Fall 12-14-2018

An Evaluation of Deferred Time-Out

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AN EVALUATION OF DEFERRED TIME-OUT

by

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A DISSERTATION

Presented to the Faculty of

the University of Nebraska Graduate College

in Partial Fulfillment of the Requirements

for the Degree of Doctor of Philosophy

Medical Science Interdepartmental Area Graduate Program
Department of Psychology

(Applied Behavior Analysis)

Under the Supervision of Professor William J. Warzak

University of Nebraska Medical Center
Omaha, NE

November, 2018

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ACKNOWLEDGEMENTS

First, I am grateful to my advisor, Dr. William Warzak, whose sincere support of my studies has been unflagging since my first day on campus and even from beyond retirement. Dr. Warzak is a true model of how to make kids want to come home for Thanksgiving; i.e., I always looked forward to our meetings. Also, thank you to my committee members, who were consistently receptive to and engaged with my questions. Their time and attention were such gifts to my education. Thanks are due to family, who have always been my cheerleaders. Most especially, thank you to my husband, Adam, who should get a Ph.D. of his own for the support and sacrifice he showed me while I completed my long run though graduate training.

An Evaluation of Deferred Time-out

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University of Nebraska-Medical Center, 2018

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Although substantial research has shown time-out to be an effective treatment for children's problem behavior, time-out resistance (i.e., failure to go to time-out, escape from time-out, as well as negative vocalizations and aggression occurring between the time-out instruction and the completion of time-out) has the potential to decrease time-out's suppressive effect, increase use of more intrusive and effortful administrative methods and escape contingencies, and negatively affect parental adherence. The primary purpose of this study was to evaluate the effect of deferred time-out (DTO) on time-out resistance in a clinic and home setting. In addition, this research provided a preliminary evaluation of DTO's effect on compliance with parent commands outside of time-out, as well as an assessment of parent acceptance of DTO. Four preschool aged children participated. DTO reduced the latency to comply with the time-out instruction and the duration of the time-out trial for three of four participants. Overall improvements in initial command compliance were observed for all participants. Parents generally found DTO to be an acceptable approach for children's problem behavior. This research extends the science of effective, and low response effort time-out procedures for children's problem behavior.

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LIST OF ABBREVIATIONS

CMO-R	reflexive conditioned motivating operation
DTO	deferred time-out
IOA	inter-observer agreement
TEI-SF	Treatment Evaluation Inventory – Short Form

INTRODUCTION

Time-out

Time-out is a common and effective method for decreasing children's problem behavior (Barkin, Scheindlin, Ip, Richardson, & Finch, 2007; Regalado, Sareen, Inkelas, Wissow, & Halfron, 2004). As a negative punishment procedure, time-out produces reductions in behavior by imposing a period of time in a less reinforcing environment than the time-in environment contingent upon a target behavior (Brantner & Doherty, 1983). Time-out is recommended by medical and other professional organizations (American Academy of Pediatrics, 1998, 2004; Vollmer et al., 2011) and has been found to be an essential component of evidenced-based behavioral parent training packages (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993; McMahon & Forehand, 2003; McNeil, Hembree-Kigin, 2010; Webster-Stratton & Reid, 2010). Over five decades of research has shown time-out to be an effective response reduction procedure for many common topographies of children's problem behavior, including noncompliance (Roberts, 1983; Rortvedt & Miltenberger, 1994), aggression (Donaldson & Vollmer, 2012; Mace, Page, Ivancic, & O'Brien, 1986), and tantrums (Wolf, Risley, & Mees, 1964). Beyond research settings, time-out has been used widely as an intervention to reduce children's problem behavior in homes and schools (Hackenberg & DeFulio, 2007).

There are three main types of time-out that vary along a continuum of more or less restricted access to reinforcers (Brantner & Doherty, 1983; note that stimuli withdrawn during time-out typically are described as reinforcers although they have rarely been evaluated in reinforcer assessments. Here, I will continue to use the term

reinforcer to be consistent with the literature). In *isolation time-out*, considered the most restrictive form of time-out, the child is separated from reinforcing stimuli by being placed in separate room. In *exclusion time-out*, children are not isolated but are separated from reinforcing stimuli such that they cannot observe reinforcing activities in the room (Harris, 1985). For example, a child may be prevented from observing by being turned to face away from these situations (Mace & Heller, 1990) or placed behind a barrier within the same room (Twyman, Johnson, Buie, & Nelson, 1994).

Nonexclusionary time-out is considered the least restrictive type of time-out because the time-out location is in the same room or area as the time-in environment (Cooper, Heron, & Heward, 2007). In addition, the child has an unrestricted field of vision during time-out, such that their engagement in reinforcing activities is lessened but not eliminated (Brantner & Doherty, 1983; Harris, 1985). There are four types of nonexclusionary time-out: contingent observation (Kodak, Grow, & Northrup, 2004; Porterfield, Herbert-Jackson, & Risley, 1976), planned ignoring (Anderson, Dancis, & Alpert, 1978; Onslow, Packman, Stacker, Van Doorn, & Sigel, 1997), time-out ribbon (Foxx & Shapiro, 1978; Salend & Gordon, 1987) and withdrawal of a specific reinforcing stimulus (Ross, 1975; Wesolowski & Zawlocki, 1982). Of these, contingent observation is the only type that involves a specified time-out location (Kodak et al., 2004; Porterfield et al., 1976). One advantage of contingent observation over other types of nonexclusionary time-out is that, by specifying a location, time-out may be more discriminable than the other types (Shriver & Allen, 1996). Further, contingent observation embeds opportunities to develop instructional control over child compliance (i.e., moving to and staying in the time-out location). Instructional, rather than physical,

control over time-out compliance would result in a safer, less effortful form of time-out, than time-out with physical administration, and may improve the generality of time-out to other settings. As a result, contingent observation was selected as the time-out procedure in this study.

To be effective, time-out must present a condition of deprivation relative to the more reinforcing time-in environment (Hackenberg & DeFulio, 2007; Shriver & Allen, 1996). Time-out's suppressive effect depends in part upon the strength of the motivation operation in place for the stimuli that are restricted during time-out (Defulio & Hackenberg, 2007). That is, if stimuli, events or conditions restricted during time-out do not contemporaneously have reinforcing value to the child at the time they are restricted by time-out, time-out may not function to reduce responding. Evidence of time-out's suppression has been found in reductions of targeted problem behavior and increases in compliance with instructions presented prior to time-out, thereby avoiding time-out (e.g., Defulio & Hackenberg, 2007; Gardner, Forehand, & Roberts, 1976; Roberts, 1982a).

Resistance. Time-out's aversiveness also is evident in time-out resistance (Leitenberg, 1965; Roberts, 1982b). When told to go to time-out, children have run away (Donaldson, Vollmer, Yakich, & Van Camp, 2013; Twyman et al., 1994; Warzak & Floress, 2009), and once in time-out, children have escaped (Bean & Roberts, 1981; Donaldson et al., 2013; McMahon & Forehand, 2003; McNeil & Hembree-Kigin, 2010; Roberts & Powers, 1990). Although escape and other forms of problem behavior are not always reported, time-out resistance is nonetheless evident in the design of time-out procedures. A review of time-out research by Everett, Hupp, and Olmi (2010) found that about half of time-out procedures include contingencies for escape behavior, and

manualized behavioral parent training programs describe at length contingencies for escape behavior during time-out (McMahon & Forehand, 2003; McNeil & Hembree-Kigin, 2010).

Time-out resistance poses several problems. First, running away or refusing to go to time-out delays delivery of the punisher, which weakens time-out's suppressive effect (Roberts & Powers; 1990; Trenholme & Baron, 1975). Second, parents attempting to keep a resistant child in time-out may use increased force or place the child in more restrictive locations, such as a separate, enclosed room (i.e., a back-up room), increasing the potential for danger and the difficulty in providing supervision (Everett et al., 2010). Third, physical efforts to keep resistant children in time-out can be counterproductive, as holding a child in time-out has been associated with increased escape attempts (Roberts & Powers, 1990). Finally, physically moving a resistant child to time-out and keeping them there increases the response effort of caregivers, which may punish implementation of time-out (Friman & Poling, 1995). Given the effort required, some parents, particularly smaller parents of larger children, may not be to able administer time-out with a resistant child (Warzak, Floress, Kellen, Kazmerski, & Chopko, 2012). These concerns point to a need for time-out procedures that produce less of a struggle between the child and parent, and which minimize the use of physical interactions and other intrusive time-out methods used to administer and enforce time-out (Ducharme & Popnick, 1993).

Administration. The literature suggests that most time-out procedures are implemented physically (58.5%) or with combinations of physical and verbal means (10.8%), whereas verbal administration alone is rare (1.5%; Everett et al., 2010). Few

studies have specifically evaluated methods for improving compliance with the time-out instruction. One example by Twyman, Johnson, Buie, and Nelson (1994) evaluated the effect of warnings, more restrictive time-out locations, and response cost on compliance with the time-out instruction. In this study, the original time-out procedure required children to complete time-out in the regular classroom area. Additionally, there was a classroom token economy system, which included delivery of points for time-out compliance, and removal of points for noncompliance with time-out. In the no warnings condition, if children engaged in inappropriate behavior during time-out (e.g., failed to assume the correct position within 5 s of the instruction, made noise during time-out) children were immediately moved to exclusionary time-out behind a partition. Additionally, points were removed via the classroom token economy system. In the warnings condition, several warnings regarding the more restrictive time-out were provided before moving the child to exclusionary time-out, and each subsequent warning resulted in a higher number of points removed. The authors found that the immediate delivery of exclusionary time-out coupled with response cost produced greater levels of immediate compliance with the original time-out procedure than warnings alone. Nonetheless, this procedure is limited by its use of exclusionary time-out, which removes children from their natural environment. Additionally, separate spaces for exclusionary time-out are not be available in all settings.

A second study provides a promising example of how modifications to the duration parameter may decrease reliance on physical administration. Donaldson et al. (2013) compared the effect of two time-out conditions on compliance with the time-out instruction for six, 3-5-year-old children. In the 1- or 4-min time-out condition,

participants received a shorter time-out for quickly moving to time-out by themselves, and a longer time-out when they did not. Specifically, participants who independently moved to time-out within 10 s of the time-out instruction had to complete a 1-min time-out, whereas, participants who did not reach time-out in 10 s, or required physical assistance to do so, had to complete a 4-min time-out. In contrast, in the 4-min time-out condition, all time-outs were 4 min. For four of the six participants, the authors found that compliance with the time-out instruction was higher in the 1- or 4-min condition, when timely compliance produced a shorter time-out. This procedure improved instructional control over time-out compliance, and potentially reduced physical interactions during time-out administration, although physical interactions during time-out were not reported. Despite this, this procedure did not eliminate the potential for physical interactions, as they were necessary to take the child to time-out if children did not move to time-out independently, and additionally, physical interactions were required to implement the escape contingency (i.e., blocking), which the authors reported was necessary for all participants.

Escape. As illustrated in Donaldson et al. (2013), physical interactions during time-out also are likely to occur when implementing escape contingencies for time-out. Escape contingencies have consisted of extinction in the form of put-backs (i.e., physical guidance to return the child to the correct position in time-out; Mace & Heller, 1990; Wolfe et al., 1982), blocking (Donaldson & Vollmer, 2012), and restraint (Roberts & Powers, 1990; Rolider & Van Houten, 1985). Escape contingencies also have involved punishment by increasing the duration of time-out (McMahon & Forehand, 2003), moving the child to a more restrictive time-out location (e.g., a back-up room; Day &

Roberts, 1983; Porterfield et al., 1976; Twyman et al., 1994), restraint in a separate location (McNeil, Clemens-Mowrer, Gurwitch, & Funderburk, 1994), gathering toys and leaving the child in the room alone (Roberts, McMahon, Forehand, & Humphreys, 1978), response cost (McMahon & Forehand, 2003), and spanking (Bean & Roberts, 1981; Day & Roberts, 1983; Forehand & King, 1974). As can be seen here, the majority of escape contingencies in time-out research have consisted of physically manipulating the child to enforce the time-out location.

The effectiveness of most escape contingencies in reducing escape has not been specifically evaluated. Several studies by Roberts and colleagues are exceptions, and provide empirical support for the effectiveness of barriers (i.e., room enclosed with a 4 ft high barrier) and spanks (Roberts, 1988; Roberts & Powers, 1990), yet both methods are problematic. First, not all settings have extra enclosed rooms available to serve as an escape contingency (Kunkle & Ortiz, 2016; Roberts, 1988). Second, children in separate rooms may be difficult to supervise so to ensure their safety. Third, physical interactions are most likely necessary to move children to back-up rooms. Finally, spanking raises concerns about the use of force and modeling of aggression (Roberts, 1988). Therefore, neither of the empirically supported escape contingencies provide an optimal method for minimizing the use of physical interactions (Everett et al., 2010).

Deferred time-out. An alternative approach to administering and enforcing time-out may be found in Warzak and Floress (2009), who examined DTO, a time-out training procedure where physical interactions were not required for either administration or escape contingencies. The authors evaluated the effect of DTO on the latency to comply with the time-out instruction for two, time-out resistant participants, ages 3- and 4-years

old. In DTO, if children were noncompliant with moving to time-out, the parent did not attend to the child or help them access items that they could not access independently until time-out was completed. If the child made a request to the parent before the full time-out was completed, the parent reminded the child to complete time-out. DTO appeared to reduce participants' latency to comply with the time-out instruction, however, the study had several weaknesses that make it difficult to draw firm conclusions regarding the effectiveness of the procedure. First, experimental control was not demonstrated, as there was not a within-subject replication of DTO's effect for either participant, and the design did not allow for between-participant comparisons. Second, the reliability of the data is unknown, as no reliability data were reported. Third, only latency to time-out data were reported, so other measures of resistance to time-out are unknown. Finally, Warzak and Floress (2009) argued that DTO is a time-out training procedure, and did not include a measure of DTO's effect on problem behavior outside of time-out. Therefore, DTO's effectiveness as a response reduction procedure for problem behavior outside of time-out is unknown.

Despite the methodological limitations of the previous research, DTO is worthy of further investigation due to its potential for providing a non-intrusive method for improving time-out compliance (Kunkle & Ortiz, 2016). As a largely hands-off time-out training method, physical interactions are unlikely to reinforce resistance (Kern, Delaney, Hilt, Bailin, & Elliot, 2000; Roberts, 1988). Further, DTO avoids the use of force or removal of the child from the natural setting. That is, if the child fails to go to time-out or escapes time-out, caregivers will not chase the child, use blocking, put-backs, or more restrictive back-up locations, to enforce the child's placement in the time-out. Moreover,

time-out resistance will not increase the response effort required to implement the procedure, and so should not negatively affect parent implementation of time-out (Allen & Warzak, 2000).

DTO may improve time-out compliance through a combination of punishment and a reflexive conditioned motivating operation [(CMO-R; i.e., a condition that establishes its own termination as a form of reinforcement (Michael, 1993; 2000)]. That is, contingent upon noncompliance with the time-out instruction, planned ignoring is applied and maintained until contingent observation is completed, with the exception of reminders to complete time-out. The withdrawal of parent attention also may function as an aversive condition of deprivation from attention as well as a range of stimuli that cannot be accessed without parent mediation. This deprivation may produce a momentary increase in the reinforcing value of the removal of DTO (i.e., the absence of parent attention), and evoke a momentary increase in all behaviors that produced those stimuli in the past (e.g., compliance with instructions). To terminate the aversive condition, the child must complete a behavior chain consisting of moving to and staying in the time-out location for the total time-out duration, after which parent attention and assistance is again available. One could speculate that the establishing operation for the reinforcing effects of parent attention and other potentially reinforcing stimuli should increase the longer that DTO is in effect such that children may be more motivated to comply with the time-out instruction the longer that they are exposed to DTO. The CMO-R also may evoke compliance with time-out following escape because if a child leaves time-out before time-out is completed, the withdrawal of attention and tangibles remains in effect.

Despite the potential benefits of DTO, it is has potential shortcomings as well. DTO depends upon the child's selection of an aversive condition, time-out, over other responses. Accordingly, DTO's success may depend upon whether stimuli that are restricted until time-out is completed are valued by the child. As such, in addition to withholding attention and assistance, DTO may be enhanced if the parent also restricts access to preferred items in the interim between stating the DTO contingency and completion of time-out. A second potential limitation is that DTO may not be acceptable to parents due to allowing a break between the time-out instruction and the child's placement in time-out (Kazdin, 1980; Kunkle & Ortiz, 2016), and therefore, integrity with implementation may be poor. Finally, as DTO permits a delay between problem behavior and time-out, DTO may fail to produce a suppression of problem behavior (Baron, Kaufman, & Fazzini, 1969). Although DTO originally was presented as a time-out training procedure, its use may be limited if it fails to produce reductions in problem behavior outside of time-out. Suppression has occurred in delayed punishment arrangements if stimuli are present between the targeted response and punishment (e.g., conditioned punishers, instruction; Lerman & Vorndran, 2002; Trenholme & Baron, 1975). In DTO, the stated DTO contingency may serve to bridge the gap between the time-out instruction and the initiation of time-out.

Purpose

The primary purpose of this study was to evaluate DTO's effect on time-out resistance. The primary dependent variable was the latency to comply with the time-out instruction. A secondary purpose of this study was to assess whether DTO functions as a punisher for noncompliance with commands as compared to a time-out instruction-only baseline condition. A third purpose of this study was to examine DTO's generality to a

home setting. Finally, this study assessed the acceptability of DTO to parents. The procedure evaluated by Warzak and Floress (2009) was modified by adding the withdrawal of a high-preferred item, as identified by a free-operant preference assessment, if the child did not move to time-out within 10 s of the time-out instruction. This study extends DTO research by a) conducting an evaluation of DTO with a stronger experimental design and reliability assessments to better determine DTO's effect on time-out resistance, b) providing preliminary data on the DTO's effect as a punishment procedure, c) assessing DTO's generality to home settings, and d) furthering our understanding regarding the acceptability of DTO to parents.

CHAPTER 1: METHOD

Procedure

Participants. Participants were recruited from outpatient psychology clinics affiliated with an university medical center in a mid-sized, Midwestern city. Eligibility was determined through a structured parental interview (see Appendix A) and direct parent-child observation. To be included, child participants had to be (a) between the ages of 3-6 years old; (b) English speaking; (c) able to complete simple instructions (e.g., "Put the ball in the bucket"); (d) display compliance to 60% or less of parent instructions in the baseline phase (Houlihan, Sloane, Jones, & Patten, 1992); (e) reported by parents to engage in time-out resistance (i.e., failure to go to time-out, escape from time-out, as well as negative vocalizations and aggression occurring between the time-out instruction and the completion of time-out); and (f) demonstrate a time-out latency of 1 min or higher for a minimum of three trials in baseline. Children were excluded if they presented with severe problem behavior that posed a risk to the child or others. Ineligible children were referred as needed to local service agencies.

Setting and materials. The setting for baseline and DTO was a 5 m x 5 m carpeted clinic room in an university-based psychology department equipped with a two-way mirror and adjacent observation booth. The room included a couch, chairs, and side tables arranged around a coffee table. In addition, there was a shelving unit for buckets of miniatures (e.g., animals, cars) and a few larger associated items (e.g., car ramp). In one corner, there was a sink, and a row of cupboards lined one wall. The time-out location was a .3 m x .3 m plastic square placed on the floor approximately .6 m from the cupboards. While in time-out, the child was able to see the room. Ten stimuli serving as materials for initial commands were in the room for all trials (see Appendix B).

Experimenters observed from an observation booth equipped with sound. Prompts and directions were provided to parents through a Bluetooth headset. All sessions were video recorded.

The setting for generality was a bedroom in participants' homes where free access to toys was provided. The time-out location was the same .3 m x .3 m plastic square as in previous phases, and was placed on the floor approximately .6 m from a wall. The same ten stimuli for initial commands were present for all trials (see Appendix B).

Response measurement and data collection. The primary dependent measure was the latency to comply with the time-out instruction per time-out trial. Time-out latency was defined as the period between the end of the parent's time-out instruction and the beginning of contingent observation time-out (i.e., when the child's bottom or both knees touched the time-out location).

Secondary dependent measures of time-out resistance were duration of the time-out trial and the number of time-out trial intervals with occurrences of negative vocalizations, aggression, and escape. Escape was scored if the child's bottom or both knees were off of the time-out location for longer than 3 s. Escapes only were recorded between the initiation and completion of contingent observation time-out. The duration of the time-out trial was considered a summary indicator of time-out resistance. Time-out trial duration was defined as the amount of time between the time-out instruction and completion of contingent observation time out, inclusive of the latency to comply with the time-out instruction and escapes from the time-out location. Time-out trial duration was capped at 10 min. Finally, negative vocalizations and aggression were recorded between the time-out instruction and completion of contingent observation time-out or

the end of the time-out trial using 10-s partial interval recording. Negative vocalizations were defined as crying (i.e., engaging in high-pitched sobs or shedding tears), yelling (vocalizations with a higher volume than conversational level), or using threatening or offensive language (e.g., swearing, naming calling). Aggression was defined as forceful contact initiated by the participant towards another person (e.g., hitting, kicking, spitting).

Initial command compliance was assessed during each command trial as a measure of DTO's effect on compliance outside of time-out. Initial command compliance was defined as initiation of a motor response within 5 s of the end of the initial command, terminating in the grasp of the specified item, and completion of the specified task within 10 s (Roberts & Powers, 1988).

Latency to comply with the time-out instruction and compliance with parent commands were recorded by observers live during sessions. The number of time-out trial intervals with negative vocalizations, aggression, and escape, as well as the duration of the time-out trial were recorded from video.

Inter-observer agreement. The investigator served as the primary observer during sessions. A second observer recorded inter-observer agreement (IOA) data during at least 33.3% of trials in each phase for each participant. Secondary observers were graduate students trained to 90% agreement with the primary observer using video tapes of sessions not included in the reliability sample. IOA for the latency to comply with the time-out instruction, duration of the time-out trial, and initial command compliance was calculated using trial-by-trial IOA. Agreements were scored if each observer recorded the same response for each trial, and disagreements were scored if responses differed. For time-out latency and duration of the time-out trial, an agreement was scored if

timings were within +/-3 s of the primary observer. IOA was calculated by dividing the number of agreements by the total number of trials and multiplying by 100. For time-out latency, IOA was as follows: 100% for Spencer and Calvin, 93.3% for Yuki, and 87.5% for Rose. For duration of the time-out trial, IOA was 93.3% for Spencer, 91.7% for Calvin and Yuki, and 100% for Rose. For initial command compliance, IOA was 100% for all participants.

IOA for number of time-out trials with occurrences of negative vocalizations, aggression, and escape was scored using interval-by-interval IOA. Agreement between observers was calculated by dividing the total number of intervals in which both observers scored an occurrence of this response divided by the total number of intervals. Agreement ranged from 80-100%. Mean IOA for each participant for negative vocalizations was 99.2% for Spencer, 98.7% for Calvin, 96.3% for Yuki, and 94.2% for Rose. Mean IOA for aggression was 100% for Spencer, Calvin, and Yuki, and 99.2% for Rose. Mean IOA for escape was 97.9% for Spencer, 100% for Calvin and Yuki, and 99.2% for Rose.

Procedural integrity. The integrity of parent implementation of the DTO protocol was determined by scoring videos of trials. Baseline, DTO, and generality procedures were outlined and provided to data collectors as a checklist (see Appendix C, D, and E). The primary investigator recorded procedural integrity data for each trial**.** A secondary observer recorded data for at least 33.3% of all trials in each phase. Integrity was assessed by calculating the percentage of procedural steps completed correctly by the total number of applicable steps for each trial, and multiplying the total by 100. Overall, procedural integrity was 97.5%. For individual participants, procedural integrity was

99.1% for Spencer, 97% for Calvin, 97.3% for Yuki, and 96.6% for Rose. IOA for procedural integrity was 96.9%.

Design. The effects of DTO were evaluated using a nonconcurrent multiple-baseline design (Watson & Workman, 1981). The multiple baseline design was selected because it has the potential to control for threats to internal validity, such as history and maturation. Data from time-out trials were plotted trial by trial.

The decision regarding when to introduce each experimental phase was based on visual analysis of the time-out latency data. Phases continued until the time-out latency data revealed a) stability, b) a trend in the opposite of the therapeutic direction in baseline, or c) a trend in the desired therapeutic direction in DTO and generality phases. Emphasis was given to the final three data points but considered the overall trend in the phase.

Pre-assessment. Standardized information on the frequency and intensity of children's problem behavior was gathered with the ECBI following consent and prior to initiation of baseline (Eyberg, 1999). The ECBI is a 36-item, parent rating scale commonly used to assess the intensity and severity of behavior problems in children 2-16 years old. The ECBI measures the frequency of common forms of problem behavior, such as noncompliance, aggression, and impulsive behavior, with its Intensity scale. Severity of problem behavior is assessed by examining the extent to which behaviors are regarded as a problem for the parents via its Problem scale.

Training. Parent training preceded each phase. Experimenters provided a flow chart showing each behavior expected to be performed for the subsequent phase (see Figures 1 and 2). The experimenter and parent role-played each component (i.e., play

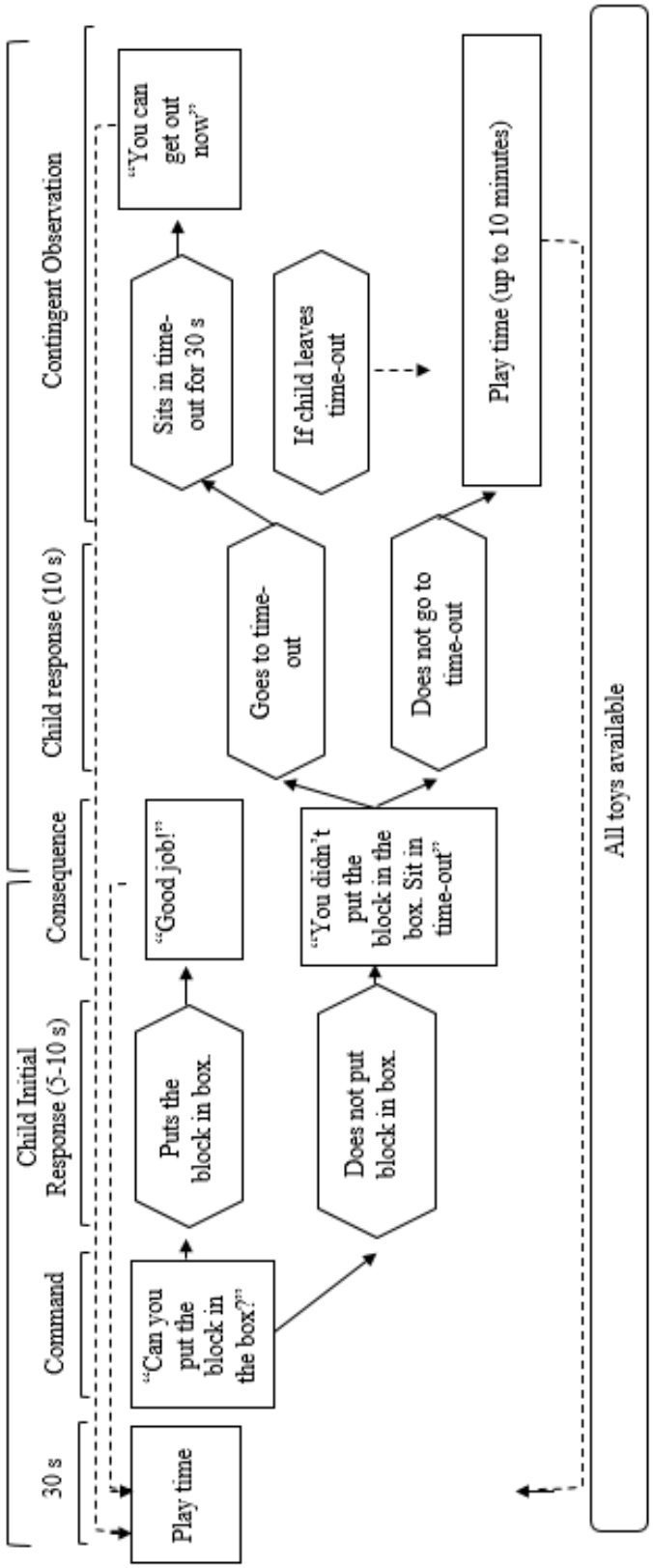

Figure 1: Baseline session flow chart. DTO = deferred time-out. TO = time-out. Rounded squares indicate the presence or absence of preferred items. Squares represent parent responses. Hexagons are child responses. Time-out trials ended after completion of contingent observation time-out, or 10 min post-time-out instruction, whichever comes first.

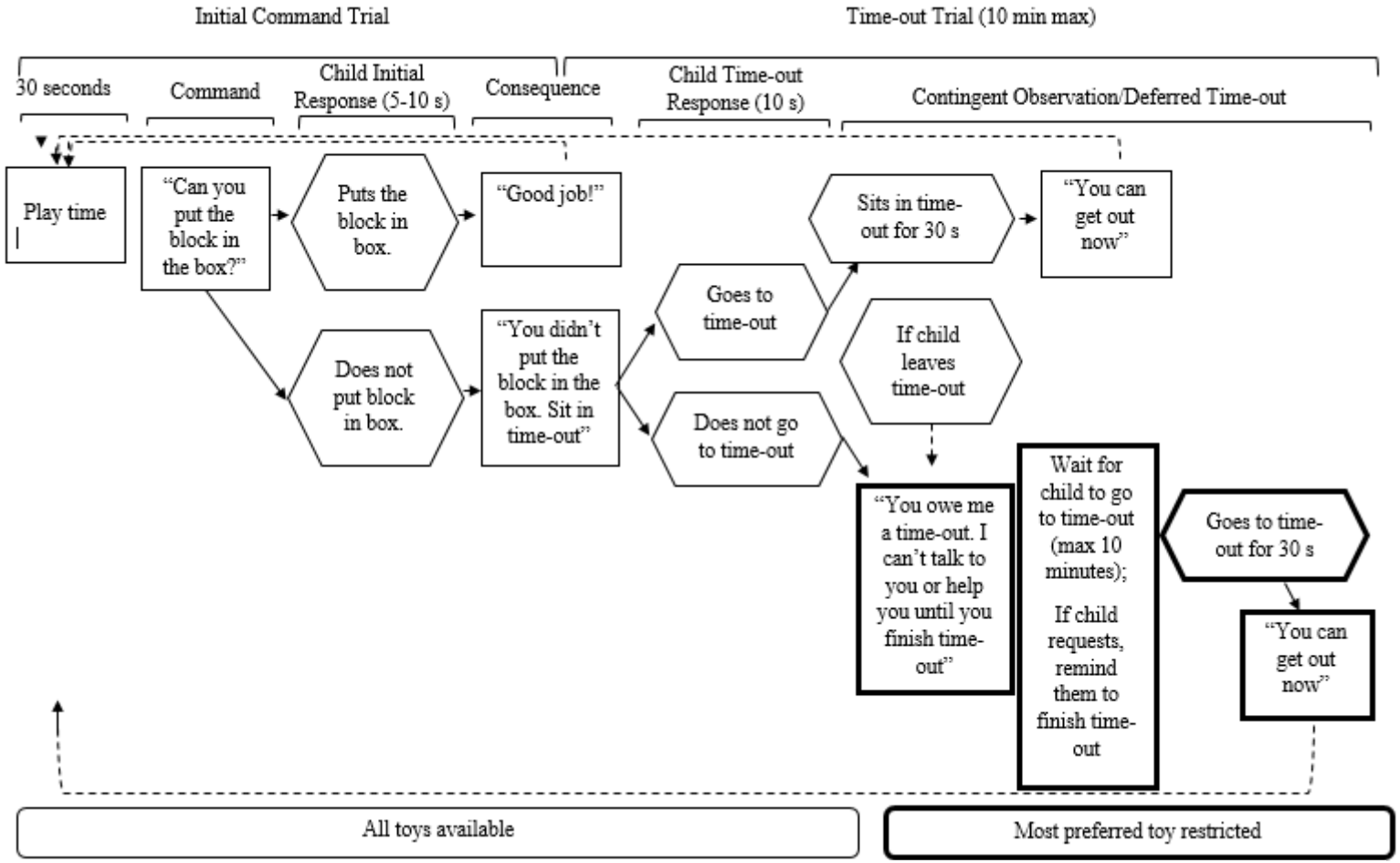

Figure 2: Rounded squares indicate the presence or absence of preferred items. Squares represent parent responses. Hexagons are child responses. Time-out trials ended after time-out completion, or 10 min post-time-out instruction, whichever comes first. .

time, initial command, child response, contingent observation time-out, and deferred time-out). Feedback was provided. Parent training was assessed by observing parent implementation during a role-play with an experimenter until the parent demonstrated 100% of procedural steps correctly for 10 trials according to procedural integrity checklists.

Child participants were instructed on contingent observation prior to the first baseline trial. The child was told "We are going to practice time-out while you are here. If your mom says to go to time-out, this is how you do time-out. [The experimenter then moved to and sat in time-out]. You have to have your bottom on the time-out square until your mom tells you can get out. Time-out is 30 s." Children then were asked to restate the time-out contingency. No further instruction on time-out was provided to child participants for the remainder of the study.

Preference assessment. One 5-min free-operant preference assessment was conducted prior to the start of each day of baseline and DTO data collection (Roane, Vollmer, Ringdahl, & Marcus, 1998). In free-operant preference assessments, participants are provided noncontingent access to a range of stimuli for a period of time. All stimuli remain present throughout the assessment. The purpose of the preference assessment was to establish an index of relative preference for the toys in the clinic room. To begin, an experimenter showed participants which toys were present by pointing at and labeling toys. Afterwards, the experimenter told the child that they could play with whatever toy they wanted. Then the experimenter left the room, went to the observation booth and the assessment began. Items available during the assessment were cars, trains, and animals, with the exception of the first day of data collection for Yuki, when people

also were available, and the fourth day for Spencer, when food and blocks were available in place of trains and cars.

Experimenters scored item manipulation using 10-s partial-interval recording. An interval was scored if a participant manipulated a toy (i.e., touched it with any part of their hand) at any point in an interval. The number of intervals in which an item was manipulated was summed and divided by the total number of intervals and converted to a percentage. High-preferred items for all participants for each day of data collection are listed in Table 1.

Baseline. See Figure 1 for a schematic of baseline command and time-out trials. Baseline consisted of initial command trials and time-out trials. An initial command trial was followed by a time-out trial if the child was noncompliant with the initial command. However, if the child complied with the initial command, the parent delivered praise, and the next command trial began. For all trials, an experimenter provided directions for each procedural step implemented by parents during baseline and DTO via the Bluetooth headset. If an error occurred, immediate prompting of the correct response was provided.

Each initial command trial consisted of a 30-s play period, one initial command, a 5-10 s post-command period for the child response, and parent-implemented consequence. During the 30-s play period, free access to toys and parent attention were available. Parents were instructed to limit demands, increase verbal interactions, play with their child during play time, and ignore problem behavior. After 30 s, the caregiver issued one command. The basic command structure was based on the Compliance Test by Roberts and Powers (1990), however, commands were posed as questions to increase the likelihood that participants would display sufficient levels of noncompliance with

	Spencer	Calvin	Yuki	Rose
1	Trains (80)	Trains (93.3)	Trains (43.3)	Cars (56.7)
2	Cars (80)	Trains (83.3)	Animals (70)	Animals (96.7)
3	Cars (90)	Cars (100)	Trains (100)	Animals (83.3)
4	Food (80)	Cars (53.3)	Cars (3.3)	Cars (100)
5			Trains (70)	Animals (76.7)
6				Animals (100)

Table 1: High preferred items during baseline and DTO. DTO=deferred time-out. Participants are listed across the top. Days of data collection are listed in the left column. Percentage of intervals in which the high preferred item was manipulated is listed in parentheses. For Spencer, Day 1 was in baseline, and Days 2-4 were in DTO. For Calvin, Days 1-2 were in baseline, and Days 3-4 were in DTO. For Yuki, Days 1-3 were in baseline, and Days 4-5 were in DTO. For Rose, Days 1-3 were in baseline, and Days 4-6 were in DTO.

commands to produce time-out trials and allow an evaluation of DTO (Shriver & Allen, 1996). Initial commands consisted of asking a child to place a specific item in a container (e.g., "Can you put the ball in the bus?" See Appendix B for complete list of items and containers). Parents pointed at each respective item as they stated the command. After the command, the parent was silent for a 5-10 s post-command period to allow the child to initiate compliance (Roberts & Powers, 1990). If the child grasped the item within 5 s and completed the task within 10 s, the parent said "Good job." If the child did not grasp the item within 5 s or complete the task within 10 s, a time-out trial was triggered. Parents were shown a list of initial commands and the time-out instruction prior to the start of baseline and were asked to confirm that their child could understand and comply with the commands and time-out instruction prior to the participation in the study.

A time-out trial began with a time-out instruction (i.e., "You did not put the [item] in the [container]. Sit in time-out" while pointing at the time-out location). Time-out consisted of a 30-s contingent observation time-out. After giving the time-out instruction, the parent waited silently for 10 s to see if the child moved to time-out (Donaldson et al., 2013). No physical prompting was used to move the child to time-out. The time-out duration started when the child sat on the time-out location. Access to toys and attention were withdrawn while the child was in contingent observation. If the child carried toys to the time-out location or accessed toys while sitting in time-out, the parent removed them. Removal of toys from the child during contingent observation was the only instance when parents initiated physical interactions with children at any point during this procedure.

When the child had sat in time-out for 30 s continuously, they were released when parents said, “You can get out now.” If the child did not move to time-out within 10 s of the time-out instruction, or if the child left the time-out location (i.e., escaped) before contingent observation was finished, attention and toys were available. Total time-out trial time varied depending upon if and how quickly the child moved to the time-out location, and the frequency and duration of escapes from time-out. Time-out trials ended after completion of contingent observation time-out or 10-min post-time-out instruction, whichever came first, to prevent excessive trial length. Approximately every five trials, there was a brief break in between trials. A command trial took approximately 40 s. Time-out trials took a maximum of 10 min. Data collection was conducted for no more than 2 hours per day, no more than twice a week.

Deferred time-out. See Figure 2 for schematics of DTO initial command and time-out trials. DTO was the same as baseline with the following exceptions: if the child did not initiate contingent observation within 10 s of the time-out instruction, then the parent gave the DTO contingency statement: “You owe me a time-out. I can’t talk to you or help you until you finish time-out” while pointing to the time-out location. The parent also removed the highest-preferred toy from the play area, according to the most recent preference assessment, and restricted access to it by holding it or placing it near them. If a toy was too large to hold (e.g., the car ramp), the parent picked up the related pieces for that item (e.g., cars), put them in a bin and held them. If the child moved to time-out within 10 s of the time-out instruction, but escaped before completing time-out, the DTO contingency statement was delivered following the first escape only.

After the DTO contingency was delivered, no parent attention was available until

continent observation time-out was completed with the following exception: if the child made a request to the parent prior to initiating contingent observation, or during an escape, the parent provided a reminder to complete time-out. The reminder consisted of restating the DTO contingency. A request was defined as the child indicating an interest in the restricted item, information, or attention, from the parent by gesturing towards the item (e.g., pointing) or making a verbal request (e.g., “Give me the toy!” "Mom!"). To minimize the delivery of attention, the parent provided a reminder if a minimum of 1 min elapsed since the last reminder (i.e., a fixed-interval, 1 min schedule). The purpose of the reminder was to increase the saliency of the restricted stimuli and enhance the motivating operation for compliance with the time-out instruction. After the conclusion of time-out trials, the item was returned to the play area.

There was one modification to DTO for Rose. During the first two time-out trials of DTO, Rose persistently threw the time-out location under furniture so that it was not possible for her to sit on it. For time-out trials 13-19, if Rose threw the time-out location, Rose’s caregiver stood with her heel on the time-out location to keep the location in place.

Generality. The purpose of this phase was to assess the generality of DTO’s effect on time-out resistance in the home setting following exposure to DTO in clinic (Johnston, 1979; Johnston & Pennypacker, 2009). Generality data were collected during a single visit to participants’ homes. Data collection was conducted for no more than 1 hr. The procedure for this condition was the same as DTO, however, experimenters did not use a headset to provide parent directions. Instead, experimenters were located in the room. Parents were provided with a written list of initial commands and instructed to

read one command when cued by the experimenter. An experimenter prompted correct responses if errors occurred. Finally, no preference assessment was conducted in the home setting. Instead, parents were instructed to restrict the toy that the child was playing with at the time of the DTO contingency statement until the end of the time-out trial. If the child was not playing with a toy at the time of the statement, the parent was instructed to remove a toy of their choice.

Treatment acceptability. Treatment acceptability was assessed following completion of the generality phase using a modified Treatment Evaluation Inventory-Short Form (TEI-SF; Kazdin, 1980; Kelley, Heffer, Gresham, & Elliott, 1989). The questionnaire presents nine statements pertaining to the social validity of the treatment (see Appendix F). The questionnaire asked parents to answer each question by checking one of five options ranging from strongly disagree to strongly agree. Scoring was done on a five-point scale, with one scored for strongly disagree and five for strongly agree. Higher scores indicate greater acceptability. The TEI-SF is brief to administer, preferred by consumers over longer instruments, and has adequate internally consistency and discriminant validity (Kelley, Heffer, Gresham, & Elliott, 1989).

CHAPTER 2: RESULTS

The effect of DTO on the latency to comply with the time-out instruction is displayed on Figure 3. The latency to comply with the time-out instruction was high and stable in baseline for Spencer, Yuki, and Rose, as none of these three children complied with the time-out instruction before the time-out trial was terminated (*M* = 10 min). In contrast, Calvin showed a highly variable latency (*M* = 5.8 min), wherein he initiated but failed to complete contingent observation time-out prior to the end of the trial on four trials. On the remaining four trials, Calvin did not initiate contingent observation time-out prior to the termination of the trial.

With the introduction of DTO, Spencer, Calvin, and Yuki all showed a reduction in the level of the time-out latency. For Spencer, the latency to comply remained high during the first two exposures to the DTO contingency, after which a sharp reduction in the latency was observed, and the level remained low and stable for the remainder of DTO (*M* = 2.3 min) and generality (*M* = .2 min). Similarly, for Calvin, the latency to comply with the time-out instruction remained high for the first trial of DTO, followed by a sharp reduction, which maintained for the remainder of DTO (*M* = 2.8 min) and generality (*M* = .1 min). Yuki's latency to comply with the time-out instruction displayed an immediate reduction with the introduction of DTO, followed by a decreasing trend, and low stable levels throughout DTO (*M* = .8 min) and generality (*M* = .1 min). In contrast, Rose's latency to comply with the time-out instruction remained high following the introduction of DTO (*M* = 7.3 min). In the second half of the phase, the latency became highly variable. That is, for three time-out trials in the latter half of DTO, Rose initiated but did not complete contingent observation time-out. It appeared

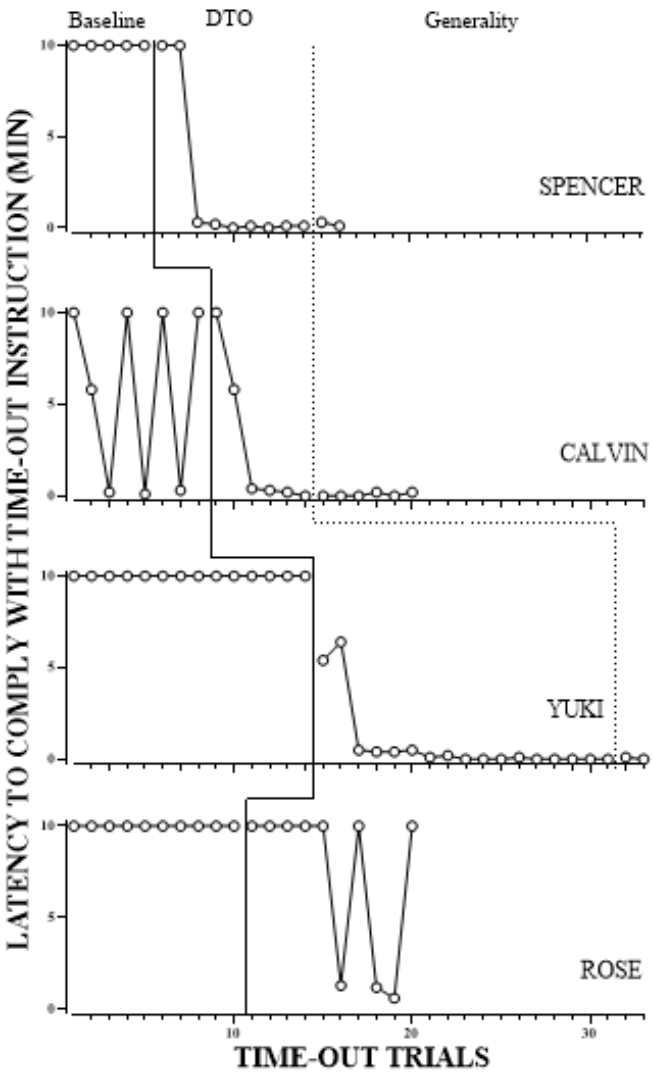

Figure 3: Latency to comply with the time-out instruction across baseline, DTO, and generality phases for all four participants. DTO=deferred time-out.

on these trials, anecdotally, that Rose inadvertently initiated contingent observation time-out by contacting the time-out location with her bottom as she laid on the ground. This was a position from which she repeatedly kicked her caregiver. Generality was not introduced for Rose given the lack of improvement observed in DTO.

See Figure 4 for the results of both the latency to comply with the time-out instruction and duration of the time-out trial. The duration of the time-out trial was high and stable in baseline for all participants. For three participants (i.e., Yuki, Spencer, and Rose), the duration of the time-out trials was the same as the latency to comply with the time-out instruction (M = 10 min). For Calvin, the time-out trial duration was high and stable throughout baseline, although the latency was variable, as he initiated but did not complete contingent observation on several trials. With the introduction of DTO, the duration of time-out trials remained high during the first two trials of DTO for Spencer, followed by high variability. Thereafter, a low, stable level of time-out trial duration was observed for the remainder of DTO (M = 4.7 min) and generality (M = 1.7 min). For Calvin, the duration of the time-out trial remained at the maximum level for the first trial of DTO, followed by a decreasing trend and low, stable levels for the remainder of the phase (M = 3.4 min) and generality (M = .8 min). A similar level change and trend in time-out trial duration was observed for Yuki with the introduction of DTO, as it remained low and stable for the remainder of DTO (M = 1.7 min) and generality (M = .9 = min). Finally, as Rose never completed contingent observation, the duration of time-out trials was 10 min throughout DTO.

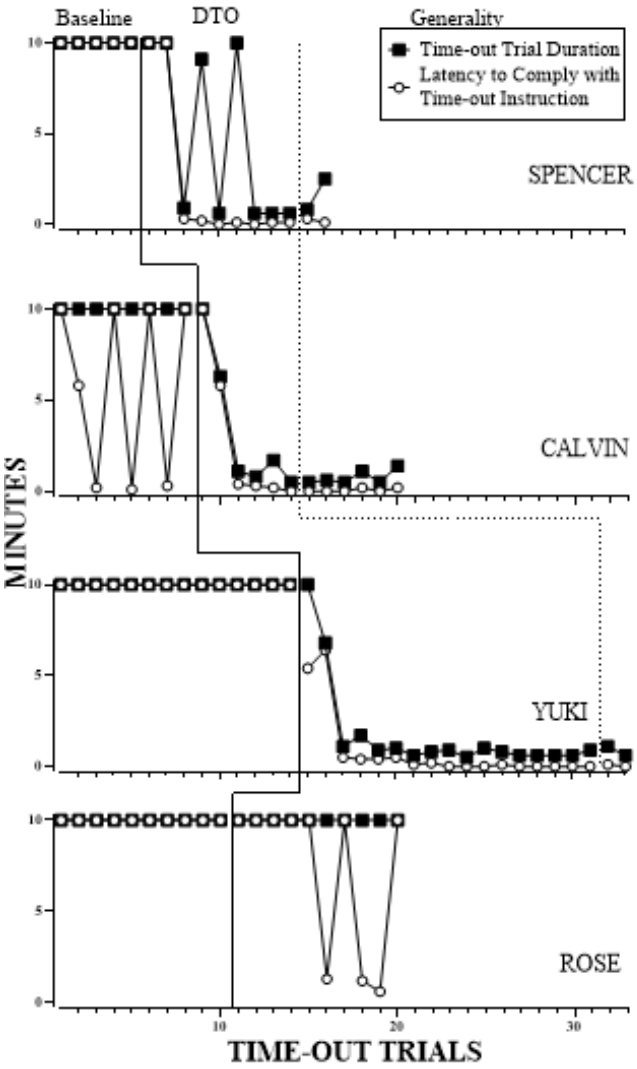

Figure 4: Latency to comply with the time-out instruction and time-out trial duration across baseline, DTO, and generality phases for all four participants. DTO = deferred time-out.

See Table 2 for initial command compliance data. In DTO, Spencer's initial command compliance improved 35% over baseline, and remained high in generality. For Yuki, command increased in DTO by 50.8% over baseline. Further increases in command compliance (i.e., 22.5%) over those in DTO were observed in generality. For Calvin, command compliance increased by 52% in DTO over baseline, and this increase maintained during generality. For Rose, an increase in initial command compliance also was observed (i.e., 41.2%) in DTO relative to baseline.

The number of time-out trial intervals with occurrences of negative vocalizations, aggression, and escape can be seen in Figure 5. For Spencer, occurrences of negative vocalizations were near zero in baseline (M = .2 intervals/time-out trial). Negative vocalizations continued to occur at low levels in DTO (M = 4.3 intervals/time-out trial) and generality (M = .5 intervals/time-out trial; note, negative vocalizations and aggression data from Spencer's first time-out trial in DTO were not able to be assessed and included in these findings due to a video recording error). For Calvin, negative vocalizations were low but variable in the second half of baseline (M = 4.8 intervals/time-out trial). A sharp increase in negative vocalizations was observed with the introduction of DTO, followed by a sharply decreasing trend and a low stable level for the remainder of the phase (M = 14.8 intervals/time-out trial) as well as during generality (M = .5 intervals/time-out trial). Negative vocalizations for Yuki were generally low in baseline, with an increase observed during the last time-out trial (M = 8.4 intervals/time-out trial). In DTO, there was an immediate increase in intervals with occurrences of negative vocalizations for the first time-out trial, after which there was a sharply decreasing trend, and a low stable level for the remainder of the phase (M = 8.9 intervals/time-out trial) as

Participant	Baseline	DTO	Generality
Spencer	50 (10)	85 (60)	86.7 (15)
Yuki	6.7 (15)	57.5 (40)	80 (10)
Calvin	27.3 (11)	79.3 (29)	80 (30)
Rose	37.5 (16)	78.7 (46)	NA

Table 2: Percentage of initial command compliance per phase. DTO=deferred time-out. The number of command trials per phase is listed in parentheses. Generality was not introduced for Rose.

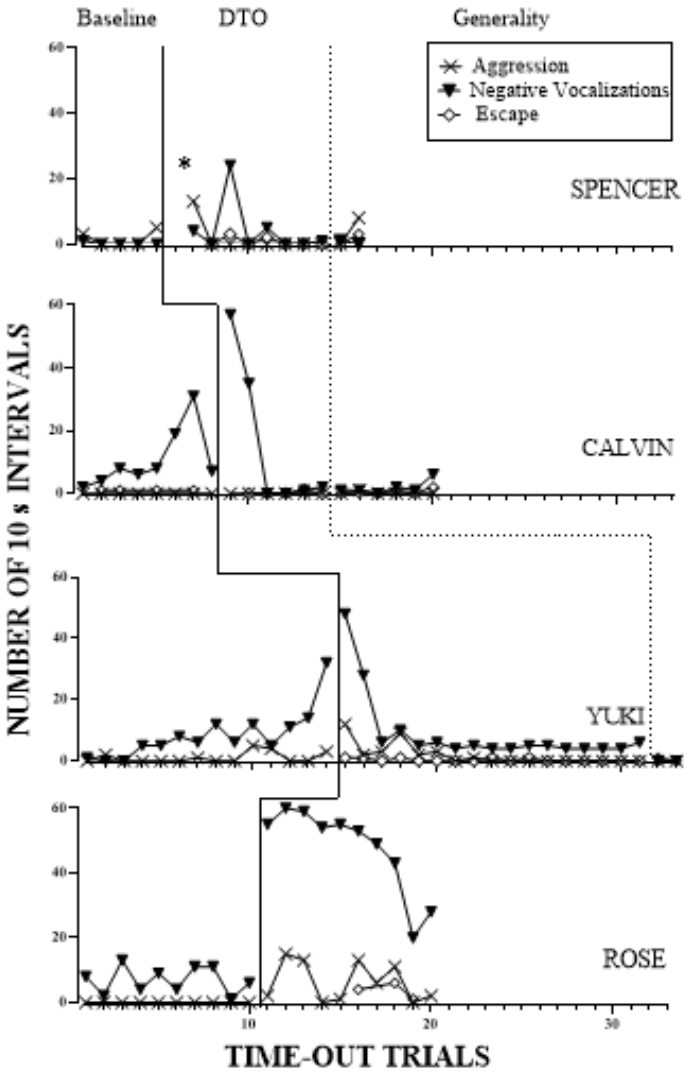

Figure 5: Number of time-out intervals with occurrences of negative vocalizations, aggression, and escape across baseline, DTO, and generality for all four participants. Data are missing for Spencer's first time-out trial in DTO (*).

well as generality (*M* = 1 interval/time-out trial). For Rose, negative vocalizations were low in baseline (*M* = 6.8 intervals/time-out trial). An immediate increase to high levels was observed with the introduction of DTO, followed by a gradually decreasing trend towards the end of the phase (*M* = 47.6 intervals/time-out trial).

For Spencer, time-out trials with occurrences of aggression were observed at low levels during baseline (*M* = 1.6 per time-out trial). A slight increase in aggression occurred with the introduction of DTO, but it decreased to near zero levels for the remainder of DTO (*M* = 1.8 intervals/time-out trial). During generality, no aggression occurred in the first exposure to DTO, however, there was a slight increase during the final time-out trial (*M* = 4 intervals/time-out trial). For Calvin, no aggression occurred in baseline or DTO, and was low in generality (*M* = 3.3 intervals/time-out trial). For Yuki, the number of time-out intervals with aggression in baseline was low (*M* = 1.1 per time-out trial). A slight increase in aggression was observed with the introduction of DTO, followed by a decrease to zero levels in the latter half of the phase (*M* = 1.9 intervals/time-out trial), which also was observed in generality (*M* = 0 intervals/time-out trial). For Rose, occurrences of aggression were very low in baseline (*M* = .1 intervals/time-out trial), but during DTO, aggression increased to a mean of 6.3 intervals per time-out trial.

Yuki, Spencer, and Rose did not initiate contingent observation time-out in baseline, so escape from contingent observation was not possible. Spencer displayed a low mean number of time-out intervals with escape in DTO and generality (.3 and .5, respectively). In DTO, Yuki escaped from contingent observation during a mean of .3 intervals/time-out trial. A similar mean was observed for time-out trials during generality

(i.e., .5 intervals). For Rose, the mean number of intervals with escape was 3.7/ time-out trial in DTO. Calvin displayed a mean of 1 interval with escape per time-out trial in baseline, .2 intervals/time-out trial with escape in DTO, and .5 intervals/time-out trial with escape in generality.

Treatment Acceptability

Mean treatment acceptability data were compiled by summing scores for all items for each participant and dividing the total by the total possible score and multiplying by 100 to obtain a percentage. Mean treatment acceptability for all participants was 90%. See Table 3 for the mean and range of scores for each item. All caregivers selected strongly agree for six items, including that the approach in the study was acceptable for addressing children's problem behavior. The item with the lowest score stated that the child was likely to experience discomfort when exposed to DTO.

Items	Means	Ranges
1. I find this approach to be an acceptable way of dealing with the child's problem behavior.	5	5
2. I would be willing to use this procedure if I had to change the child's problem behavior.	5	5
3. I believe that it would be acceptable to use this approach without children's consent.	5	5
4. I like the procedure used in this approach.	5	5
5. I believe this approach is likely to be effective.	5	5
6. I believe the child will experience discomfort during the approach.	3.5	2-5
7. I believe this approach is likely to result in permanent improvement.	4	3-5
8. I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves.	4.3	4-5
9. Overall, I have a positive reaction to this approach.	5	5
Total	**41.8**	**2-5**

Table 3: Treatment Evaluation Inventory – Short Form items, means and range of scores.

Discussion

On the whole, the results of this study supports the use of DTO to improve child compliance with time-out. When presented with the time-out instruction in baseline, three participants never complied with the instruction, and a fourth participant showed variable compliance but failed to complete contingent observation before the trial was terminated. With the introduction of DTO, notable improvements in the latency to comply with the time-out instruction were observed for three of the four participants. These changes maintained during a home visit. For these three participants, with a few exceptions, the duration of the time-out trial closely resembled that of the latency to comply with the time-out instruction, indicating that escapes from contingent observation were limited. In addition, overall improvement in initial command compliance following exposure to DTO was found for all participants. In general, caregivers found the intervention to be an acceptable approach for children's problem behavior.

This study extends previous time-out research by providing support for DTO as a method that improves instructional control over compliance with time-out. With the exception of Warzak and Floress (2009), the small number of earlier studies that evaluated methods for improving compliance with the time-out instruction relied upon increased durations of time-out or more-restrictive time-out locations, and included physical administration if the child did not move to time-out independently (Donaldson et al., 2013; Twyman et al., 1994). In this study, DTO improved time-out compliance without physical administration or more restrictive locations, thereby avoiding the potential for physical interactions to reinforce time-out resistance or punish caregiver adherence (Allen & Warzak, 2000; Ducharme & Popnick, 1993). Additionally, DTO

served as a non-physical escape contingency, and although Spencer displayed variable time-out trial duration for a portion of DTO before stable improvements were seen, in general, escapes from contingent observation were infrequent and brief. As such, the current study provides rare empirical support for a method that improves compliance with time-out without the use of intrusive administration or escape contingencies (Everett et al., 2010).

For the three participants for whom improvement in time-out compliance was observed, it was observed within three time-out trials. As time-out trials were terminated at 10 minutes if contingent observation was not completed sooner, Spencer, Calvin, and Yuki, were exposed to DTO (i.e., withdrawal of attention and high-preferred tangible) for 20 min, 15.8 min, and 11.8 min, respectively, on the first two trials of DTO. For all subsequent trials, the latency to comply with the time-out instruction was 30 s or less. Thus, improvements in the latency to comply with the time-out instruction were achieved within 11 – 20 min for these three participants, which suggests that DTO is an efficient method of improving compliance with the time-out instruction.

This study extends prior research on DTO by providing preliminary support for DTO as a time-out procedure for improving compliance with initial commands. Only one prior study has examined DTO, and it did not include data on DTO's effect on problem behavior outside of time-out, as DTO was originally designed as a time-out training procedure (Warzak & Floress, 2009). In this current study, overall improvements in initial command compliance were observed in DTO for all participants, including for Rose, who failed to show improvements in compliance with the time-out instruction, but improved initial command compliance from baseline to DTO by 41.2%.

Although further research on this topic is needed, these data suggest that DTO also may function to reduce problem behavior outside of time-out.

This study had several limitations. Notably, Rose never displayed stable improvements in compliance with time-out. Despite this, her improvements in initial command compliance, as well as the sharp increases in negative vocalizations and aggression observed upon introduction of DTO, suggests that DTO functioned as an aversive stimulus. Anecdotally, during DTO, Rose appeared motivated to obtain caregiver attention, as she frequently approached her caregiver while crying and asking for help, and upon the termination of time-out trials, quickly calmed down and began playing with her caregiver. It is possible that the duration of the time-out trial may not have been long enough to establish adequate deprivation from parent attention to evoke Rose's compliance with time-out, or that caregiver attention, which followed termination of time-out trials after 10 min (i.e., play time), intermittently reinforced avoidance of contingent observation time-out. As this study did not include functional analyses, the function of Rose's noncompliance with contingent observation is unknown. It appeared that avoidance of contingent observation was a more potent reinforcer for Rose's noncompliance with contingent observation than the availability of caregiver attention for completing time-out, although this is speculation. Inclusion of functional analyses in future studies on DTO would illuminate the conditions under which DTO likely to be effective.

Rose's data provide a telling example that DTO is not appropriate for all children who avoid time-out. Other procedures, such as providing a reduced time-out interval contingent upon compliance with time-out (Donaldson et al., 2013), as well as shaping

and response cost, also may improve compliance with the time-out instruction, and have the potential to reduce the relative rate of physical administration. It should also be noted that DTO is not appropriate for children who engage in severe problem behavior, as DTO does not include methods that prevent harm to the child or others (e.g., blocking).

Negative vocalizations and aggression occurring during time-out trials suggests that DTO may not remove all aversive side effects of time-out. A consistent increase in the level of negative vocalizations followed the introduction of DTO for Calvin, Yuki, and Rose. For Calvin and Yuki, the increase only was observed during the first two trials of DTO, after which there was a reduction to low levels. The reduction in the number of intervals with problem behavior during time-out was partially a function of the decreasing time-out trial duration, as the number of time-out trials decreased as compliance with time-out improved. It would be beneficial for researchers to consider manipulations to parameters of time-out to further reduce problem behavior occurring while the child is in the time-out location, such as signals (e.g., timers), which may attenuate time-out's aversiveness by specifying how much longer the child must remain in time-out. In addition, rules may also reduce time-out's aversiveness by specifying the criteria for time-out release. In the present study, a rule regarding release from time-out was only presented during child training prior to the start of baseline. Spencer's time-out compliance, in particular, may have benefitted from the use of more frequent iteration of the rules, as he was observed escaping from contingent observation after rapidly counting aloud to 30, but prior to parent release, on several time-out trials during DTO. Repeating the rule regarding release prior to the DTO phase may have produced more consistent time-out compliance.

The findings do not allow one to draw firm conclusions regarding DTO's effect as a punishment procedure. The emphasis of the present study was on examining behavior within time-out, whereas DTO's effect on command compliance was a secondary consideration. Time-out trials in the present study were time consuming and had the potential for reactivity, so in an effort to reduce exposure to a lengthy baseline of time-out trials, only a small and nonstandardized number of initial commands were presented in baseline. Future studies would be better able to examine DTO's effect on noncompliance and other problem behavior outside of time-out if time-outs were eliminated from baseline.

Although the DTO condition included qualities that are common in home settings and DTO's effect maintained during generality, the procedure was nonetheless more highly controlled that would be possible if training occurred in participants' homes. In the current study, parent-child dyads were provided with a limited number of toys, all trials took place in an enclosed room, and procedural steps were prompted by the experimenter. As compared to Warzak and Floress (2009), where all data collection occurred in the home, the present study had lower mean latencies to comply with the time-out. Evaluation of DTO in a home setting would further illuminate conditions under which DTO is effective. Moreover, use of longer time-out trials may be more practical in home settings, which would allow a more realistic assessment of DTO's effect on compliance with the time-out instruction and would reduce the potential for capped trials to intermittently reinforce time-out resistance.

A few methodological concerns should be noted. There was less stability in Spencer's data than would be optimal prior to introducing DTO for Calvin, however,

considerations regarding introductions of DTO were considerate of participants' time and the potential for reactivity to time-out trials in baseline. Nonetheless, the consistency in the level change in the latency to comply with the time-out instruction after two trials of DTO for Spencer, Calvin and Yuki, supports the conclusion that behavior change was due to DTO rather than some other extraneous variable. Similarly consistent reductions were found in the duration of the time-out trial after two trials in DTO for Calvin and Yuki, and for Spencer, as well, albeit with greater variability preceding stable reductions, which further supports that DTO was responsible for the change in level.

In DTO, caregiver-initiated physical interaction only occurred if the parent removed a toy from a child during contingent observation. This likely resulted in fewer physical interactions between caregivers and children than occur during other time-out procedures with locations, but the frequency of physical interactions between caregivers and child participants were not specifically measured. Future researchers should assess physical interactions during time-out procedures so that such findings could contribute to an index of relative effort, intrusion, and effectiveness across time-out procedures. Within subject comparisons of physical interactions during time-out also would illuminate the efficiency or counter-therapeutic effects of various administration methods.

It is unclear if the contingent observation component of DTO is necessary for improving compliance with initial commands. It is possible that the other components of DTO (i.e., withdrawal of attention, tangibles, and fixed-interval delivery of reminders to complete the initial command) may produce improvements in the latency to comply with initial commands. Similarly, it is also possible that time-out is unnecessary if improvements in command compliance are attainable with reinforcement-based methods.

However, time-out remains one of the most routinely used methods for improving children's problem behavior, so it stands to reason that methods that improve children's time-out compliance and time-out's ease of use are worthy of study (Hackenberg & Defulio, 2007). Moreover, time-outs that use a specified location have the advantage of increased discriminability, and gaining instructional control over moving to and staying in the time-out location holds promise for the potential of obtaining time-out compliance when using time-out in other settings in which problem behavior is commonly reported (e.g., stores). It would further extend the literature on DTO, and time-out more generally, for a future study to examine the generality of DTO's effect on compliance with time-out in community settings. DTO may be of greater relative value to parents who implement time-out in public than other forms of time-out with specified locations, as the absence of physical administration would allow parents to avoid negative perceptions regarding the use of force with children.

In summary, this study provides support for the use of DTO as a method for improving compliance with the time-out instruction and completing time-out. Importantly, DTO was effective with minimal physical interactions, providing an example of a time-out training method that is effective, safe, and requires little response effort.

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APPENDIX A

Hello. Thank you for your interest in our study. The purpose of the study is to evaluate whether a procedure called deferred time-out helps children go to and stay in time-out. First, I have to ask you some questions to see if you and your child qualify for the study. Afterwards, you can ask me any questions you have.

1) Is your child between the ages of 3-6 years old?
2) Do you and your child speak English?
3) Does your child follow your instructions?
4) Is your child able to complete simple instructions, such as "Put the block in the bucket?"
5) Have you used time-out with your child?
6) *(If yes to number #5)* → During time-out, does your child go to time-out by themselves when you tell them? Do they stay until you tell them to leave?
7) Does your child engage in severe problem behavior that poses a risk to the child or others?

(*The parent must answer yes to questions 1 -5, and no to questions 6 and 7 to be eligible for the study).*

(If the parent-child dyad is eligible for the study) → Okay, based on this information, it looks like you and your child are eligible for the study. What questions do you have? *(After questions are answered)* → Let's set up a time for you to come in. During the first session, we will review the consent form. Afterwards, you will have another chance to ask any questions that you have. If you choose to consent, then we will begin the first research session with you and your child.

(If the parent-child dyad is not eligible for the study) → Based on this information, you and your child do not show the behaviors necessary to qualify for the study. If you are interested, I can provide you with information on other community resources available.

APPENDIX B

Command: “Can you put the [item] in the [container]?”

The order of items and containers presented during initial commands was randomly selected prior to each day of data collection.

Item	**Container**
Block	Box
Book	Plate
Dinosaur	Basket
Car	Table
Person	Bus

APPENDIX C

Baseline Procedural Integrity			
Check box if step completed. Score NA if step is non-applicable. Write Trial number at top.			
Command Trial			
30 s play period -- toys and parent attention available			
Imitates command "Can you put the [item] in the [container]?" correctly.			
Points at each respective item as they say the words.			
Waits silently for up to 10 s for the child initial response.			
Only says the command once.			
If the child complies with command within 10 s, imitates "Good job."			
Time-out Trial			
If child is noncompliant with command, imitates time-out instruction: "You didn't put [item] in [container]. Sit in time-out."			
Points at time-out.			
Silently waits for up to 10 s to see if the child moves to time-out.			
If the child has not moved to time-out after 10 s – attention available			
Contingent Observation Time-out			
Access to toys restricted			
Does not talk to child when in time-out			
After continuous 30 s in time-out, correctly imitates release statement "You can leave time-out now."			
If child escapes time-out, attention available			
Steps completed correctly			
Steps possible			

APPENDIX D

DTO Procedural Integrity			
Check box if step completed. Score NA if step is non-applicable.			
Command Trial			
30 s play period -- toys and parent attention available			
Imitates command "Can you put [item] in [container]?" correctly.			
Points at each respective item as they say the words.			
Waits silently for up 10 s for the child initial response			
Only says the command once.			
If the child complies with command within 10 s, imitates "Good job."			
Time-out Trial			
If child is noncompliant with command, correctly imitates time-out instruction: "You didn't [item] in the [container]. Sit in time-out."			
Only says the time-out instruction once.			
Points at time-out.			
Silently waits for up to 10 s to see if the child moves to time-out.			
Contingent Observation Time-out			
Access to toys restricted			
Does not talk to child in time-out (unless time-out instruction or reminder is ongoing when time-out initiated)			
After continuous 30 s sitting in time-out, correctly imitates release statement: "You can get out now."			
If child escapes, imitates, "You owe me a time-out. I can't talk to you or help you until you finish time-out." First escape only.			
DTO			
If child does not move to time-out within 10 s, correctly imitates DTO contingency, "You owe me a time-out. I can't talk to you or help you until you finish time-out."			
Does not talk to child until time-out is completed except for reminders.			
Correctly imitates reminder "You owe me a time-out. I can't talk to you or help you until you finish time-out." Reminders provided minimum of 1 min apart contingent upon request.			
Removes and holds high-preferred toy.			

APPENDIX E

Generality Procedural Integrity			
Check box if step completed. Score NA if step is non-applicable.			
Command Trial			
30 s play period -- toys and parent attention available			
Asks "Can you put [item] in [container]?" correctly.			
Points at each respective item as they say the words.			
Waits silently for up to 5 s for the child initial response.			
Only says the command once.			
If the child complies with command within 10 s, says "good job."			
Time-out Trial			
If child is noncompliant with command, correctly gives time-out instruction: "You didn't put [item] in [container]. Sit in time-out."			
Only says the time-out instruction once.			
Points at time-out			
Silently waits for up to 10 s to see if the child moves to time-out.			
Time-out			
If the child moves to time-out, access to toys while in TO restricted.			
Does not talk to child in time-out.			
After continuous 30 s in time-out, says release statement: "You can get out now."			
If child escapes, says, "I can't talk to you or help you until you finish time-out." First escape only.			
DTO			
If child does not move to time-out within 10 s, says DTO contingency, "You owe me a time-out. I can't talk to you or help you until you finish time-out"			
Removes item child currently touching OR one item of their choice			
If a request occurs during the time-out latency or escape, gives reminder "You owe me a time-out. I can't talk to you or help you until you finish time-out" Reminders provided a minimum of 1 min apart.			
Does not talk to child until time-out is completed except for reminders.			

APPENDIX F

Treatment Evaluation Inventory – Short Form

Please complete the items listed below by placing a checkmark on the line next to each question that best indicates how you feel about the treatment. Please read the items very carefully because a checkmark accidentally placed on one space rather than another may not represent the meaning you intended.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I find this approach to be an acceptable way of dealing with the child's problem behavior.	_____	_____	_____	_____	_____
2. I would be willing to use this procedure if I had to change the child's problem behavior.	_____	_____	_____	_____	_____
3. I believe that it would be acceptable to use this approach without children's consent.	_____	_____	_____	_____	_____
4. I like the procedure used in this approach.	_____	_____	_____	_____	_____
5. I believe this approach is likely to be effective.	_____	_____	_____	_____	_____
6. I believe the child will experience discomfort during the approach.	_____	_____	_____	_____	_____
7. I believe this approach is likely to result in permanent improvement.	_____	_____	_____	_____	_____

8. I believe it would be acceptable to use this approach with individuals who cannot choose treatments for themselves. _____ _____ _____ _____ _____

9. Overall, I have a positive reaction to this approach. _____ _____ _____ _____ _____