportunity to choose which children's book she would look at while eating.

*Clinical Extension.* Victoria's parents had also identified four other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) "hurried or rushed," (b) "having to wait," (c) "activity is too long" and, (d) "denied access to what he or she wants." Information gathered from the initial assessment of the experimental context, demonstrated that individual adult attention was associated with appropriate behavior for Victoria. Therefore, attention for appropriate behavior was included as a mitigation strategy in each of the problematic clinical extension contexts. In addition to individual adult attention, a visual schedule was also included for contexts in which Victoria was hurried or rushed. Being hurried or rushed has been found to be associated with higher rates of problem behavior in individuals with developmental disabilities (Kennedy &

Itkonen, 1993). Therefore, a visual schedule was included as a mitigation strategy to allow Victoria to be able to predict upcoming activities.

Tasks and activities that are too long have been shown to be associated with an increase in problem behavior in individuals with developmental disabilities (Sweeney & LeBlanc, 1995). Some research has suggested that providing verbal warnings (reminders) to signal duration of an activity decreases problem behavior (Mace et al., 1998). Therefore, in addition to individual adult attention for appropriate behavior, a verbal reminder was included as part of the intervention package to mitigate the negative influence of activities that were too long. Victoria was given verbal reminders by her mother as to the duration of an activity. Victoria's mother would give her 10, 5, and 1 min reminders to indicate the remaining duration of each activity such as, "Ten more minutes until work is all done."

As previously noted, being denied access to preferred items or activities has been shown to be associated with problem behavior in individuals with developmental disabilities (Vollmer et al., 2001). To mitigate the context of denied access, Victoria's mother gave verbal reminders (Mace et al., 1998) or used a visual representation of time such as an egg timer or calendar (Dettmer et al., 2000) to indicate to Victoria when access would be permitted again.

### *Participant 3: Jeffrey*

*Mitigation Strategies Following Reprimands.* Research has shown that the delivery of negative feedback (reprimands) can be associated with increased levels of problem behavior (O'Reilly, Lancioni, & Emerson, 1999; Taylor, Ekdahl, Romanczyk, & Miller, 1994). Data gathered from the CAI, follow-up assessment, and baseline

observations confirmed that this feedback was associated with problem behavior during spelling homework assignments for Jeffrey. Some research has suggested that negative feedback is aversive and serves as a setting event that negatively impacts later social interactions (O'Reilly et al., 1999). Changing the content and timing of the feedback has been shown to be associated with a decrease in problem behavior and an increase in correct responding (Barbetta, Heward, Bradley, & Miller, 1994; West & Billingsley, 2005). Therefore, to decrease Jeffrey's problem behavior, we had his mother *alter the content of the correction language* she used when Jeffrey made spelling errors. Research has suggested that omitting negative verbal feedback in error correction procedures is associated with lower rates of errors and a reduction in problem behavior (West & Billingsley, 2005). As mentioned earlier, the discriminative stimulus delivered by his mother was, "No, that's wrong." Baseline observations, had determined that the presentation of the discriminative stimulus alone reliably predicted problem behavior. Therefore, initially, the discriminative stimulus was changed so that it now took the form of his mother pointing to the error on his spelling worksheet and saying, "Try again." After five sessions, the verbal portion of the discriminative stimulus was faded and only a finger point was used.

In addition to modifying the discriminative stimulus delivered to Jeffrey, the *timing of the correction* was also altered as part of the intervention package. Some research has suggested that the timing of correction may be associated with successful acquisition and maintenance of instructional material. Specifically, introducing a discriminative stimulus for correction as soon as an error on a given homework problem is made (rather than waiting for the entire problem to be completed) makes it less likely

that a child will produce an incorrect response (Barbetta et al., 1994) that, in Jeffrey's case, increased the likelihood of problem behavior because of its prior association with reprimands. Therefore, this procedure was used for Jeffrey.

To address low rates of positive reinforcement during homework completion, we used a mitigation strategy referred to as *behavioral momentum* (Ducharme & Worling, 1994). This strategy allowed Jeffrey to be highly successful for a period of time before completing more difficult homework problems. The method involved modifying Jeffrey's spelling homework to ensure that he completed several easy problems first, thereby allowing him to receive high rates of positive reinforcement. Then, a few difficult problems were introduced. This rearrangement of the order of problems created a situation in which behavior displayed during completion of easy problems produced high rates of reinforcement that plausibly reduced the aversiveness of the homework situation, generating greater tolerance for the more difficult problems that followed later.

*Coping Strategies Following Reprimands.* Replacing problem behavior with *functionally equivalent communication* skills has been shown to reduce problem behavior (Carr & Durand, 1985). Specifically, using requests for help with difficult tasks is associated with decreased levels of problem behavior (Reichle, Drager, & Davis, 2002). Therefore, to minimize the number of errors that Jeffrey made, we taught him to ask his mother for help with the more difficult problems. When Jeffrey came to a spelling problem that he was not able to complete within 10 s, he was prompted to ask his mother for help.

*Clinical Extension.* Jeffrey's parents had also identified three other contexts from the CAI, highly associated with problem behavior, that negatively impacted family



quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) “preferred activity ends or is no longer possible,” (b) “activities that are difficult, frustrating, disliked, or boring,” and (c) “medical appointments or medical settings.” The unanticipated withdrawal of a preferred activity, due to its negative influence on environmental predictability, has been shown to be associated with the display of problem behavior in individuals with developmental disabilities (Mace et al., 1998). Therefore, the mitigation strategy developed to address this problematic context involved providing verbal warnings at 10, 5, and 1 min prior to the end of the activity as well as the use of a visual representation of time (i.e., clock, calendar) to indicate when the activity would be available again. Both verbal warnings and visual representations have been shown to be associated with an increase in predictability and a decrease in problem behavior (Dettmer et al., 2000; Mace et al., 1998).

Bedtime routines (disliked and difficult routine), a problematic context identified for Jeffrey, have been found to be associated with the display of problem behavior in individuals with developmental disabilities (Durand, 2003). In addition, children diagnosed with Autistic Disorder have also been characterized as rigid and as having difficulty deviating from established routines (Sansosti & Powell-Smith, 2006). For Jeffrey, bedtime was a difficult activity because he insisted on going to his room at 7:00 p.m. to go to sleep. This pattern posed a problem for the family because Jeffrey often displayed tantrum behavior if prevented from going to his room at this time. Therefore, to address Jeffrey’s problem behavior, we implemented a shaping procedure. To address the family’s desire to stay up longer, we implemented a shaping procedure in which Jeffrey

was allowed access to his favorite stuffed animal for staying awake in 5 min increments after 7:00 p.m. without displaying problem behavior. When Jeffrey did not display problem behavior for three consecutive nights, 5 min were added to the following night. This procedure was implemented until Jeffrey's bedtime reached the goal (established by his family) of 8:30 p.m.

Medical appointments and medical settings have been shown to be associated with problem behavior in individuals with developmental disabilities (Carlson, 2000). Social stories have been shown to decrease problem behavior and increase appropriate behaviors when presented to individuals with developmental disabilities (Gray & Garand, 1993; Sansosti et al., 2004). Therefore, to address Jeffrey's problem behavior associated with medical appointments, we developed and implemented social stories to increase the predictability of the time and content of the appointment. Three days prior to the appointment, Jeffrey's mother would review a social story showing the steps of the medical appointment with him. The social story consisted of pictures depicting arrival at the appointment, meeting with the doctor, and procedures to be conducted. In addition, pictures depicting Jeffrey engaging in appropriate behavior and parental response to his appropriate behavior were also included in the story. This review would take place when Jeffrey was calm and occurred from two to five times per day.

#### *Intervention Fidelity*

As outlined in Study 1, an intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity for the experimental context (see Appendix L, that shows the intervention components for the experimental contexts for all three studies). In 30% of the baseline

sessions and 40% of the intervention sessions for Jeana, in 50% of the baseline sessions and 71% of the intervention sessions for Victoria, and in 55% of the baseline sessions and 50% of the intervention sessions for Jeffrey, the investigator and each of the respective mothers recorded whether each intervention component was implemented.

As described in Study 1, another intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity for the clinical extension contexts (see Appendix M, that shows the intervention components for the clinical extension contexts for all three studies). Since these were considered “spot checks” and not part of the formal experimental demonstration, the investigator only observed two sessions of each of the clinical extension contexts for each participant.

#### *Interrater Reliability*

Using the same procedures as in Study 1, the investigator and a parent collected reliability data on the independent and dependent variables. A binary reliability index was used to assess agreement on intervention fidelity (in both the experimental and clinical extension contexts), and for the experimental contexts only: delivery of the verbal discriminative stimulus to initiate the social context, percentage of task steps completed, latency to session termination, and reason for session termination. Thus, for each session, reliability was scored as either perfect agreement or no agreement. Agreement was defined as both observers recording the implementation of the intervention, the presence or absence of the discriminative stimulus, the same number of task steps completed, latency measures that were within 5 s of one another, and agreement on the reason for session termination (i.e., occurrence of problem behavior versus successful completion of

social context). For the clinical extension contexts, a binary reliability index was used to assess agreement on intervention fidelity only.

*Participant 1: Jeana*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 40% of the baseline sessions and 30% of the intervention sessions. Agreement on intervention fidelity, percentage of task steps completed, initiation of the social context, and reason for session termination was noted for 100% of both the baseline and intervention sessions. Agreement on latency to session termination was noted for 90% of the baseline sessions and 100% of the intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 2: Victoria*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 50% of the baseline sessions and 71% of the intervention sessions. Agreement on all measures was noted for 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 3: Jeffrey*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 55% of the baseline sessions and 50% of the intervention sessions. Agreement on all measures was noted for 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

## Results

### *Intervention Fidelity*

In baseline, a mean of 0% of the intervention components were recorded as having been implemented by each respective parent. During intervention in the experimental contexts, a mean of 100% of the intervention components were implemented by each respective parent. During intervention in the clinical extension contexts, a mean of 100% of the intervention components were implemented by each respective parent.

### *Delivery of the Verbal Discriminative Stimulus*

For each of the participants, a binary (yes/no) measure was developed to document the presence of the verbal discriminative stimulus that signaled the start of the problematic social context. Across all three participants, the verbal discriminative stimulus was confirmed as having been delivered in 100% of the baseline and intervention sessions.

### *Percentage of Steps Completed*

The percentage of activity/routine steps completed for each participant is shown in Figure 3. In baseline, Jeana completed a mean of 46.2% of the steps that constituted the dressing routine. However, during intervention, she completed a mean of 100% of the steps in 18 out of 20 sessions and a mean of 49.5% of the steps in the remaining two sessions. In baseline, Victoria completed a mean of 16.5% of the steps that constituted the breakfast routine. However, during intervention, she completed 100% of the steps in 16 out of 17 sessions and 66% of the steps in the remaining session. In baseline, Jeffrey completed a mean of 50% of the steps that constituted the homework routine. However,

during intervention, he completed 100% of the steps that constituted the homework routine.

#### *Latency to Problem Behavior*

Figure 4 presents data on the amount of time that elapsed between the delivery of the verbal discriminative stimulus that began the social context session and session termination for the three participants. For Jeana, the mean latency to onset of problem behavior following denied access was 2 s during baseline. The mean latency to problem behavior during intervention was 22 s in sessions that were terminated (2 out of 20 sessions); however, mean latency to successful completion (18 out of 20 sessions) of the denied access context was 56 s. For Victoria, the mean latency to the onset of problem behavior following insufficient attention was 38 s in baseline. The latency to problem behavior during intervention was 3 min in the single session (out of 17 sessions) that was terminated; however, mean latency to successful completion (16 out of 17 sessions) of the insufficient attention context was 8 min, 21 s during intervention. For Jeffrey, the mean latency to onset of problem behavior following reprimands in baseline was 1 min 20 s versus 8 min, 46 s to successful completion (14 out of 14 sessions) of the reprimands context during intervention.

#### *Number of Sessions Terminated*

Figure 4 shows that sessions could be terminated due to the presence of intolerated problem behavior (solid black bars), tolerated problem behavior (grey bars), or successful completion of the problematic social context in the absence of problem behavior (open bars). For each participant in baseline, all sessions were terminated due to the presence of intolerated problem behavior. Following intervention for Jeana, 2 out of

the 20 sessions were terminated due to tolerated problem behavior. For Victoria, only 1 of the 17 sessions was terminated due to tolerated problem behavior. For Jeffrey, none of the intervention sessions were terminated due to problem behavior. In sum, following intervention, no sessions had to be terminated for any of the children, due to untolerated (serious) problem behavior.

### STUDY 3: BIOLOGICAL EVENTS AS A CONTEXT FOR PROBLEM BEHAVIOR

#### Method

#### *Overview*

All the procedures described in the Overview sections of Studies 1 and 2 were repeated in Study 3 for a new group of families. This process resulted in the selection of three participants. Each set of parents indicated that their child was very likely to show problem behavior in different *biological* contexts, specifically, for Adam, “side effects of medication or changes in medication,” for Jacob, “feeling frightened, worried, anxious or agitated,” and for Nate, “feeling hungry or thirsty.”

#### *Participant and Context Selection*

#### *Participant 1: Adam*

Adam was a 7-year-old boy diagnosed with Asperger’s Disorder (Full Scale IQ = 119, Stanford-Binet Intelligence Scale, Fifth Edition), who displayed symptoms of depression. He was in a first grade general education classroom and lived at home with his parents and two younger sisters. Adam was verbal and communicated through the use

of complete sentences. On the CAI, his parents identified “side effects of medication or changes in medication” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Adam’s mother indicated that he was most likely to exhibit problem behavior when he was completing his homework in the kitchen after school with his mother. Typically, Adam would display tantrum behavior while completing his homework, a nonpreferred activity, and in order to calm Adam down, his mother would remove the homework and allow him to “cool off” in the living room. Therefore, it was hypothesized that Adam’s problem behavior served an escape function. Importantly, additional assessment revealed that this behavior was considerably exacerbated after Adam had been placed on the antidepressant, Prozac. After being placed on the medication, he experienced negative side effects, namely, increased anxiety and agitation.

*Participant 2: Jacob*

Jacob was a 3.5-year-old boy diagnosed with PDD-NOS (IQ standard score = 6, Preschool Evaluation Scale, Cognitive Thinking Domain), who received early intervention services through a local agency for children with developmental disabilities. He was an only child who lived at home with his parents. Jacob had limited verbal ability and communicated through short sentences and gestures. On the CAI, his parents identified “feeling frightened, worried, anxious, or agitated” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Jacob’s mother indicated that Jacob was most likely to exhibit problem behavior when his mother prevented him from compulsively closing doors in his home after he had arrived home from school. Specifically, his mother reported that Jacob



engaged in problem behavior (e.g., tantrums) when prevented from opening and closing closet, bathroom, and bedroom doors in their home. When Jacob's mother allowed access to closing doors, he displayed a sharp reduction in problem behavior.

According to parent report and baseline observations, it was hypothesized that closing doors appeared to relieve Jacob's anxiety. After arriving home from school, Jacob would immediately check all of the doors in his home and if any were open, he would close them. Prior to the intervention, Jacob was often prevented from closing doors by his parents. They gave him the verbal prompt to "leave the door open" and Jacob became increasingly agitated. When his parents left the immediate area, Jacob visually scanned the area for the presence of adults, closed the door, and did not display problem behavior. When Jacob's parents physically prevented him from closing a door, he became increasingly agitated and displayed tantrum behavior. Research has shown that there are high rates of comorbidity involving developmental disabilities and anxiety symptoms (Muris, Steernemen, Merckelbach, Holdrinet, & Meesters, 1998). Relatedly, it has been suggested that interruption of ritualistic behavior is an aversive event that precipitates escape-motivated problem behavior for some children (Murphy, Macdonald, Hall, & Oliver, 2000). Significantly, Jacob displayed problem behavior when his chain of stereotyped behavior was interrupted (terminated by others) and he became calm when he was allowed to engage again in the ritualistic behavior. Therefore, it was hypothesized that Jacob's problem behavior served an escape function; that is, such behavior had a history of being followed by the reinstatement of the opportunity to engage in ritualistic behavior. The reinstatement terminated an aversive event, namely, the anxiety associated

with interruption of the ritual. Thus, problem behavior allowed Jacob to escape an aversive event, namely, anxiety.

### *Participant 3: Nate*

Nate was a 14-year-old boy diagnosed with Autistic Disorder and Seizure Disorder (Full Scale IQ = 60, Leiter International Performance Scale – Revised), who received educational programming from a local agency that served individuals with developmental disabilities. He lived at home with his parents and older sister. Nate was nonverbal and communicated through the use of an augmentative voice-output device. On the CAI, his parents identified “feeling hungry or thirsty” as the most problematic context for their family; therefore, it was selected as the experimental context. During the follow-up assessment, Nate’s mother indicated that Nate was most likely to display problem behavior (e.g., aggression, self-injury) when she asked him to complete his chores (i.e., putting away silverware, feeding the dog) after school provided that he had not eaten lunch that day. In contrast, if Nate was given a snack prior to being asked to complete his chores, he complied without displaying problem behavior. When Nate displayed problem behavior, all chores were discontinued and he was allowed to go to the living room to watch Disney movies. Once the chores were removed, Nate became calm. Therefore, it was hypothesized that Nate’s problem behavior served an escape function, namely, termination of chores made aversive due to ongoing hunger.

### *Baseline Observations*

As outlined in Studies 1 and 2, during baseline, the investigator and when possible, a second observer (e.g., the child’s parent), directly observed the contexts identified to confirm the occurrence of problem behavior. To document the occurrence of

a particular biological context, we used an ancillary assessment instrument for each participant. For Adam, an additional assessment instrument, the Structured Interview for Assessment of Medication Side Effects (Appendix N), was administered to his mother to determine whether the medication side effect occurred while Adam completed his homework after school (Bleiweiss, Ladd, Robinson, & Carr, 2006). A task analysis was developed to measure Adam's homework completion in this problematic context. The steps of homework completion were defined as follows: (1) Adam placed all homework materials on the kitchen table; (2) Adam completed all assignments; and (3) Adam removed all homework materials from kitchen table.

An anxiety rating form (Appendix O) was completed (to document the presence of anxiety) immediately prior to Jacob attempting to close doors, after he had successfully closed doors, and also during times when he was prevented from closing doors. In addition, a behavioral discriminative stimulus, namely, Jacob reaching for a door, constituted the signal to begin recording his behavior in the problematic context. For Jacob, a task analysis was not relevant since the problematic context (i.e., anxiety as a reaction to not being able to close doors) did not constitute a task in any meaningful sense.

For Nate, a daily record was kept of his food intake to document the presence of hunger. Days in which Nate refused to eat lunch at school (i.e., a plausible "hunger" event) were the focus of the intervention efforts. A task analysis was developed to measure Nate's chore completion in the context of hunger. The steps of chore completion were defined as follows: (1) Nate put two scoops of dog food in the dog dish; and (2) Nate put away all silverware in the appropriate drawer.

To ensure the safety of the child and the parent, we terminated a session contingent upon the display of problem behavior defined as either: (1) the occurrence of a single instance of “untolerated” problem behavior, defined as aggression (i.e., kicking, hitting, dropping to the floor) or self-injury (i.e., hitting head, biting hand), or more than 5 sec of screaming (Carr & Carlson, 1993), or (2) three instances of “tolerated” problem behavior, namely, brief episodes of certain behavior (i.e., less than 5 sec) of screaming, verbal protests, and/or stomping feet on the floor. Tolerated problem behavior was viewed as less serious and, therefore, up to three instances of such behavior were allowed prior to session termination.

#### *Response Recording*

Data collection procedures were similar to those outlined in Studies 1 and 2. Data were collected on: (a) percentage of task steps completed (Adam and Nate only), (b) latency to session termination due to the occurrence of problem behavior or successful completion of the relevant activity in the biological context, and (c) number of sessions terminated due to problem behavior. In addition, for Adam, data were collected on presence of medication side-effects and completion of homework. For Jacob, data were collected on presence of anxiety. For Nate, data were collected on presence of hunger and completion of chores.

#### *Development of the Intervention*

As outlined in Studies 1 and 2, the purpose of this component was to use assessment information about each of the problematic biological contexts to design an intervention package that included techniques to mitigate the impact of the problematic context on problem behavior and teach coping skills to the child to successfully deal with

that context. Following implementation of the intervention package for the identified (experimental) problematic context, several other intervention techniques were informally implemented with additional problematic contexts (clinical extension) for each family. As noted previously, the decision rules for initiating, continuing, and terminating intervention in experimental and clinical extension contexts are outlined in Appendix J. The rationale for implementing each component of the intervention package for participants in all three studies is shown in Appendix I.

*Participant 1: Adam*

*Mitigation Strategies for Medication Side Effects.* Research has suggested that medication side effects can serve as setting events for problem behavior (Kalchnik, Hanzel, Sevenich, & Harder, 2003). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed this possibility for Adam. While completing his homework, Adam displayed signs of agitation and anxiety. He was unable to remain seated, threw his assignments, perseverated on minute details of the assignment, and was not able to complete his work. Mitigation strategies were developed to attenuate the negative effects of the medication while Adam was completing his homework assignment.

Research has shown that *shorter tasks* may produce increased productivity and lower levels of problem behavior in individuals with developmental disabilities (Sweeney & LeBlanc, 1995). Therefore, to make Adam's homework assignments shorter and less overwhelming, his mother divided his homework tasks into manageable portions. Adam's mother reviewed all of his assignments and then separated the tasks by academic subject. *Organizing tasks* has also been shown to be associated with a decrease in problem

behavior (e.g., Kunce & Mesibov, 1998). Therefore, to organize the homework, Adam wrote “to do” lists that outlined the work he needed to complete. Adam’s mother noted that Adam benefited from organized outlines and enjoyed making lists and crossing out items after completing tasks. Using this interest, we encouraged Adam to list all tasks by academic subject and then subdivide the academic subject by the tasks that fell under that category.

Research has also suggested that *providing assistance* during difficult tasks is associated with a decrease in problem behavior (Reichle et al., 2002). Therefore, to provide Adam with additional support while he was completing homework assignments, Adam’s mother engaged Adam approximately every 5 min and gave him instructional support as needed. Specifically, if Adam was independently completing his homework assignment without displaying problem behavior, his mother provided him with verbal praise. If Adam did have difficulties completing an assignment, his mother provided him with assistance (i.e., relevant prompts) until he was able to independently complete the remainder of his assignment.

*Coping Strategies for Medication Side Effects.* Research has suggested that the use of relaxation strategies is associated with decreased agitation and problem behavior in individuals with developmental disabilities (Mullins & Christian, 2001). As a strategy for dealing with the increased agitation and anxiety related to his medication regime, Adam was taught to correctly identify his feelings of agitation and effectively cope with these feelings. Specifically, using portions of a cognitive behavioral therapy manual, The Coping Cat (Kendall & Hedtke, 2006), we taught Adam to identify somatic signs of agitation. Then, Adam was shown cognitive and behavioral methods to effectively deal

with his feelings. In illustration, Adam developed lists of distracting activities he could engage in (e.g., listen to background music), resources he could use (e.g., ask for help), and relaxation strategies to employ when he felt upset (e.g., deep breathing exercises).

*Clinical Extension.* Adam's mother had also identified three other contexts from the CAI, highly associated with problem behavior, that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) "preferred activity ends or is no longer possible," (b) "disagreement or argument with or among family members, peers, or other people," and (c) "feeling anxious, frightened, or worried." As previously noted, visual representations of time have been associated with increased predictability, and consequently, decreased problem behavior in individuals with developmental disabilities (Dettmer et al., 2000). Therefore, a calendar was developed for the family to use to illustrate when a preferred activity ended (e.g., family trip to the movies) and when it would be available again. For example, on a monthly calendar, a sticker was placed on the day that a preferred activity (e.g., going to the movies) was next scheduled to take place. This visual representation of time was hung on the family's refrigerator and served as a cue relevant to predicting the reinstatement of preferred activities in the future.

Having a disagreement with others has also been shown to be associated with problem behavior in individuals with developmental disabilities (Gardner, Cole, Davidson, & Karan, 1986). Adam often displayed problem behavior after having an argument with his sisters over access to the family television. Individuals diagnosed with Asperger's Disorder are often described as rigid and rule-bound (Sansosti & Powell-Smith, 2006); therefore, a television schedule was developed as a mitigation strategy to

allow equal access to the television and/or videogames among siblings. This schedule provided organization and created usage rules for all members of the family to refer to.

Agitation and feelings of anxiety have been shown to be associated with problem behavior in individuals with developmental disabilities (Rojahn, Matson, Naglieri, & Mayville, 2004). Therefore, to address Adam's feelings of agitation and anxiety, he was encouraged to use the coping and relaxation skills he had learned in the experimental context of this study in other contexts in which he had exhibited anxiety even prior to going on medication (e.g., when people came to visit his family).

*Participant 2: Jacob*

*Mitigation Strategies for Feeling Anxious.* Research has shown that feeling anxious or worried can serve as a setting event for problem behavior (Rojahn et al., 2004). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed this event for Jacob. As previously noted, Jacob displayed problem behavior when his chain of stereotyped behavior (door closing) was interrupted (terminated by others) and he became calm when he was allowed to engage again in the ritualistic behavior. Providing an alternative, socially acceptable ritual has been shown to decrease problem behavior because it does not result in a termination of the ritual. In other words, it simply replaces the inappropriate ritual (Murphy et al., 2000). Therefore, an *alternative activity* that was viewed as more socially appropriate was made available to Jacob. Specifically, when Jacob reached for a door in his home, he was redirected to engage with a door puzzle. This wooden puzzle consisted of six doors on hinges that had different lock mechanisms. Jacob was allowed unlimited time with this puzzle; however,



when he began to engage in another appropriate activity, the door puzzle was removed to prevent satiation.

*Coping Strategies for Feeling Anxious.* Children with developmental disabilities who experience symptoms of anxiety have been shown to benefit from direct instruction on *relaxation* techniques (Mullins & Christian, 2001). Therefore, to decrease Jacob's overall level of anxiety, we taught him relaxation techniques, such as deep breathing and progressive muscle relaxation (Cautela & Groden, 1978). Relaxation techniques were directly taught to Jacob and they were demonstrated to Jacob's mother so that she could also teach them. These techniques were practiced with Jacob during two 10-min sessions each day, 3-4 days per week. When Jacob reached for a door knob, he was prompted to use his newly acquired relaxation techniques. For example, his mother said, "Jacob, squeeze your hands hard and then let go."

Research has shown that an increase in relevant *communication* skills is associated with reductions in problem behavior (Carr & Durand, 1985). Therefore, in order for Jacob to signal to his parents the times when he felt the urge to close doors, Jacob was taught to use the phrase, "I'm scared." Given his age, this statement was determined to be an appropriate verbal cue to signal his parents to provide him with the mitigation strategy previously outlined. Thus, after verbalizing his feelings, Jacob was redirected to engage with his door puzzle.

*Clinical Extension.* Jacob's mother had also identified two other contexts from the CAI that were highly associated with problem behavior and that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) "preferred activity

ends or is no longer possible” and (b) “transitions between settings or activities.”

Research has suggested that the lack of predictability associated with the end of a preferred activity and, also, transitions are associated with problem behavior in individuals with developmental disabilities (Mace et al., 1998; Schmit et al., 2000).

Verbal warnings that signal the upcoming withdrawal of a preferred activity as well as signaling an upcoming transition have been found to decrease problem behavior (Mace et al., 1998; Schmit et al., 2000). Therefore, in both problematic contexts, a verbal warning (i.e., “Jacob, three minutes until bath is all done and we go to bed”) was delivered 3 min prior to the end of the current activity. This warning made the change in activity more predictable. In addition to the verbal warning presented prior to a transition, Jacob was also presented with a picture of a reward that would be given to him upon his successful transition. Thus, this picture served as a discriminative stimulus for displaying appropriate behavior while transitioning.

### *Participant 3: Nate*

*Mitigation Strategies for Hunger.* Research has shown that hunger can serve as a setting event for problem behavior (Wacker, Harding, Cooper, Derby, Peck, Asmus, et al., 1996). Data gathered from the CAI, follow-up assessment, and baseline observations confirmed this event for Nate. *Neutralizing routines* have been shown to decrease problem behavior when introduced between the presence of a setting event (hunger) and the presentation of a discriminative stimulus (“Do your chores”) (Horner, Day, & Day, 1997). Therefore, on days in which Nate refused to eat lunch, his mother introduced a neutralizing routine (eating) by providing free access to small food items from the time he returned home from school until 30 min prior to the start of dinner. These small food

items, such as a peanut butter tube, were made available to Nate 15 min prior to the delivery of the demand to do his chores as a way of mitigating his hunger.

*Coping Strategies for Hunger.* Research has shown that including *choice* opportunities in an intervention significantly decreases problem behavior (Shogren et al., 2004). Therefore, to encourage Nate to eat his lunch at school, we gave him the opportunity to choose some of the foods to be included in his lunchbox. Including preferred foods in his lunch encouraged Nate to eat more at that meal thereby preempting subsequent hunger-related problems.

Research has also suggested that an increase in *communication* skills can be associated with reductions in problem behavior (Carr & Durand, 1985). Therefore, Nate was taught to express feelings of hunger (i.e., “I’m very hungry”) through the use of his augmentative speech device. On days in which he had refused to eat lunch at school, his mother directed him to his augmentative device at home and prompted him to communicate the presence of hunger. Upon communicating his hunger, Nate was presented with a small food item.

*Clinical Extension.* Nate’s parents had also identified three other contexts from the CAI that were highly associated with problem behavior and that negatively impacted family quality of life. Additional mitigation and coping skill strategies were developed and implemented to reduce problem behavior in the contexts of (a) “preferred activity ends or is no longer possible,” (b) “having to wait,” and (c) “transitions between settings or activities.” As previously noted, the withdrawal of a preferred activity has been shown to be associated with the display of problem behavior in individuals with developmental disabilities (Mace et al., 1998). The withdrawal of a preferred activity produces an

unpredictable environment. Importantly, the presence of a warning stimulus that indicates the pending onset of activity removal is associated with reduced rates of problem behavior (Flannery & Horner, 1994). Therefore, for the problematic context of “preferred activity ends,” a timer was used as a mitigation strategy to increase predictability. Approximately 5 min before the end of the activity (e.g., watching a video), an egg timer was set to provide a visual representation of the time remaining in the activity. In addition to a timer, a calendar was also used to mitigate the impact of “preferred activity ends.” The calendar displayed a picture of the activity on the date on which it would be available again.

Waiting has been found to be associated with problem behavior in individuals with developmental disabilities and including a neutralizing routine while waiting has been shown to reduce problem behavior (Horner et al., 1997). Therefore, in situations in which Nate was required to wait more than 10 min for an activity, a mitigation strategy was used in which Nate engaged in a preferred activity (i.e., the neutralizing routine) while waiting. Specifically, Nate was provided access to strings, wires, and shoelaces that he enjoyed tangling and untangling (neutralizing routine).

As previously noted, transitions between settings have been found to be associated with problem behavior in individuals with developmental disabilities (Schmit et al., 2000). The lack of predictability associated with transitioning is particularly problematic for these individuals; however, a mitigation strategy that includes a transitional item has been shown to be associated with a reduction in problem behavior (Cameron et al., 1992). Introducing a stimulus associated with appropriate behavior into a context typically associated with problem behavior is often associated with a reduction in

problem behavior (Gardner et al., 1986). For the problematic context of transitioning, a mitigation strategy was implemented in which Nate was provided with a transitional item (i.e., a DVD) prior to beginning the transition. Nate usually displayed problem behavior while transitioning from his home to his family's vehicle. Prior to leaving the house, Nate was given the opportunity to choose a DVD (a highly preferred object) to view once he entered the vehicle. This transitional item was associated with appropriate behavior and also gave Nate a visual reminder of the preferred activity (i.e., watching a movie) that would take place in the vehicle.

#### *Intervention Fidelity*

As outlined in Studies 1 and 2, an intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity for the experimental context (see Appendix L, that shows the intervention components for the experimental contexts for all three studies). In 25% of the baseline sessions and 33% of the intervention sessions for Adam, in 50% of the baseline sessions and 82% of the intervention sessions for Jacob, and in 50% of the baseline sessions and 57% of the intervention sessions for Nate, the investigator and each respective mother recorded whether each intervention component was implemented.

As described in Studies 1 and 2, another intervention fidelity checklist, based on the intervention components for each participant, was developed to evaluate intervention integrity for the clinical extension contexts (see Appendix M, that shows the intervention components for the clinical extension contexts for all three studies). Since these were considered "spot checks" and not part of the formal experimental demonstration, the

investigator only observed two sessions of each of the clinical extension contexts for each participant.

### *Interrater Reliability*

Using the same procedures as in Studies 1 and 2, the investigator and a parent collected reliability data on the independent and dependent variables. A binary reliability index was used to assess agreement on intervention fidelity (in both the experimental and clinical extension contexts), and for the experimental contexts only: presence of the biological context, percentage of task steps completed, latency to session termination, and reason for session termination. Thus, for each session, reliability was scored as either perfect agreement or no agreement. Agreement was defined as both observers recording the presence of the biological context, the implementation of the intervention, the same number of task steps completed, latency measures that were within 5 s of one another, and agreement on the reason for session termination (i.e., occurrence of problem behavior versus successful completion of context). For the clinical extension contexts, a binary reliability index was used to assess agreement on intervention fidelity only.

### *Participant 1: Adam*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 25% of the baseline sessions and 33% of the intervention sessions. Agreement on intervention fidelity, percentage of task steps completed, presence of the biological context, and reason for session termination was noted for 100% of both the baseline and intervention sessions. Agreement on latency to session termination was noted for 80% of the baseline sessions and 100% of the intervention

sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 2: Jacob*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 50% of the baseline sessions and 82% of the intervention sessions. Agreement on all measures was noted for 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

*Participant 3: Nate*

For the experimental context, two observers independently (but concurrently) completed reliability checks for 50% of the baseline sessions and 57% of the intervention sessions. Agreement on latency to session termination was noted for 100% of the baseline sessions and 88% of the intervention sessions. Agreement on presence of the biological context, intervention fidelity, percentage of task steps completed, and reason for session termination was noted for 100% of the baseline and intervention sessions. For all of the clinical extension contexts, agreement on intervention fidelity was noted in 100% of the intervention (“spot checks”) sessions.

## Results

### *Intervention Fidelity*

Intervention fidelity checks were completed during each of the sessions for each of the participants. In baseline, 0% of the intervention components were recorded as having been implemented by each respective parent. During intervention in the experimental contexts, 100% of the intervention components were implemented by each

respective parent. During intervention in the clinical extension contexts, 100% of the intervention components were implemented by each respective parent.

#### *Percentage of Steps Completed*

The percentage of steps completed for Adam and Nate is shown in Figure 5. In baseline, Adam completed a mean of 33% of the steps that constituted homework completion. However, during intervention, he completed a mean of 100% of the steps. In baseline, Nate completed a mean of 0% of the steps that constituted chore completion. However, during intervention, he completed 100% of the steps for 14 out of 17 sessions and 50% of the steps in the remaining three sessions. As previously noted, Jacob's problematic context (anxiety associated with perseverative behavior) did not constitute a task and, therefore, percentage of steps completed was not a relevant variable for him.

#### *Behavioral Discriminative Stimulus*

For Jacob, a binary (yes/no) measure was used to document the display of the behavioral discriminative stimulus that signaled the start of the problematic (door closing) context. The verbal discriminative stimulus was delivered for 100% of the baseline and intervention sessions.

#### *Behavioral Discriminative Stimulus*

For Jacob, a binary (yes/no) measure was used to document the display of the behavioral discriminative stimulus that signaled the start of the problematic (door closing) context. The verbal discriminative stimulus was delivered for 100% of the baseline and intervention sessions.

#### *Latency to Problem Behavior*



Figure 6 presents data on the amount of time that elapsed before the session was terminated (due to problem behavior or successful completion of activity) for the three participants. For Adam, the mean latency to problem behavior in baseline was 5 min, 24 s. During intervention, Adam did not display problem behavior; mean latency to successful homework completion was 16 min, 3 s. For Jacob, mean latency to problem behavior in baseline was 2.3 s. The mean latency to problem behavior during intervention was 5.5 s in the sessions that were terminated (2 out of 17); however, mean latency to successful completion of the session (15 out of 17 sessions) was 2 min, 29 s. For Nate, mean latency to problem behavior in baseline was 1 min, 14 s. The mean latency to problem behavior during intervention was 2 min in the sessions that were terminated (3 out of 14); however, mean latency to successful chore completion (11 out of 14 sessions) was 4 min, 46 s.

#### *Number of Sessions Terminated*

Figure 6 shows that sessions could be terminated due to the presence of intolerated problem behavior (solid black bars), tolerated problem behavior (grey bars), or successful completion of the problematic social context in the absence of problem behavior (open bars). For each participant in baseline, all sessions were terminated due to the presence of intolerated problem behavior. Following intervention for Adam, no sessions were terminated due to problem behavior. For Jacob, 2 out of the 17 sessions were terminated due to tolerated problem behavior. For Nate, 3 out of the 14 sessions were terminated due to intolerated problem behavior. In sum, following intervention, intolerated problem behavior rarely occurred.

### General Results: Studies 1, 2, and 3

In addition to outcome measures related to latency to problem behavior or latency to successful completion of routines, data were collected, across all three studies, to measure the association between multiple contexts and the overall likelihood that problem behavior would be displayed, as well as overall improvements in family quality of life. As noted earlier, global measures included the Irritability subscale of the ABC-Community (Aman & Singh, 1994) that measured global perception of level of serious problem behavior, the Resident Lifestyle Inventory (Kennedy, Horner, Newton, & Kanda, 1990) that measured family involvement in community events, the Home Situations Questionnaire (Barkley, 1981) that measured the extent to which the child's problem behavior disrupted common home situations, the Parental Locus of Control Scale (Campis, Lyman, & Prentice-Dunn, 1986) that measured the degree to which parents felt in control of their children, and the Parenting Stress Index (Abidin, 1997) that measured the amount of distress that parents felt.

The mean CAI ratings associated with experimental contexts in both baseline and following intervention for each of the nine participants are shown in Table 1. As previously noted, the context items listed were rated on a Likert scale that ranged from 1 (not likely to be associated with problem behavior) to 5 (very likely to be associated with problem behavior). Across all nine participants, the mean rating for experimental contexts in baseline was 4.67 and the mean rating for experimental contexts following intervention was 2.67. A paired sample t-test was used to examine the difference between the mean ratings on the CAI in baseline versus intervention for the experimental contexts. Ratings were significantly different suggesting that the experimental contexts were less

likely to be associated with problem behavior following intervention than in baseline,  $t(8) = 8.49, p < .05$ .

Additionally, the mean rating for clinical extension contexts in baseline was 4.65 and the mean rating for clinical extension contexts following intervention was 3.13. A paired sample t-test was used to examine the difference between the mean ratings on the CAI in baseline and following intervention for the clinical extension contexts. Ratings were significantly lower suggesting that the clinical extension contexts were less likely to be associated with problem behavior following intervention than in baseline,  $t(32) = 9.80, p < .05$ .

Table 2 shows the mean number of CAI items that were rated lower following intervention than in baseline. Recall that the CAI consists of 24 items, each potentially having many variations both within and across participants; in other words, it represents a global measure of overall problem behavior beyond the specific contexts targeted in the three studies described. As can be seen, across all participants, a mean of 1.78 items were rated higher following intervention; a mean of 9.67 items on the CAI were rated lower following intervention; a mean of 10.89 items were rated the same (i.e., unchanged) following intervention; and a mean of 1.67 items were rated as not applicable. In addition, a paired sample t-test was performed on the mean of all 24 items to compare baseline and post-intervention ratings. Mean inventory ratings were significantly lower suggesting that there was a *global* reduction in the likelihood that multiple contexts were associated with problem behavior following intervention,  $t(8) = 5.36, p < .05$ .

Paired sample t-tests were also performed on all ancillary measures of quality of life to compare scores during baseline with those following intervention. As can be seen

in Table 3, following intervention, there was a significant decrease in the global perception of the level of serious problem behavior as measured by the Irritability subscale of the ABC-Community,  $t(8) = 3.14, p < .05$ . In addition, following intervention, there was a significant increase in family involvement in community events as measured by the Resident Lifestyle Inventory,  $t(8) = -2.93, p < .05$ . As families were able to engage in more community events, the number of problematic home routines (and severity of problem behavior in problematic home routines) decreased. Thus, following intervention, there was a significant decrease in the *number* of problematic routines as measured by the Home Situations Questionnaire,  $t(8) = 3.08, p < .05$ . In addition, the *severity* of problem behavior in the problematic home routines was also rated significantly lower following intervention,  $t(8) = 4.33, p < .05$ . Following intervention, there was a significant increase in the degree to which parents felt in control of their child as measured by the Parental Locus of Control Scale,  $t(8) = -2.43, p < .05$ . Finally, following intervention, there was a decrease in the amount of stress parents experienced as measured by the Parenting Stress Index; the decrease approached significance,  $t(8) = 2.29, p = .052$ .

## General Discussion

### *Improvement in Problem Behavior and Family Quality of Life*

In a series of three studies, a context-based model of assessment and intervention for problem behavior in children with developmental disabilities was implemented and evaluated in home settings. Intervention included a variety of mitigation and coping strategies. All nine children who participated showed substantial behavioral improvement in contexts that had been identified as the most problematic by their families and the most damaging to family quality of life. Latency to problem behavior was short in baseline and the children were unable to successfully complete the tasks and activities associated with targeted contexts. Following intervention, problem behavior was sharply reduced in the problem contexts for all of the children and successful completion of tasks and activities was high. Importantly, there was also evidence of more global (generalized) reductions in problem behavior, specifically, as reflected by improved mean scores on the ABC-Community and by improvements on numerous additional items of the CAI that had not been directly targeted for specific participants.

Families noted improvements in several dimensions of quality of life. Specifically, families reported an increase in the number of community activities they were able to engage in (Resident Lifestyle Inventory) as well as a decrease in the number of problematic home routines as well as the severity of problem behavior associated with those routines (Home Situations Questionnaire). In addition, parents reported that they felt more in control of their children (Parental Locus of Control Scale). Further, there was a decrease in parental level of stress (Parenting Stress Index) that approached significance.

### *Context-Based Mechanisms of Problem Behavior Control*

Problem contexts produce problem behavior. Therefore, it was hypothesized that if we altered the problem contexts, we would be able to reduce or eliminate problem behavior. Context (setting events and discriminative stimuli) and consequences (reinforcers) interact to control behavior. Any given contextual variable can function as either a discriminative stimulus or setting event. Thus, being recently disciplined or reprimanded, for example, could function as either type of antecedent. In illustration, if a girl is reprimanded by her teacher and engages in self-injury, the teacher may respond by terminating the reprimand. In this case, being reprimanded constitutes a discriminative stimulus that directly triggers self-injurious behavior that functions to allow the girl to escape from the putatively aversive reprimand. Alternatively, if the girl was reprimanded by her teacher earlier in the day and then was given a task demand by her parents when she arrived home, she may then display self-injurious behavior and her parents might respond by removing the task demand. In this instance, being reprimanded functions as a setting event that increases the aversiveness of the task, making escape-motivated, self-injurious behavior more likely to occur in the presence of the discriminative stimulus (i.e., the task demand).

To illustrate plausible mechanisms related to the control of problem behavior, we will discuss the behavior of one child from each of the three studies.

#### *Study 1: Robert (Context: Activities and Routines)*

Recall that Robert's parents reported that he was most likely to exhibit problem behavior when asked to engage in a disliked activity (eating dinner). Robert had been diagnosed with ulcerative colitis, an inflammatory condition of the intestines, a few

months prior to the start of his participation in the current study. Until receiving a diagnosis, and subsequent medication to treat symptoms, food ingestion caused Robert considerable abdominal pain and discomfort. He had learned to engage in problem behavior to escape the pain associated with eating. Over time, the demand to eat, reliably predicted subsequent aversive stimuli (associated with food ingestion) and thus became a discriminative stimulus for problem behavior. Thus, problem behavior that occurred in response to the demand to eat had the effect of not only avoiding movement to the kitchen table, but also resulted in avoidance of having to eat.

Given the aversiveness of the eating situation, it was logical to use mitigation strategies that served to attenuate the aversiveness of the dinner routine. Embedding a preferred activity (watching a video) into the eating routine constituted a strategy that simultaneously introduced a highly desired reinforcer as well as a discriminative stimulus for nonproblem behavior (i.e., quietly watching the video). Likewise, the slow introduction of nonpreferred foods (that had an aversive texture) mixed into highly preferred foods (that had a desired pureed texture) minimized the aversiveness of eating the food as well as providing a discriminative stimulus for nonproblem behavior (i.e., consuming foods that had a history of being readily accepted by Robert). Finally, the coping skill that was taught (i.e., teaching Robert to display an “all done” card to his mother after an acceptable amount of food had been consumed) provided Robert with an appropriate behavior that could be used to terminate the mealtime in lieu of aggression and self-injury.

*Study 2: Jeana (Context: Social Interaction)*

Recall that Jeana's mother reported that Jeana was most likely to engage in problem behavior when she was denied access to short-sleeved shirts. Intermittently, such behavior caused her mother to allow her access to a short-sleeved shirt (e.g., when the family was running late for an appointment and needed to get Jeana out of the house quickly). In other words, problem behavior was occasionally reinforced by access to short-sleeved shirts. Thus, problem behavior, that followed denial of access to a short-sleeved shirt, was positively reinforced, on an intermittent schedule. In this manner, the demand to wear a long-sleeved shirt came to function as a discriminative stimulus for problem behavior.

Given that Jeana's tantrums and aggressive behavior were evoked by her being denied access to short-sleeved shirts, it was logical to use a mitigation strategy that provided clear signals as to when those shirts might again be available. Thus, the use of a visual schedule, that showed Jeana being able to access a short-sleeved shirt at the end of each school day when she returned home, made access to that shirt a predictable event, thereby signaling that the shirt was not permanently unavailable. Further, it was logical to teach a coping strategy that provided access to desirable alternatives to the short-sleeved shirts, thereby compensating for the temporary unavailability of those shirts. Thus, teaching Jeana the skill of expressing preferences for carefully selected and highly desirable long-sleeved shirts (e.g., with preferred cartoon characters) and then choosing one of them, allowed her to access a desirable alternative shirt thereby undermining aggressive and self-injurious behavior that had functioned to gain access to desired shirts.

*Study 3: Nate (Context: Biological)*



Recall that Nate's mother reported that he was most likely to engage in problem behavior (aggression and self-injury) when asked to do his chores at a time when he was hungry. On days that Nate had eaten all of his lunch at school and was asked to complete his chores at home, he complied without exhibiting problem behavior. However, on days in which Nate refused to eat his lunch at school and was asked to complete his chores at home, he displayed significant problem behavior. Therefore, hunger was plausibly a setting event for Nate's problem behavior. That is, hunger was a variable that increased the aversiveness of the demand (chores), thereby strengthening any behavior that reliably allowed Nate to escape from having to comply with the demand. In other words, Nate's problem behavior was negatively reinforced to a greater degree when the setting event was present than when it was not.

Given the aversiveness of chores within the context of hunger, it was logical to employ a mitigation strategy to attenuate hunger immediately prior to the demand to do chores. Thus, the neutralizing routine used (i.e., intermittent free access to small snacks leading up to the delivery of the demand) reduced hunger, thereby presumably making the demand to do chores less aversive and undermining the necessity for escape-motivated problem behavior. Similarly, it was logical to teach a coping strategy (i.e., allowing Nate, at home, to choose several preferred foods to be included in his lunchbox for the following school day) that resulted in Nate eating a normal lunch, thereby eliminating hunger. Thus, presumably, when he arrived home from school, later in the day, he was no longer hungry as before and, therefore, the demand to do chores was not as aversive. In this manner, a coping skill was taught that had the effect of preempting subsequent problem behaviors.

### *Implications of a Context-Based Intervention Approach*

Context-based intervention involves the introduction of stimuli associated with appropriate behavior into contexts that contain stimuli associated with problem behavior. The introduction of the competing stimuli can be done by the individual with a developmental disability himself/herself or by other adults in his/her environment. Using this generic model, it is possible to generate a great variety of intervention strategies that can be tailored to each specific context. More specifically, to address problematic activity and social contexts, one can select discriminative stimuli and/or setting events that evoke appropriate behaviors that compete with and replace discriminative stimuli and setting events that evoke problem behavior. A second consideration, specific to biological contexts, is to address the physiological factors related to the context. For example, providing food to mitigate hunger or the opportunity to nap to mitigate fatigue are strategies that address the physiological factors that impact an individual's behavior.

### *Ecological and Social Validity*

Much assessment and intervention research on problem behavior involves the use of controlled laboratory and analog situations that simulate aspects of the natural environment (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). While this line of research has been critical in identifying the factors that control problem behavior, as well as providing important guidelines for intervention strategies, questions remain regarding the applicability of this information to naturalistic environments (Carr et al., 2002). The data produced across the three studies described suggest that context-based strategies are robust with respect to several dimensions of ecological validity. Specifically, they are

applicable in natural settings (e.g., family homes) by natural intervention agents (e.g., parents) within natural routines (e.g., eating dinner, getting dressed, doing chores).

The social validity (clinical significance) of intervention strategies is also an important issue to address (Wolf, 1978). Results of the ancillary quality of life measures suggest that parents affirmed intervention effects in important aspects of their lives beyond those pertaining to the reduction of problem behavior per se. Specifically, there were improvements with respect to participation in community activities, behavior during home routines, parental sense of control over their child's behavior, and overall parental stress level. Together, these improvements were clinically significant for families in that they rated their daily life experiences more positively.

#### *Concluding Comment*

Context-based interventions for problem behavior help alter the focus of research towards a more global, systemic analysis of the individual in his/her environment. One important aspect of the present studies, pertained to the partnership with parents in terms of their facilitating ecologically valid assessment, establishing intervention priorities, and selecting interventions (from many possible options) that they decided were appropriate for their particular home and community settings. Thus, these studies contribute to a growing literature in which families of children with developmental disabilities who display problem behavior are active participants in research (Lucyshyn et al., 1997). Our data make clear that the benefits of this partnership are not only a reduction in serious problem behavior but also an improvement in overall family quality of life.

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## Appendix A

### Aberrant Behavior Checklist – Community: Irritability Subscale

#### INSTRUCTIONS

The ABC-Community rating scale is designed to be used with clients living in the community. Please note that the term client is used throughout to refer to the person being rated. This may be a child of school age, an adolescent, or an adult.

Please rate this client's behavior for the last four weeks. For each item, decide whether the behavior is a problem and circle the appropriate number:

- 0 = not at all a problem
- 1 = the behavior is a problem but slight in degree
- 2 = the problem is moderately serious
- 3 = the problem is severe in degree

When judging the client's behavior, please keep the following points in mind:

(a) Take relative *frequency* into account for each behavior specified. For example, if the client averages more temper outbursts than most other clients you know or most others in his/her class, it is probably moderately serious (2) or severe (3) even if these occur only once or twice a week. Other behaviors, such as noncompliance, would probably have to occur more frequently to merit an extreme rating.

(b) If you have access to this information, consider the experiences of other care providers with this client. If the client has problems with others but not with you, try to take the whole picture into account.

(c) Try to consider whether a given behavior interferes with his/her *development, functioning, or relationships*. For example, body rocking or social withdrawal may not disrupt other children or adults, but it almost certainly hinders individual development or functioning.

*Do not spend too much time on each item – your first reaction is usually the right one.*

1. Injures self on purpose	0	1	2	3
2. Aggressive to other children or adults (verbally or physically)	0	1	2	3
3. Screams inappropriately	0	1	2	3
4. Temper tantrums/outbursts	0	1	2	3
5. Irritable and whiny	0	1	2	3
6. Yells at inappropriate times	0	1	2	3
7. Depressed mood	0	1	2	3
8. Demands must be met immediately	0	1	2	3
9. Cries over minor annoyances and hurts	0	1	2	3
10. Mood changes quickly	0	1	2	3
12. Stamps feet or bangs objects or slams doors	0	1	2	3
13. Deliberately hurts himself/herself	0	1	2	3
14. Does physical violence to self	0	1	2	3
15. Has temper outbursts or tantrums when he/she does not get own way	0	1	2	3



Appendix B

# Contextual Assessment Inventory for Families: Initial Screening

## Part I: Background Information

ID# \_\_\_\_\_  
(researcher use only)

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

Relationship to the child you are rating (e.g. mother, father, sister, grandmother): \_\_\_\_\_

If you are not a biological parent, please indicate how long you have known the child: \_\_\_\_\_

On average, how many hours per day do you spend with your child on weekdays? \_\_\_\_\_  
on weekends/holidays? \_\_\_\_\_

Child's age: \_\_\_\_\_ Child's sex (circle one): M F Child's diagnosis: \_\_\_\_\_

IQ Score if known (e.g. score from WISC or Stanford-Binet IQ test) \_\_\_\_\_

Please circle the number that best corresponds to how well your child is able to communicate:

Poor		Average		Excellent
1	2	3	4	5

List the name, the dosage level, benefits, and side effects of each medication that your child currently takes:

Name of Medication	Dosage Level	Observed Benefits of Medication	Observed Side Effects of Medication
Example: Paxil	10 mg 2x/day	Less compulsive behavior	Fatigue during the day

Please list any chronic health problems that your child has (e.g. diabetes, seizures, etc.)

Please list any psychiatric problems that your child has (e.g. anxiety, depression, obsessive-compulsive disorder, bipolar disorder, etc.)

Continue on the back of this page if more space is needed for any of the questions.

Department of Psychology

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### Instructions

Listed below are some of the most common types of problem behavior. **Please rate how often your child has shown aggression, self-injury, tantrum behavior, and noncompliance over the past year. When you do the rating, please circle only one number for each item. You may also circle “Never” or “Don’t Know” if appropriate.** Examples are given to illustrate each type of problem behavior. Please keep in mind that your child may show other examples of these problem behaviors, and you should also consider these when rating your child’s behavior.

**Please rate how often your child has shown aggression, self-injury, tantrum behavior, and noncompliance over the past year.**

		Rarely		Sometimes		Often
<b>(1) Aggression</b>						
(e.g. <i>Hurts others</i> : hits, kicks, pinches, head butts, bites, punches, scratches others; pulls others’ hair. <i>Destroys property</i> : breaks, rips, tears objects. <i>Threatens others</i> )	Never	1	2	3	4	5
	Don’t Know					
<b>(2) Self-injury</b>						
(e.g. hits head, bangs head on walls or other objects, bites hands, slaps or punches own face)	Never	1	2	3	4	5
	Don’t Know					
<b>(3) Tantrum Behavior</b>						
(e.g. angry crying or screaming)	Never	1	2	3	4	5
	Don’t Know					
<b>(4) Noncompliance</b>						
(e.g. refuses to do tasks, pushes away work materials, runs away from adults, falls to floor and refuses to move)	Never	1	2	3	4	5
	Don’t Know					
<b>(5) Other problem behavior</b>						
	Never	1	2	3	4	5

Please list other problem behaviors, not covered above, that you find upsetting.

**Don't Know**

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**Please answer the following questions with regard to your child's overall problem behavior during the past year.**

(1) Overall, my child's problem behavior occurs:

<b>Rarely</b>		<b>Sometimes</b>		<b>Often</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

(2) Overall, the intensity of my child's problem behavior is:

<b>Mild</b>		<b>Moderate</b>		<b>Severe</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

(3) Overall, my child's problem behavior disrupts our family life:

<b>A little</b>		<b>Somewhat</b>		<b>A lot</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

(4) Overall, my child's problem behavior upsets me:

<b>A little</b>		<b>Somewhat</b>		<b>A lot</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

(5) Overall, my child's problem behavior upsets him or her:

<b>A little</b>		<b>Somewhat</b>		<b>A lot</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

**Please circle the number that best represents the overall quality of the relationship between you and your child over the past year.**

**UNSATISFYING**

**SATISFYING**

-----1-----2-----3-----4-----5-----

The majority of my interactions with my child are awkward, unpleasant, and stressful. I do not feel particularly close to my child, and oftentimes, it is difficult to find any "common ground."

The majority of my interactions with my child are neutral, that is, not particularly good or bad. While I care for my child, I don't feel particularly close or "connected" to him/her in any meaningful way.

The majority of my interactions with my child are enjoyable, satisfying, and interesting. Together, we share a warm, open, balanced relationship. I find that we have a lot in common and enjoy each other's company.

## Part II: Individual Items with Specific Examples

### Instructions

Listed below are different situations that may make your child more likely to show problem behavior. Some of these situations may trigger problem behavior immediately, and others may put your child in a bad mood, causing problem behavior later on. Examples are given of each situation. Please read through these examples, keeping in mind the experiences you have had with your own child *over the past year*. Although these examples are given to illustrate each situation, you should remember that **many other examples are also possible**. In Part III, you will rate how likely it is that your child will show problem behavior in each of the situations described. When you clearly understand each item, you should continue on to Part III to rate your child. Note: "your child" simply refers to the child you are rating, whether or not the child is actually your son or daughter.

#### SOCIAL

The following items describe aspects of the social environment that may make it more likely that your child will show problem behavior.

#### 1. Disagreement or argument with or among family members, peers, or other people

**Examples:** Your child shows problem behavior when he or she argues with a peer over a toy, when he or she argues with you about school, or when he or she witnesses an argument between family members or peers.

#### 2. Recently disciplined or reprimanded

**Examples:** Your child shows problem behavior when you discipline or reprimand him or her for making a mess during dinner, running away from you in public, or not listening to your instructions.

#### 3. Peer or other person is teasing your child

**Examples:** Your child shows problem behavior when a peer calls your child "stupid", or when a peer makes fun of your child's appearance.

#### 4. Hurried or rushed

**Examples:** Your child shows problem behavior when you hurry your child to get ready in the morning to avoid being late for school, or when you rush your child in order to make an appointment on time.

#### 5. Not enough attention from parents, peers, or others

**Examples:** Your child shows problem behavior when you are busy and can't pay attention to him or her, when peers ignore your child on the playground, or when a favorite person is not available to socialize with.

**6. Frustrated because he or she has trouble communicating with you about what he or she wants or needs**

**Examples:** Your child shows problem behavior when you can't understand what he or she is trying to say, or when he or she points to something and you do not understand what he or she wants.

**7. Denied access to what he or she wants**

**Examples:** Your child shows problem behavior when he or she asks for a toy or food and is told that he or she can't have it.

**8. Bad day at school or other daytime activity**

**Examples:** Your child shows problem behavior in the *evening*, and you know that *earlier in the day*, he or she had trouble with teachers, peers at school, co-workers, or experienced some other unpleasant social event in the community.

**ACTIVITIES AND ROUTINES**

**The following items describe aspects of your child's activities or routines that may make it more likely that your child will show problem behavior.**

**9. A preferred activity ends or is no longer possible**

**Examples:** Your child shows problem behavior when he or she is told to stop playing with his or her toys and get ready for bed, or when important personal items are lost and broken.

**10. Activities or routines that are difficult, frustrating, disliked, or boring**

**Examples:** Your child shows problem behavior when he or she is having trouble tying his or her shoes, when he or she is doing homework, when he or she is told to brush her teeth, when he or she is told to take a bath.

**11. Activity is too long**

**Examples:** Your child shows problem behavior when he or she is asked to do activities that take too long. (Activities that require longer engagement than your child is able to tolerate.)

**12. Activity is too noisy and/or crowded**

**Examples:** Your child shows problem behavior when he or she is taken shopping in a busy mall, or when he or she is participating in a loud birthday party, or when he or she hears a vacuum cleaner.

**13. Having to wait**

**Examples:** Your child shows problem behavior when he or she has to wait in a line, wait in a waiting room, or has to ride in a car for a prolonged period of time before reaching his or her destination.

**14. Medical appointments or medical settings**

**Examples:** Your child shows problem behavior when he or she is examined by a doctor or a dentist.

**15. Changes in routine, or has to deal with new and unfamiliar situations**

**Examples:** Your child shows problem behavior when you have to change his or her bath time, when a new babysitter comes, when he or she has to go with you into an unfamiliar store in the community.

**16. Transitions between settings or activities**

**Examples:** Your child shows problem behavior when he or she has to move from one setting to another (e.g. from home to the school bus, from a shopping mall to the family car) or switch activities (e.g. from playing outside to playing inside).

**BIOLOGICAL**

**The following items refer to your child’s state of health, as well as physical conditions that may make it more likely that your child will show problem behavior.**

**Medications**

**17. Side effects of medication or changes in medication**

**Examples:** Your child shows problem behavior when first put on medication, when the dosage level of his or her medication is increased or decreased, when your child switches from one medication to another, or when your child is taken off medication.

**Illness**

**18. Illness or pain**

**Examples:** Your child shows problem behavior when he or she experiences discomfort due to a cold, constipation, ear infection, stomachache, menstruation, or other physical ailment.

**Body States**

**19. Feeling tired**

**Examples:** Your child shows problem behavior when he or she is tired because of physical activity or lack of sleep.

**20. Feeling hungry or thirsty**

**Examples:** Your child shows problem behavior when he or she hasn’t eaten for several hours.

**21. Feeling hot and uncomfortable**

**Examples:** Your child shows problem behavior when he or she is uncomfortable because of hot and/or humid weather, when the room is too warm, or when sweating after a lot of exercise.

**22. Feeling frightened, worried, anxious, or agitated**

**Examples:** Your child shows problem behavior when he or she sees a large dog, hears thunder, is in a dark room, or is fearful due to a psychiatric condition, such as obsessive-compulsive disorder, or some other anxiety disorder.

**23. Feeling sad or depressed**

**Examples:** Your child shows problem behavior when in a he or she is sad or depressed due to a death in the family, other personal loss or disappointment, or is in a depressed mood due to a psychiatric condition, such as bipolar disorder or major depression.

**24. Sexual frustration**

**Examples:** Your child shows problem behavior as a consequence of not being able to meet his or her sexual needs.

**Part III: Contextual Assessment Inventory**

**Instructions**

For each item, please rate how likely it is that your child will show problem behavior in the situation described. Please circle *only one number per item*. When completing the ratings, consider your child’s problem behavior *over the past year*. If the situation doesn’t apply to your child, you should circle **NA (Not Applicable)**. For example, if your child is a boy, then item #23, menstrual discomfort, is not applicable to your child. Therefore, you should circle NA for that item. Given that family members have different roles and experiences within the family, you may not have had experience with your child in a given situation. If you have not had experience with your child in the situation described, you should circle **DK (Don’t Know)**. For example, item # 3 refers to peers teasing your child, and item # 8 refers to your child having a bad day at school. If you have no clear knowledge of your child in these situations, then you should circle DK. *Please do not guess on any items. If you are not sure how your child would respond in a given situation, you should circle DK.* If you do not understand an item, you should refer back to the item examples described in Part II.

**SOCIAL**

The following items describe aspects of the social environment that may make it more likely that your child will show problem behavior.

Please rate how likely it is that your child will show problem behavior in the situations described. When completing the ratings, consider your child’s problem behavior *over the past year*.

	Not Likely	Somewhat Likely	Very Likely	Don’t Know	Not Applicable		
1. Disagreement or argument among family members, peers, or other people	1	2	3	4	5	DK	NA
2. Recently disciplined or							

reprimanded	1	2	3	4	5	DK	NA
3. Peer or other person was teasing your child	1	2	3	4	5	DK	NA
4. Hurried or rushed	1	2	3	4	5	DK	NA
5. Not enough attention from parents, peers, or others	1	2	3	4	5	DK	NA
6. Frustrated because he or she has trouble communicating with you about what he or she wants or needs	1	2	3	4	5	DK	NA
7. Denied access to what he or she wants	1	2	3	4	5	DK	NA
8. Bad day at school or other daytime activity.	1	2	3	4	5	DK	NA

Are there any other types of social interactions that make it more likely that your child will show problem behavior?

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**ACTIVITIES AND ROUTINES**  
**The following items describe aspects of your child’s activities or routines that may make it more likely that your child will show problem behavior.**

**Please rate how likely it is that your child will show problem behavior in the situations described. When completing the ratings, consider your child’s problem behavior *over the past year*.**

	Not Likely	Somewhat Likely	Very Likely	Don’t Know	Not Applicable		
9. A preferred activity ends or is no longer possible	1	2	3	4	5	DK	NA
10. Activities or routines that are difficult, frustrating, disliked, or boring	1	2	3	4	5	DK	NA
11. Activity is too long	1	2	3	4	5	DK	NA
12. Activity is too noisy and/or	1	2	3	4	5	DK	NA



crowded

13. Having to wait	1	2	3	4	5	DK	NA
14. Medical appointments or medical settings	1	2	3	4	5	DK	NA
15. Changes in routine, or has to deal with new and unfamiliar situations	1	2	3	4	5	DK	NA
16. Transitions between settings or activities	1	2	3	4	5	DK	NA

Are there any other factors related to activities or your child’s routine that make it more likely that he or she will show problem behavior?

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**BIOLOGICAL**

The following items refer to your child’s state of health and physical conditions that may make it more likely that your child will show problem behavior.

Please rate how likely it is that your child will show problem behavior in the situations described. When completing the ratings, consider your child’s problem behavior *over the past year*.

	Not Likely	Somewhat Likely	Very Likely	Don’t Know	Not Applicable		
<b><u>Medications</u></b>							
17. Side effects of medication or changes in medication	1	2	3	4	5	DK	NA
<b><u>Illness</u></b>							
18. Illness or pain	1	2	3	4	5	DK	NA
<b><u>Body States</u></b>							
19. Feeling tired	1	2	3	4	5	DK	NA

20. Feeling hungry or thirsty	1	2	3	4	5	DK	NA
21. Feeling hot and uncomfortable	1	2	3	4	5	DK	NA
22. Feeling frightened, worried, anxious or agitated	1	2	3	4	5	DK	NA
23. Feeling sad or depressed	1	2	3	4	5	DK	NA
24. Sexual frustration	1	2	3	4	5	DK	NA

Are there any other factors related to medication, illness, or your child's body state that make it more likely that he or she will show problem behavior?

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## Appendix C

### Resident Lifestyle Inventory

**Instructions:** For each of the following items, please indicate if your child (a) performs/enjoys the activity and (b) how often the activity occurs.

Activity	Does your child perform/enjoy activity?			# of times performed in past 30 days
	Yes (Y)	No (N)	Neutral (0) Don't Know (DK)	
Exercise (walk, ride bike, swim)				
Dance				
Attend camp				
Take music lessons				
Attend art classes				
Attend club meetings (girl/boy scouts)				
Attend hobby/interest club (model airplane)				
Attend parties/dances				
Attend concerts				
Attend an exhibit/show (art, dog)				
Go to museum				
Go to aquarium/zoo				
Go to amusement park				
Go to arcade				
Attend religious services				
Attend sporting events				
Go to a movie				
Use the library				
Go to the park				
Attend fair or circus				
Watch a parade				
Visit with family/friends				
Eat at fast food restaurant				
Eat at sit-down restaurant				
Use vending machines				
Purchase snack/beverage				

## Appendix D

### Home Situations Questionnaire

**Instructions:** Does your child present any problems with compliance to instructions, commands, or rules for you in any of these situations? If so, please circle the word *YES* and then circle a number beside that situation that describes how severe the problem is for you. If your child is not a problem in a situation, circle *NO* and go on to the next situation on the form.

Situations	Yes/No			If yes, how severe?								
	Yes	No	N/A	Mild					Severe			
While playing alone	Yes	No	N/A	1	2	3	4	5	6	7	8	9
While playing with other children	Yes	No	N/A	1	2	3	4	5	6	7	8	9
At mealtimes	Yes	No	N/A	1	2	3	4	5	6	7	8	9
Getting dressed	Yes	No	N/A	1	2	3	4	5	6	7	8	9
Washing and bathing	Yes	No	N/A	1	2	3	4	5	6	7	8	9
While you are on the telephone	Yes	No	N/A	1	2	3	4	5	6	7	8	9
While watching television	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When visitors are in your home	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When you are visiting someone's home	Yes	No	N/A	1	2	3	4	5	6	7	8	9
In public places (restaurants, stores, church, etc.)	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When father is home	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When asked to do chores	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When asked to do homework	Yes	No	N/A	1	2	3	4	5	6	7	8	9
At bedtime	Yes	No	N/A	1	2	3	4	5	6	7	8	9
While in the car	Yes	No	N/A	1	2	3	4	5	6	7	8	9
When with a babysitter	Yes	No	N/A	1	2	3	4	5	6	7	8	9

Total:

Mean Score:

## Appendix E

### Parenting Locus of Control Scale

**Instructions:** Please rate the degree to which you agree/disagree with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. What I do has little effect on my child's behavior	1	2	3	4	5
2. When something goes wrong between me and my child, there is little I can do to correct it	1	2	3	4	5
3. If your child tantrums no matter what you try, you might as well give up	1	2	3	4	5
4. My child usually ends up getting his/her way, so why try	1	2	3	4	5
5. I am often able to predict my child's behavior in situations	1	2	3	4	5
6. It is not always wise to expect too much from my child because many things turn out to be a matter of good or bad luck anyway	1	2	3	4	5
7. When my child gets angry, I can usually deal with him/her if I stay calm	1	2	3	4	5
8. When I set expectations for my child, I am almost certain that I can help him/her meet them	1	2	3	4	5
9. When my child is well-behaved, it is because he/she is responding to my efforts	1	2	3	4	5
10. I am responsible for my child's behavior	1	2	3	4	5
11. My life is chiefly controlled by my child	1	2	3	4	5
12. My child does not control my life	1	2	3	4	5
13. My child influences the number of friends I have	1	2	3	4	5
14. I feel like what happens in my life is mostly determined by my child	1	2	3	4	5
15. When I make a mistake with my child I am usually able to correct it	1	2	3	4	5
16. Even if your child has frequent tantrums, a parent should not give up	1	2	3	4	5
17. I always feel in control when it comes to my child	1	2	3	4	5
18. My child's behavior is more than I can handle	1	2	3	4	5
19. Sometimes I feel that my child's behavior is hopeless	1	2	3	4	5
20. It is often easier to let my child have his/her way than to put up with a tantrum	1	2	3	4	5
21. I find that sometimes my child can get me to do things I really did not want to do	1	2	3	4	5
22. My child often behaves in a manner very different from the way I would want him/her to behave	1	2	3	4	5
23. Sometimes when I'm tired, I let my child do things I normally wouldn't	1	2	3	4	5
24. Sometimes I feel that I do not have enough control over the direction my child's life is taking	1	2	3	4	5
25. I allow my child to get away with things	1	2	3	4	5

## Appendix F

### Parenting Stress Index

SA = Strongly Agree    A=Agree    NS=Not Sure    D=Disagree    SD=Strongly Disagree

1. I often have the feeling that I cannot handle things very well	SA	A	NS	D	SD
2. I find myself giving up more of my life to meet my children's needs than I ever expected	SA	A	NS	D	SD
3. I feel trapped by my responsibilities as a parent	SA	A	NS	D	SD
4. Since having this child, I have been unable to do new and different things	SA	A	NS	D	SD
5. Since having a child, I feel that I am almost never able to do things that I like to do	SA	A	NS	D	SD
6. I am unhappy with the last purchase of clothing I made for myself	SA	A	NS	D	SD
7. There are quite a few things that bother me about my life	SA	A	NS	D	SD
8. Having a child has caused more problems that I expected in my relationship with my spouse (or male/female friend)	SA	A	NS	D	SD
9. I feel alone and without friends	SA	A	NS	D	SD
10. When I go to a party, I usually expect not to enjoy myself	SA	A	NS	D	SD
11. I am not as interested in people as I used to be	SA	A	NS	D	SD
12. I don't enjoy things as I used to	SA	A	NS	D	SD
13. My child rarely does things for me that make me feel good	SA	A	NS	D	SD
14. Sometimes I feel my child doesn't like me and doesn't want to be close to me	SA	A	NS	D	SD
15. My child smiles at me much less than I expected	SA	A	NS	D	SD
16. When I do things for my child, I get the feeling that my efforts are not appreciated very much	SA	A	NS	D	SD
17. When playing, my child doesn't often giggle or laugh	SA	A	NS	D	SD
18. My child doesn't seem to learn as quickly as most children	SA	A	NS	D	SD
19. My child doesn't seem to smile as much as most children	SA	A	NS	D	SD
20. My child is not able to do as much as I expected	SA	A	NS	D	SD
21. It takes a long time and it is very hard for my child to get used to new things	SA	A	NS	D	SD
For the next statement, choose your response from the choices "1" to "5" below					
22. I feel that I am:	1	2	3	4	5
1. not very good at being a parent					
2. a person who has some trouble being a parent					
3. an average parent					
4. a better than average parent					
5. a very good parent					
23. I expected to have closer and warmer feelings for my child than I do and this bothers me	SA	A	NS	D	SD
24. Sometimes my child does things that bother me just to be mean	SA	A	NS	D	SD
25. My child seems to cry or fuss more often than most children	SA	A	NS	D	SD
26. My child generally wakes up in a bad mood	SA	A	NS	D	SD

- |  |    |   |    |   |    |
|--|----|---|----|---|----|
| 27. I feel that my child is very moody and easily upset                                    | SA | A | NS | D | SD |
| 28. My child does a few things which bother me a great deal                                | SA | A | NS | D | SD |
| 29. My child reacts very strongly when something happens<br>that my child doesn't like     | SA | A | NS | D | SD |
| 30. My child gets upset easily over the smallest thing                                     | SA | A | NS | D | SD |
| 31. My child's sleeping or eating schedule was much harder to<br>establish than I expected | SA | A | NS | D | SD |

For the next statement, choose your response from the choices "1" to "5" below

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 32. I have found that getting my child to do something or stop<br>doing something is: | 1 | 2 | 3 | 4 | 5 |
| 1. much harder than I expected  |   |   |   |   |   |
| 2. somewhat harder than I expected  |   |   |   |   |   |
| 3. about as hard as I expected  |   |   |   |   |   |
| 4. somewhat easier than I expected  |   |   |   |   |   |
| 5. much easier than I expected  |   |   |   |   |   |

For the next statement, choose your response from the choices "10+" to "1-3"

- |   |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|
| 33. Think carefully and count the number of things which your child does that bothers you | 10+ | 8-9 | 6-7 | 4-5 | 1-3 |
| 34. There are some things that my child does that really bother<br>me a lot               | SA  | A   | NS  | D   | SD  |
| 35. My child turned out to be more of a problem than I expected                           | SA  | A   | NS  | D   | SD  |
| 36. My child makes more demands on me than most children                                  | SA  | A   | NS  | D   | SD  |

Appendix G

Follow-up Questions (from O'Neill et al., 1997)

(1) What kind of *specific activity* are you referring to? \_\_\_\_\_

\_\_\_\_\_

(2) With *whom* is problem behavior most likely to occur? \_\_\_\_\_

\_\_\_\_\_

(3) In what *setting* is problem behavior most likely to occur? \_\_\_\_\_

\_\_\_\_\_

(4) During what *time of day* is problem behavior most likely to occur? \_\_\_\_\_

\_\_\_\_\_

(5) What is your *response* to problem behavior? \_\_\_\_\_

\_\_\_\_\_

(6) What is your *child's reaction*? \_\_\_\_\_

\_\_\_\_\_



## Appendix H

### Problem Solving Template (from Stiebel, 1999)

1. Identifying the problematic routine.
2. Identifying possible reasons for problem behavior in that routine.
3. Brainstorming solutions.
4. Discussing pros and cons of each solution.
5. Selecting the solution that fits best with the routine of interest.
6. Planning a strategy for implementing the solution.
7. Reviewing key questions relevant to the solution:
  - a. What are the family goals for the routine?
  - b. Do the solutions support your goals for the routine?
  - c. Will the solutions work over an extended period of time (6-12) months?
  - d. Are you comfortable with what you'll be doing?
8. Planning a follow-up meeting to discuss progress and to troubleshoot.

## Appendix I

### Components and Rationale for Interventions Used in Each Context

Participant	Context	Intervention(s)	Rationale
John	Transition*	Visual schedule	To show upcoming activities
		Visual representation of time	To show amount of time left until transition will take place
		Behavioral momentum	Effects of high rate of reinforcement during preferred activity will carry over to nonpreferred activity
		Choice of activity reinforcer	To motivate child to complete transition in order to gain access to activity upon returning home
		Functional communication	To gain access to item associated with appropriate behavior
	Denied access	Visual representation of time	To show amount of time until access is allowed
	Preferred activity ends	Visual representation of time	To show amount of time until activity will end
	Activities that are disliked	Visual schedule	To show upcoming preferred activity
		Visual representation of time	To show duration of disliked activity
	Changes in routine/new situations	Visual schedule	To increase predictability of new routine
		Social story	To give information on new situation
	Having to wait	Visual representation of time	To show duration of wait time
	Gregory	Preferred activity ends*	Access to preferred object
Verbal warning			To tell amount of time until preferred activity ends
Functional communication			To introduce discriminative stimulus associated with appropriate behavior
Activities that are disliked		Visual schedule	To show upcoming preferred activity
		Verbal warning	To indicate duration of disliked activity
Changes in routine/new situations		Visual schedule	To increase predictability of new routine
Hurried/rushed		Verbal warning	To indicate upcoming sequence of events

Note: Asterisks denote “experimental” problem contexts. All other contexts shown constitute the “clinical extension.”

cont.

Participant	Context	Intervention(s)	Rationale
Robert	Disliked Routine*	Embedding	To introduce stimuli associated with appropriate behavior (eating)
		Location of meal (living room → kitchen table)	To slowly introduce stimuli associated with appropriate behavior into problematic context
		Introduction of new food	To decrease food selectivity
		Functional communication	To provide appropriate way to indicate meal completion
	Transitions	Visual representation of time	To provide warning about upcoming transition
	Medical Appointments	Social Stories	To provide predictability about upcoming appointment
	Activity is too noisy	Functional communication	To provide signal that environment is too noisy as well as the need to leave
	Feeling tired	Establish bedtime routine	To increase predictability and prepare child for sleep
Jeana	Denied Access*	Embedding	To introduce preferred stimuli into problematic context
		Visual schedule	To signal upcoming access to preferred item
		Choice	To provide alternatives in problematic context
	Transitions	Visual representation of time	To show amount of time until activity will end
	Preferred activity ends	Visual representation of time	To show amount of time until activity will end
	Having to wait	Visual representation of time	To show duration of wait time
	Activities that are disliked (sleep)	Establish routine	To increase predictability of sleeping routine
	Feeling tired	Establish bedtime routine	To increase predictability and prepare child for sleep
		Redirect during wakings	To have child learn to self-sooth and return to sleep

Note: Asterisks denote “experimental” problem contexts. All other contexts shown constitute the “clinical extension.”

cont.

Participant	Context	Intervention(s)	Rationale	
Victoria	Not enough attention from parents, peers, others*	Provide access to preferred item	To introduce a discriminative stimulus associated with appropriate behavior	
		Scheduled attention	To give undivided attention at later point in the day	
		Visual schedule	To increase predictability	
		Functionally equivalent communication	To teach appropriate ways to ask for attention	
		Choice	To allow the opportunity to choose preferred item when adult attention is not available	
	Hurried/rushed	Visual schedule	To show upcoming activities	
		Adult attention	To introduce event associated with appropriate behavior	
	Having to wait	Adult attention	To introduce event associated with appropriate behavior	
	Activities that are too long	Verbal warning	To alert to duration of activity	
		Adult attention	To introduce event associated with appropriate behavior	
	Denied Access	Visual representation of time/verbal warning	To inform of time when access to item will be allowed	
	Jeffrey	Being disciplined or reprimanded*	Content of correction language	To change association between correction discriminative stimulus and problem behavior
			Timing of correction	To make correction functionally the same as assistance
Behavioral momentum			Effects of high rate of reinforcement for easy problems will carry over to difficult problems	
Functionally equivalent communication			To teach appropriate way to ask for help with difficult problem	
Preferred activity ends		Verbal warning	To signal upcoming end of activity	
		Visual representation of time	To provide predictability for when activity will be available again	
Activities that are difficult (bedtime)		Stuffed animal/shaping	To allow access to preferred object for staying up later	
Medical appointments		Social Story	To provide predictability about what will occur at appointment	

Note: Asterisks denote “experimental” problem contexts. All other contexts shown constitute the “clinical extension.”

cont.

Participant	Context	Intervention(s)	Rationale
Adam	Medication side effects*	Shorter tasks	To divide larger task into parts
		Organizing tasks	To provide more organization and make tasks less effortful
		Provide assistance	To provide extra support to child during homework
		Teach coping skills	To help recognize signs of anxiety and use effective ways to cope with feelings
	Preferred activity ends	Visual representation of time	To increase predictability and to show when access is available again
	Disagreement with others (siblings)	TV/videogame schedule	To allow equal access to subject of disagreement
	Anxious/worried/agitated	Teach coping skills	To help child recognize signs of anxiety and effective ways to cope with feelings
Jacob	Feeling frightened, worried, anxious, or agitated*	Alternative activity	To allow display of compulsion in socially appropriate way
		Teach relaxation skills	To decrease overall level of anxiety
		Functionally equivalent communication	To verbalize anxious feelings to parents so they can implement intervention
	Preferred activity ends	Verbal warning	To show remaining duration of preferred activity
	Transitions	Verbal warning	To tell amount of time left until transition will take place
		Visual representation of preferred item	To increase likelihood child will transition successfully
Nate	Hunger or Thirst*	Neutralizing routine	To decrease feelings of hunger as mealtime approaches
		Choice	To increase likelihood child will eat bigger portions
		Functionally equivalent communication	To allow child the opportunity to express need for food
	Preferred activity ends	Visual representation of time Calendar	To show remaining duration of preferred activity and to provide visual representation of when activity will be available again
	Having to wait	Neutralizing routine	To introduce stimuli associated with appropriate behavior
	Transitions	Transition item (DVD)	To provide child with motivation to transition to car

Note: Asterisks denote “experimental” problem contexts. All other contexts shown constitute the clinical extension

## Appendix J

### Decision Tree for Intervention Protocol

1. Administer CAI and ancillary quality of life measures.
2. Teach family intervention(s) for experimental context; 1-2 sessions of teaching by the experimenter.
3. Family must run 3 intervention sessions independently of researcher. At session 4, has family mastered interventions for experimental context (based on experimenter observation and IV integrity check)?  
If YES, EXPERIMENTAL POST-INTERVENTION BEGINS: provide family with interventions for clinical extension contexts.  
If NO, provide additional training to family for one session. Recycle Step 3 as needed.
4. After 3 additional weeks, does family report having mastered interventions for clinical contexts?  
If YES, complete 2 spot checks to confirm application of interventions.  
If NO, provide additional training to family for one session. Recycle Step 4 as needed.
5. Has family been observed during 2 spot checks to be implementing interventions for clinical extension context?  
If YES, CLINICAL EXTENSION POST-INTERVENTION BEGINS: administer CAI and ancillary quality of life measures.  
If NO, continue to do spot checks until family has been observed 2 times applying the interventions. Recycle Step 5 as needed.

Note: IV = Independent variable

## Appendix K

### Treatment Acceptability Questionnaire (from Albin et al., 1996)

1. Do the intervention strategies address your highest priority goals for your child and family?
2. Are you comfortable with what you are expected to do?
3. Are you comfortable with what others are expected to do?
4. Do the intervention strategies recognize and support the needs of your family?
5. Overall, how well do the intervention strategies fit with your values and beliefs about raising a child with a disability and creating a meaningful family life together?
6. Do the intervention strategies recognize and build on your family's strengths?
7. All things considered, how difficult will it be for you to implement the intervention strategies?
8. Do you believe the intervention strategies will be effective?
9. If the intervention strategies are effective, do you believe that you can implement the techniques over a long period of time?

Appendix L

Intervention Fidelity Checklist for the Experimental Contexts Associated with Each Study

Study 1

John		Gregory		Robert	
Date		Date		Date	
Visual schedule		Access to preferred object		Embedding	
Visual representation of time		Verbal warning		Location of meal	
Behavioral momentum		Functional communication		Introduction of new food	
Choice of activity reinforcer				Functional communication	
Functional communication					

Study 2

Jeana		Victoria		Jeffrey	
Date		Date		Date	
Embedding		Provide access to preferred item		Content of correction language	
Visual schedule		Scheduled attention		Timing of correction	
Choice		Visual schedule		Behavioral momentum	
		Functional communication		Functional communication	
		Choice			

Study 3

Adam		Jacob		Nate	
Date		Date		Date	
Shorter tasks		Alternative activity		Neutralizing routine	
Organizing tasks		Teach coping skills		Choice	
Provide assistance		Functional communication		Functional communication	
Teach coping skills					



Appendix M

Intervention Fidelity Checklist for the Clinical Extension Contexts Associated with Each Study

Study 1

**John**

<b>Denied access</b>		<b>Preferred activity ends</b>		<b>Disliked activities</b>		<b>Changes in routine</b>		<b>Having to wait</b>	
Date		Date		Date		Date		Date	
Visual representation of time		Visual representation of time		Visual schedule		Visual schedule		Visual representation of time	
				Visual representation of time		Social story			

**Gregory**

<b>Disliked activities</b>		<b>Changes in routine</b>		<b>Hurried/rushed</b>	
Date		Date		Date	
Visual schedule		Visual schedule		Verbal warning	
Verbal warning					

**Robert**

<b>Transitions</b>		<b>Medical appointment</b>		<b>Activity too noisy</b>		<b>Feeling tired</b>	
Date		Date		Date		Date	
Visual representation of time		Social story		Functional communication		Establish bedtime routine	

cont.

Study 2

**Jeana**

<b>Transition</b>		<b>Preferred activity ends</b>		<b>Having to wait</b>		<b>Disliked activities</b>		<b>Feeling tired</b>	
Date		Date		Date		Date		Date	
Visual representation of time		Visual representation of time		Visual representation of time		Establish routine		Bedtime routine	
								Redirect wakings	

**Victoria**

<b>Hurried or rushed</b>		<b>Having to wait</b>		<b>Activities that are too long</b>		<b>Denied access</b>	
Date		Date		Date		Date	
Visual schedule		Adult attention		Verbal warning		Visual representation of time/verbal warning	
Adult attention				Adult attention			

**Jeffrey**

<b>Preferred activity ends</b>		<b>Activities that are difficult (bedtime)</b>		<b>Medical appointments</b>	
Date		Date		Date	
Verbal warning		Stuffed animal/shaping		Social story	
Visual representation of time					

Study 3

**Adam**

<b>Preferred activity ends</b>		<b>Disagreement with others</b>		<b>Anxious/worried/agitated</b>	
Date		Date		Date	
Visual representation of time		TV/videogame schedule		Teach coping skills	

cont.

**Jacob**

<b>Preferred activity ends</b>	<b>Transition</b>	
Date	Date	
Verbal warning	Verbal warning	
Visual representation of preferred item		

**Nate**

<b>Preferred activity ends</b>	<b>Having to wait</b>	<b>Transition</b>	
Date	Date	Date	
Visual representation of time/calendar	Neutralizing routine	Transition item (DVD)	

Appendix N

Structured Interview for Assessment of Medication Side Effects

A. Demographics

1. Your Name: \_\_\_\_\_ Date: \_\_\_\_\_
2. Phone #: \_\_\_\_\_ Address: \_\_\_\_\_
3. Relationship to Child (e.g. mother, father, guardian, etc.): \_\_\_\_\_
4. Child's Name: \_\_\_\_\_ Child's Age: \_\_\_\_\_ Child's Sex (circle one): M F
5. Child's Diagnosis \_\_\_\_\_
6. Please list any chronic health problems that your child has (e.g. asthma, diabetes, seizures, etc.) \_\_\_\_\_
7. Is your child able to communicate with you through speech, sign language, Pecks, or another Augmentative Communication Device (Please describe)? \_\_\_\_\_

**B. Medication History**

1. Is your child presently on medication for problem behavior (i.e. for a period of at least two weeks)?

Circle one: YES NO

2. Is your child *currently experiencing* adverse side effects while on medication for problem behavior?

Circle one: YES NO

3. What type of problem behavior led to your child being put on medication?  
(Circle all that apply on attached **Problem Behavior Table**)

Please describe: \_\_\_\_\_

4. For *each* medication (or combination of medications) that your child is currently on, and/ or has been on in the **last 12 months** please provide the following information (beginning with the most recent and working backwards):

a. Name of medication: \_\_\_\_\_ b. Date started: \_\_\_\_\_

c. Dosage level: Initial: \_\_\_\_\_ Current: \_\_\_\_\_

d. Type of problem behavior currently being treated by the medication: \_\_\_\_\_

e. How many times per day is the medication given (e.g., 3 times a day)?  
\_\_\_\_\_

f. What time of day is the medication given (e.g., before meals)?  
\_\_\_\_\_

5. For *each* medication listed in Question 4, please answer the following questions:

a. After the medication was started, did your doctor **change the dosage level**?

Circle one:            Yes            No

b. Why did your doctor **change the dosage level**? Check **ALL** that apply:

1. My child experienced acute negative side effects (physiological, motor, cognitive, affective) \_\_\_\_\_
2. My child's problem behavior got worse (or new/different problem behavior was exhibited) \_\_\_\_\_
3. My child's problem behavior did not decrease \_\_\_\_\_
4. My child's problem behavior did not decrease to a satisfactory level \_\_\_\_\_
5. My child's problem behavior improved and he/she required less medication \_\_\_\_\_
6. Other (please specify) \_\_\_\_\_

c. Was the dosage level increased or decreased? (Please specify which.).

### **C. Nature of Side Effects**

For each medication identified in question 5 of Part B (i.e., dosage change), please answer the following:

1. What are the current side effects of the medication(s) he/she is receiving? (Please circle all that apply on the attached **Side Effects Table**).

#### **For *each* side effect identified:**

2. How do you know when your child is experiencing this side effect (i.e. what does he/she do/say/look like when the side effect is present)?

3. How frequently (number of days per week), on the average, is the side effect present?

4. When your child is experiencing the side effect, how long, on the average, does the side effect episode last (how many minutes or how many hours)?

5. When your child is experiencing the side effect, how intense is it, on the average, using the following scale:

Mild		Moderate		Severe
1	2	3	4	5

6. For each side effect (e.g., fatigue) you identified, specify whether the overall level (i.e., frequency, duration, and intensity combined) of the symptom described (i.e., fatigue) is now slightly worse, somewhat worse, or much worse than what it was **before** your child went on medication. Alternatively, you may indicate that the current overall level of symptoms is the same as it was before the medication.

Slightly Worse		Somewhat Worse		Much Worse	Same
1	2	3	4	5	X

7. Have other people mentioned/commented on the presence of side effects?

Circle one:      Yes              No

If so, who? Teacher/Friend/Neighbor/Other relative \_\_\_\_\_ Other person \_\_\_\_\_

**D. Impact on Context**

1. Since your child has gone on medication, is he/she having more difficulty with any activities at home or in the community?

Circle one:      Yes              No

2. If you answered “Yes,” then specify which activities (please circle all that apply on the attached **Activities Table**).

3. During the activities you specified, have you noticed the presence of any of the medication side effects you mentioned earlier?

Circle one:      Yes              No

4. If you answered “Yes,” then specify which side effect(s) was (were) present that made each activity more difficult: \_\_\_\_\_

5. If you answered “Yes” to Question 3, please specify whether the presence of the side effect (described in Question 4) has made successful completion of each activity slightly more difficult, somewhat more difficult, or much more difficult than was the case **before** your child went on medication. You may also circle No Impact if that was the case.

Slightly More Difficult		Somewhat More Difficult		Much More Difficult	No Impact
1	2	3	4	5	X

**E. Impact on Problem Behavior:**

1. For *each* activity you identified in Part D (question 5), in which the activity became more difficult because of the presence of side effects, please specify whether your child sometimes shows problem behavior during the activity.

Circle one:    Yes        No

Type of problem behavior(s) (Please refer to **Problem Behavior Table**):

---

**\*2. If you answered “Yes,” then specify whether the level of problem behavior during the activity is slightly greater, somewhat greater, or much greater since your child has been on the medication, as compared to before he/she was placed on the medication. You can also circle No Change if that was the case.**

<b>Slightly Greater</b>		<b>Somewhat Greater</b>		<b>Much Greater</b>	<b>No Change</b>	<b>Less</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>X</b>	<b>Y</b>

3. If you answered “Greater” (ratings between 1-5), please describe the type of problem behavior, and indicate if this is an increase in an existing problem behavior (i.e. behavior that the medication was intended to treat), or a new type of problem behavior.

A. Is this an increase in an EXISTING problem behavior?

Circle one:    Yes        No

B. Is this a NEW type of problem behavior?

Circle one:    Yes        No

**F. Impact on Motivation/Consequences:**

1. When your child displays problem behavior while experiencing a side effect during an activity, describe how you or other members of your family respond to the behavior. What do you say? What do you do (e.g. Do you change how you carry out the activity)? Do you discontinue the activity?

2. Do you now try to avoid the activity more so than was previously the case?

Circle one:    Yes        No

## PROBLEM BEHAVIOR TABLE

### **Aggression/Irritability:**

Physically hurts others - hits, kicks, pinches, bites, head butts, punches, scratches, pull's hair, pokes eyes, spits

Verbally aggresses toward others - curses, insults, threatens, "talks back," verbally "nasty"

Destroys property - angrily breaks, rips, tears objects.

Other (please specify)

### **Self-injury:**

Hits head, bangs head on walls or other objects, bites hands, slaps or punches own face, pinches self, pulls out own hair, picks at skin/scab until it bleeds

Other (please specify)

### **Tantrum behavior:**

Angry crying/screaming, stomping around/throwing self on floor/ thrashing body around

Other (please specify)

### **Noncompliance:**

Task refusal; pushes away work materials; runs away from adults/peers; falls to floor and refuses to move when requested; whining/complaining

Other (please specify)

### **Repetitive behavior:**

Self-stimulatory behavior/repetitive motor movements (e.g., body rocking, hand flapping); stereotypy;

Repetitive speech, obsessive speech

Compulsive/ritualistic behaviors, tics

Other (please specify)

### **Depressive features/Mood disturbances:**

Depressed mood/sadness/crying/weepy, withdrawn, moody, "no personality," overly sensitive,

Mood changes/swings, excessive elation/manic episodes

Other (please specify)

### **Anxious/obsessive traits:**

Excessive worry/anxiety/fearful; intrusive thoughts; obsessive thoughts

Other (please specify)

### **Hyperactivity/Attention difficulties:**

Overactive/impulsive/fidgeting, difficulty concentrating, off-task behavior

Short attention span, easily distracted

Other (please specify)

### **Disruptive Behavior:**

Yelling, making weird noises, acting silly

Other (please specify)

### **Sleep Disturbances:**

Insomnia, difficulty falling/staying asleep, excessive sleep

Other (please specify)

### **Other types of problem behavior :**



## SIDE EFFECTS TABLE

### **PHYSIOLOGICAL:**

Sleep problems  
-onset/trouble falling asleep  
-night awakenings  
-early awakenings  
-too much sleep  
-nightmares  
-night terrors  
-daytime sleepiness/drowsiness  
Fatigue/lethargy

Eating problems  
-weight gain (\_\_\_\_lbs)  
-weight loss (\_\_\_\_lbs)  
-appetite increase  
-appetite decrease  
-binging (driven eating)  
-driven quality to drinking/excessive thirst  
-dry mouth

Vision problems  
-blurred vision  
-watery eyes  
-red /itchy eyes

Headache  
Dizziness  
Fainting  
Seizure  
Fever/flushed  
Sweating

Urinary problems  
-nighttime bedwetting  
-daytime bedwetting  
-bowel accidents/encopresis  
-increased urge to urinate  
-decreased urge to urinate  
-painful urination

Gastrointestinal problems  
-abdominal pain  
-nausea  
-vomiting/retching  
-diarrhea  
-constipation  
-bloating

Sexual/reproductive side effects  
-orgasmic/masturbatory problems  
-amenorrhea/irregular/painful periods  
-hypersexual behavior

Itchy skin/rash/infection  
Nasal Congestion/running nose  
Breathing problems

OTHER (please specify)

### **MOTOR:**

Clumsiness/awkward movements  
Slurred speech  
Stuttering  
Fine motor impairments  
Tardive dyskinesia/jerky movements  
Tics/twitching  
Rigidity in muscle tone  
Repetitive motor behavior (new behavior or increase in old behavior)  
OTHER (please specify)

Drooling  
Lack of coordination  
Difficulty walking  
Overactivity  
Restlessness  
Tremors/shakiness  
Loss of muscle tone

### **COGNITIVE:**

Difficulty concentrating/paying attention  
Confusion/loss of orientation/delirium  
Difficulty with memory/memory loss  
Latency to speak (speech hesitancy)  
OTHER (please specify)

Spaciness/haziness  
Hallucinations (visual/auditory)  
Word finding problems  
Less speech output

### **AFFECTIVE:**

Irritable/agitated/jittery/jumpy  
Inappropriate affect/laughing/silly  
Mood swings/emotional lability  
Sadness/crying spells/feelings easily hurt/seems depressed  
Intrusive/obsessive thoughts/compulsive behaviors (e.g. finger picking)  
OTHER (please specify)

Anxious/fearful/worried  
Anhedonia/loss of interest  
Blunted/flat affect

## ACTIVITIES TABLE

### **Home Activities:**

Waking up/getting out of bed	Eating/preparing lunch
Brushing teeth	Getting/eating snack
Showering/bathing	Doing homework
Grooming (comb hair, etc.)	Chores (cleaning house, room, etc.)
Getting dressed	Playing with siblings/friends/pets
Eating breakfast (preparing breakfast)	Setting table/clearing table/helping at dinner
Talking with parents	Sitting down at table/eating dinner
Getting to bus stop/on bus	Preparing for bed/going to sleep
Practicing instrument/karate/dance etc.	OTHER (please specify)
Playing by oneself - reading, watching t.v., computer/video games, etc.	
Getting ready for community activity (e.g., changing clothes, getting materials ready, getting into car)	

### **Community Activities:**

Supermarket	Friends/peers' houses (play dates)
Movies/museum/library	Amusement park
Mall/shopping	Restaurants
Parents' office/place of work	Lessons (e.g., music, dance, karate, etc.)
Local park	Doctors' offices
Car/train/bus/plane rides	Religious services
Sports: team and individual (e.g., soccer, bowling, mini-golf)	Special entertainment (e.g., concerts, professional sports)
Relatives' houses/family gatherings	Vacations
	OTHER (please specify)

Appendix O

Anxiety Rating Scale

Instructions:

Please rate, on a scale of 1 to 7, the degree of distress your child appears to be experiencing in the situations described below

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

**Prior to closing the door:**

1-----2-----3-----4-----5-----6-----7  
Not Somewhat Very  
Distressed Distressed Distressed

**Following closing the door:**

1-----2-----3-----4-----5-----6-----7  
Not Somewhat Very  
Distressed Distressed Distressed

---

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

**Prior to closing the door:**

1-----2-----3-----4-----5-----6-----7  
Not Somewhat Very  
Distressed Distressed Distressed

**After being PREVENTED from closing the door:**

1-----2-----3-----4-----5-----6-----7  
Not Somewhat Very  
Distressed Distressed Distressed

Table 1

*CAI Ratings in Baseline and Following Intervention for Experimental and Clinical Extension Contexts*

Participant	Specific context	<u>Baseline</u>		<u>Post-intervention</u>	
		Experimental context rating	Clinical extension context rating	Experimental context rating	Clinical extension context rating
John	Transitions	4		3	
	Denied access		5		3
	Preferred activity ends		4		3
	Disliked activities		4		3
	Changes in routine		4		3
Gregory	Preferred activity ends	5		3	
	Disliked activities		5		3
	Changes in routine		5		3
	Hurried or rushed		5		4

Table 1 (con't)

*CAI Ratings in Baseline and Following Intervention for Experimental and Clinical Extension Contexts*

Participant	Specific context	<u>Baseline</u>		<u>Post-intervention</u>	
		Experimental context rating	Clinical extension context rating	Experimental context rating	Clinical extension context rating
Robert	Disliked activity	5		3	
	Transitions		3		3
	Medical appointments		5		2
	Activity too noisy		5		3
	Feeling tired		4		4
Jeana	Denied access	4		1	
	Transition		5		3
	Preferred activity ends		3		3
	Having to wait		5		3
	Disliked activities		5		3
	Feeling tired		5		2

Table 1 (con't)

*CAI Ratings in Baseline and Following Intervention for Experimental and Clinical Extension Contexts*

Participant	Specific context	<u>Baseline</u>		<u>Post-intervention</u>	
		Experimental context rating	Clinical extension context rating	Experimental context rating	Clinical extension context rating
Victoria	Not enough attention	5		3	
	Hurried or rushed		5		3
	Having to wait		5		2
	Activity too long		4		3
	Denied access		4		4
Jeffrey	Being reprimanded	5		3	
	Preferred activity ends		5		4
	Difficult activity		5		4
	Medical appointments		4		3

Table 1 (con't)

*CAI Ratings in Baseline and Following Intervention for Experimental and Clinical Extension Contexts*

Participant	Specific context	<u>Baseline</u>		<u>Post-intervention</u>	
		Experimental context rating	Clinical extension context rating	Experimental context rating	Clinical extension context rating
Adam	Medication side-effect	4		3	
	Preferred activity ends		5		4
	Disagreement with others		5		2
	Feeling anxious		5		4
Jacob	Feeling anxious	5		2	
	Preferred activity ends		5		3
	Transition		5		3
Nate	Feeling hungry	5		3	
	Preferred activity ends		5		3
	Having to wait		5		4
	Transition		5		3
Grand Mean		4.67	4.65	2.67	3.13

Table 2

*Change in CAI Ratings Following Intervention*

Participant	Number of items increased	Number of items decreased	Number of items unchanged	Number of items not applicable <sup>a</sup>
John	4	10	6	4
Gregory	0	14	8	2
Robert	2	5	15	2
Jeana	1	11	5	7
Victoria	0	8	16	0
Jeffrey	1	9	14	0
Adam	3	10	11	0
Jacob	2	11	11	0
Nate	3	9	12	0
Total	16	87	98	15
Mean	1.78	9.67	10.89	1.67

<sup>a</sup> Not applicable refers to items that were rated by the parent as “don’t know” or “not applicable.”

Note: The total number of items across each row for each participant is always 24, reflecting the fact that the CAI has 24 possible items that can be scored.



Table 3

*Mean Ratings in Baseline and Post-intervention and Significance Levels for Ancillary Measures of Quality of Life*

Measure	Baseline	Post-intervention	Significance level
<b>Aberrant Behavior Checklist,</b>			
Irritability Subscale	18.78	13.33	$p < .05$
Resident Lifestyle Inventory	9.11	11.33	$p < .05$
<b>Home Situations Questionnaire</b>			
Number of problematic routines	11.33	9.22	$p < .05$
Severity of problem behavior	3.25	2.36	$p < .05$
Parental Locus of Control	3.30	3.53	$p < .05$
Parenting Stress Index	106.11	96.44	$p = .052$

Figure 1. Percentage of activity context steps completed for three participants in the baseline and intervention phases of Study 1 (Context: Activities and Routines)

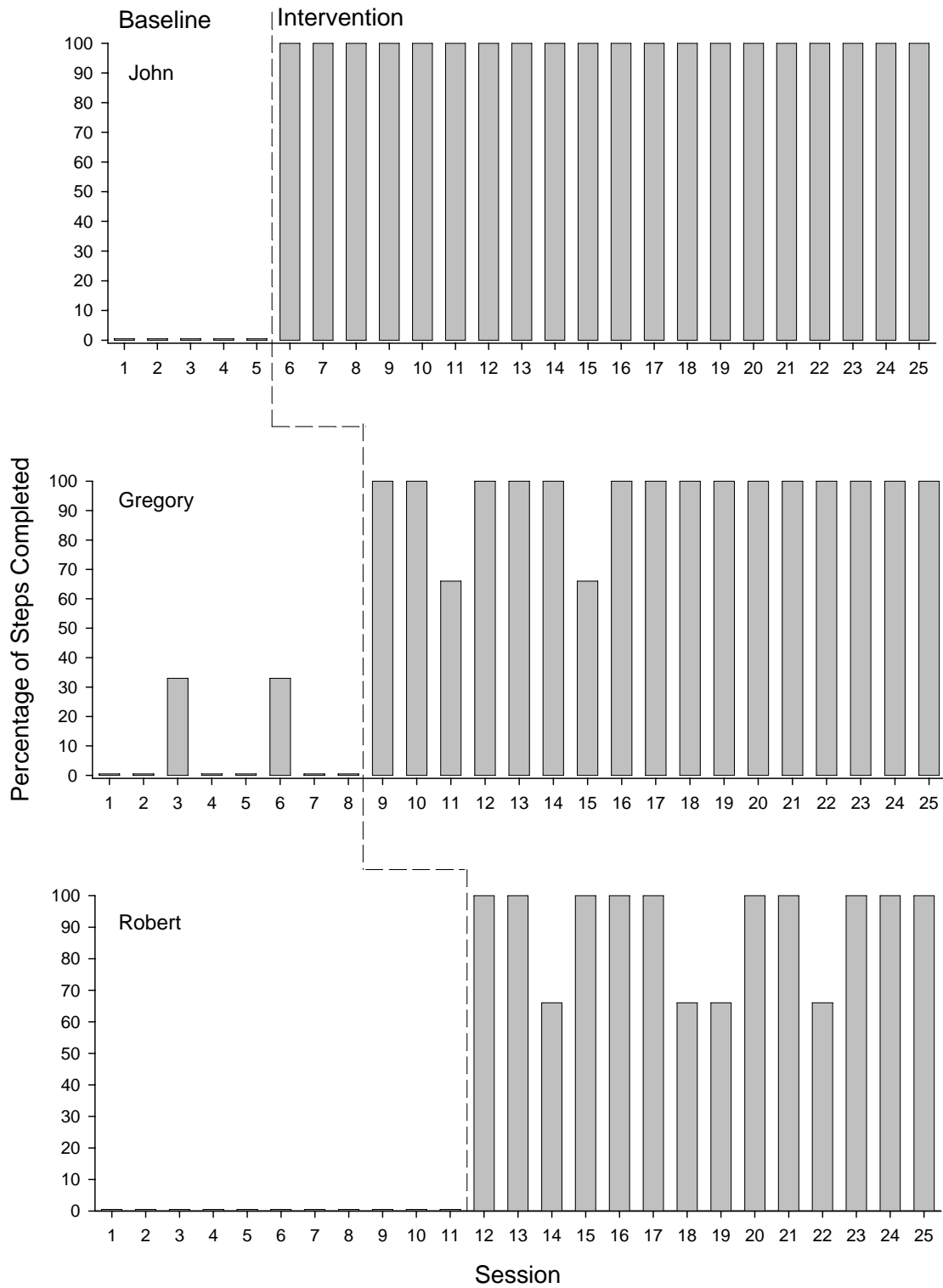


Figure 2. Latency to session termination for three participants in the baseline and intervention phases of Study 1 (Context: Activities and Routines)

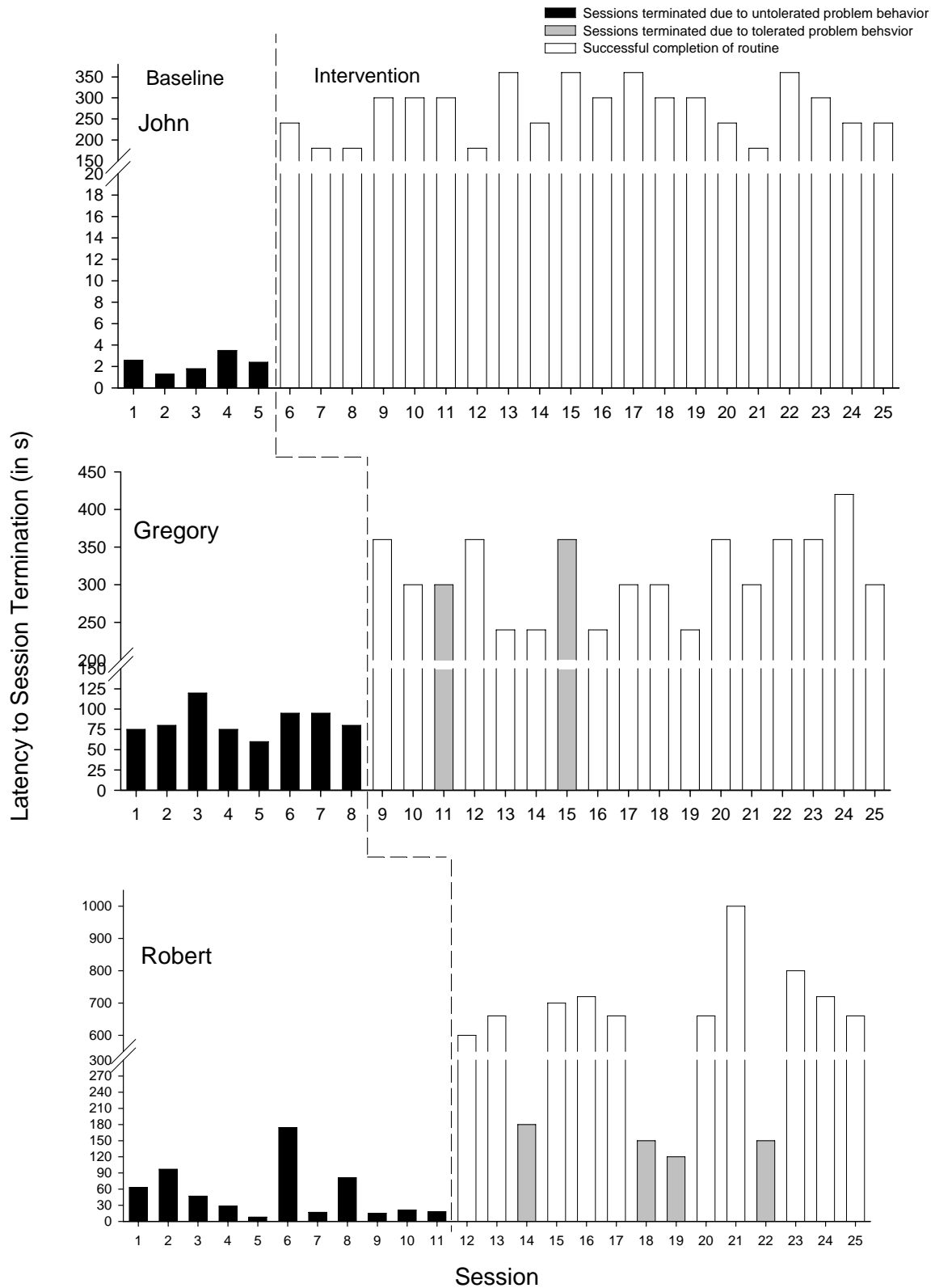


Figure 3. Percentage of activity steps completed for three participants in the baseline and intervention phases of Study 2. (Context: Social Interaction)

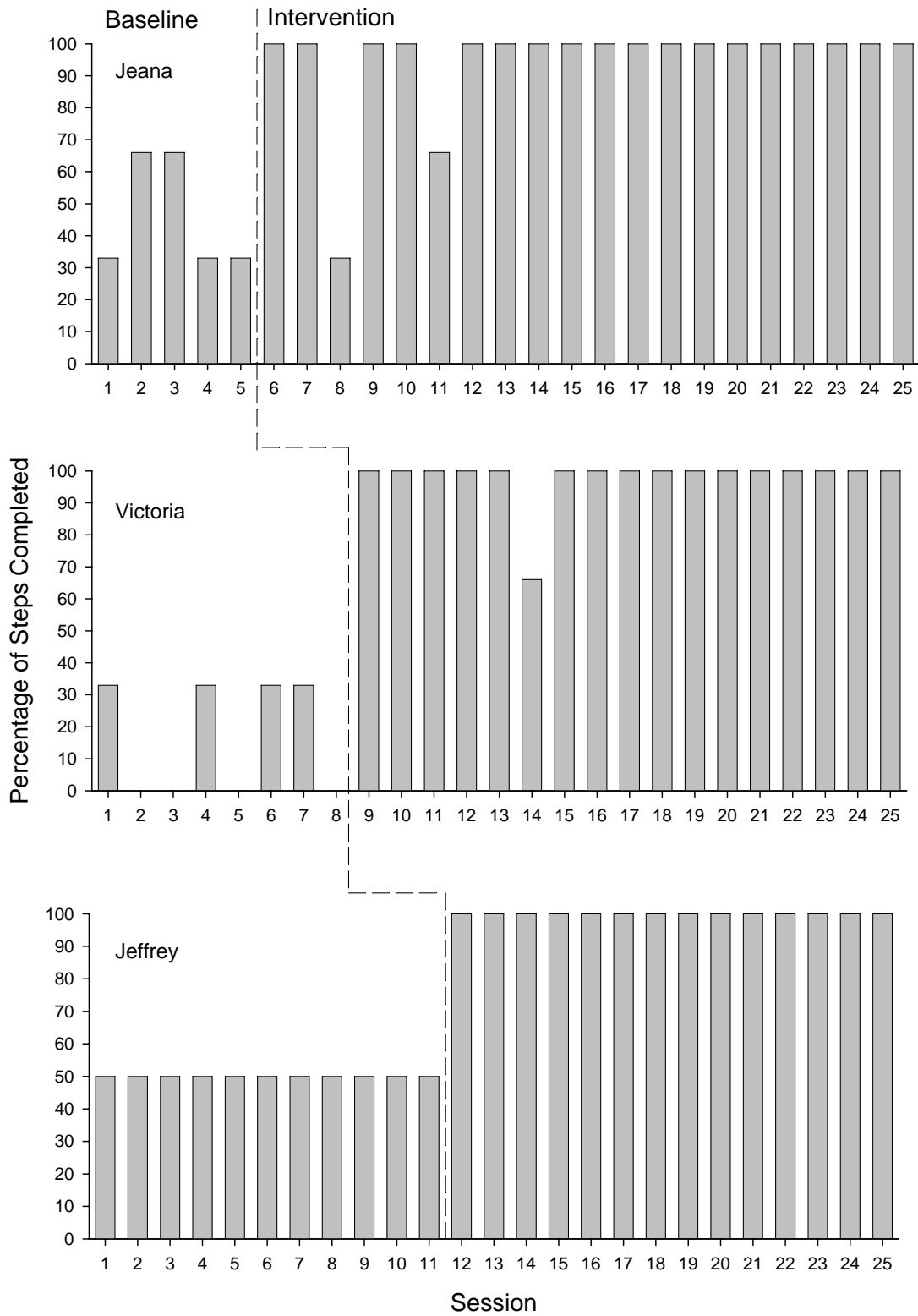


Figure 4. Latency to session termination for three participants in baseline and intervention phases of Study 2 (Context: Social Interaction)

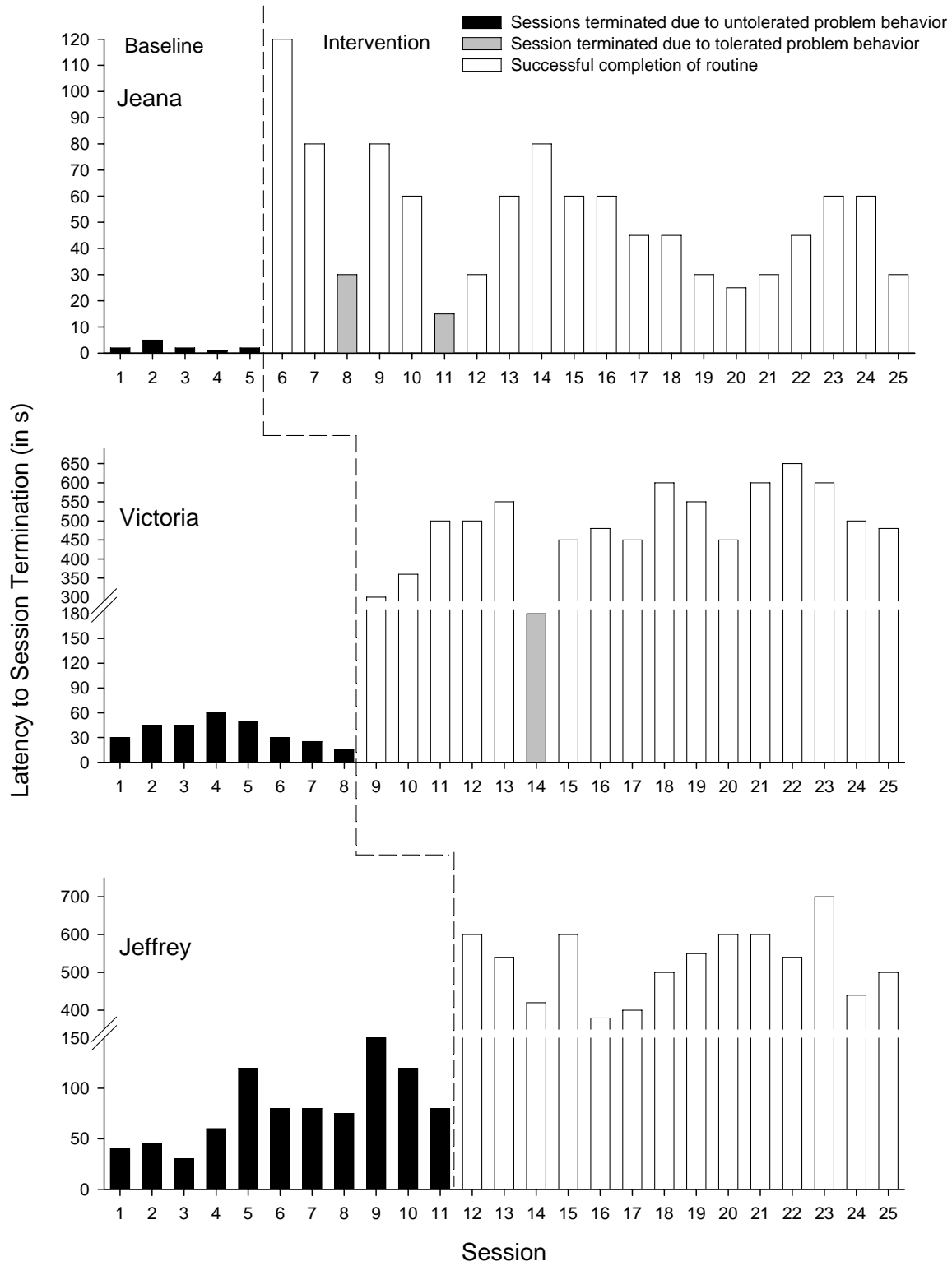


Figure 5. Percentage of activity steps completed for two participants in the baseline and intervention phases of Study 3 (Context: Biological)

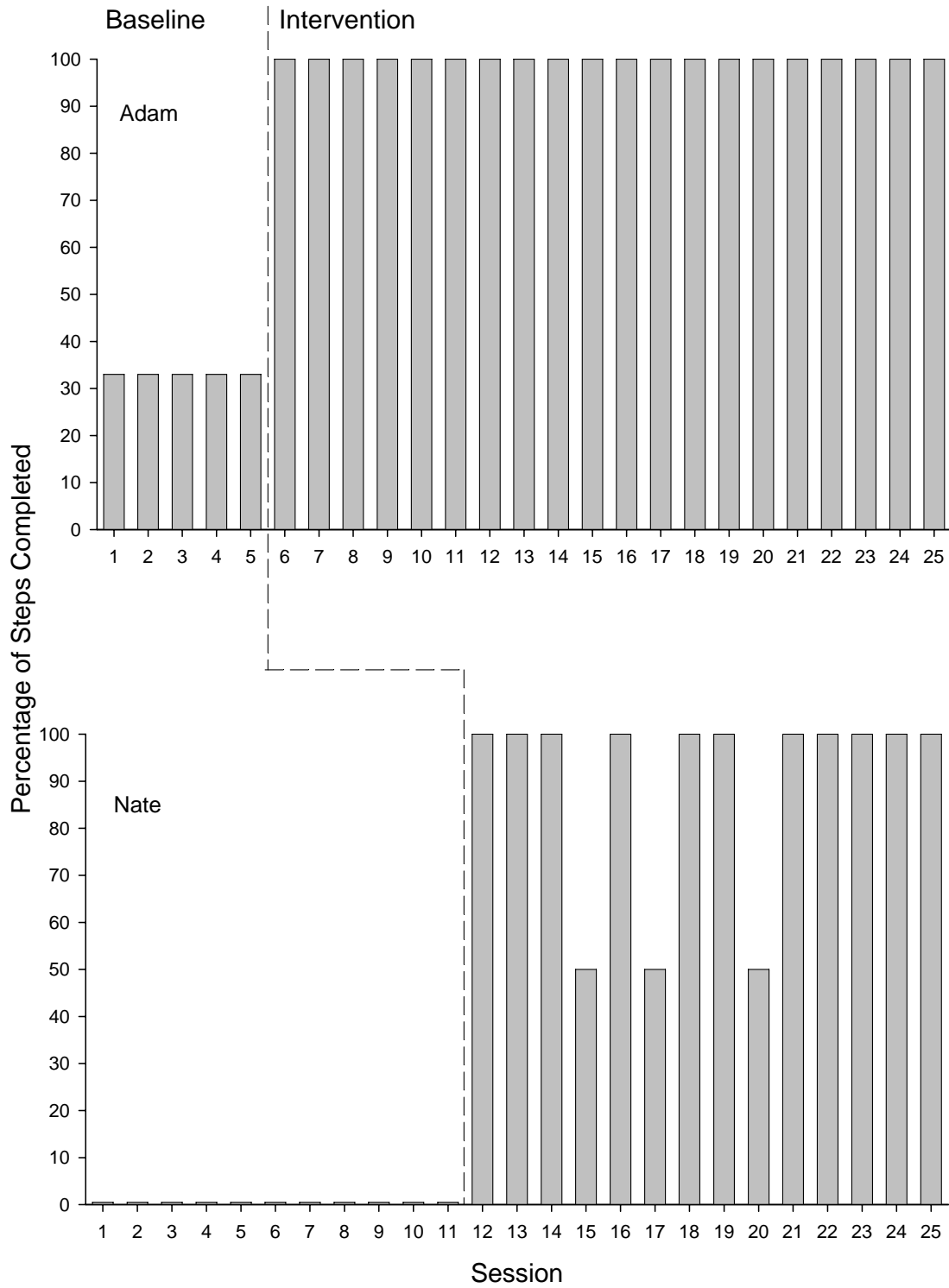


Figure 6. Latency to session termination for three participants in the baseline and intervention phases of Study 3 (Context: Biological)

