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Evaluating and Mitigating the Relapse of Undesirable Caregiver Behavior

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EVALUATING AND MITIGATING THE RELAPSE OF UNDESIRABLE CAREGIVER BEHAVIOR

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The success of behavioral treatments like functional communication training depends on their continued implementation outside of the clinical context, where failures in caregiver treatment adherence can lead to the relapse of destructive behavior (St. Peter Pipkin, Vollmer, & Sloman, 2010). In Chapter 2, we developed a laboratory model for evaluating the relapse of undesirable caregiver behavior (e.g., delivering reinforcers following destructive behavior) in which we used an adult confederate who engaged in destructive behavior to simulate a treatment-adherence challenge. Undesirable caregiver behavior relapsed in three of four treatment-adherence challenges despite a behavior analyst using behavioral skills training (BST) to teach caregivers to avoid these responses. In Chapter 3, we used a between-groups design to compare relapse following BST or enhanced BST (i.e., BST with continued performance feedback, multiple-context training, and a treatment signal). A one-tailed binomial-distribution test of these preliminary data was statistically significant, suggesting that enhanced BST may be a worthwhile training package to evaluate during caregiver training.

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LIST OF ABBREVIATIONS

BCBA	board certified behavior analyst
BST	behavioral skills training
FCR	functional communication response
FCT	functional communication training

INTRODUCTION

Treatment of Child Destructive Behavior

Individuals who engage in severe destructive behavior (e.g., self-injurious behavior, aggression, property destruction) often do so to access attention or preferred items from caregivers or to escape nonpreferred events presented by caregivers (Beavers, Iwata, & Lerman, 2013; Hanley, Iwata, & McCord, 2003). Functional communication training (FCT) is an intervention based on differential reinforcement that is commonly prescribed for the treatment of such behavior (Tiger, Hanley, & Bruzek, 2008). After identifying the reinforcer(s) maintaining destructive behavior via functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994), behavior analysts implement FCT by (a) teaching the child a functionally equivalent but otherwise more appropriate response (called a functional communication response [FCR]) and (b) placing destructive behavior on extinction (Carr & Durand, 1985). Behavior analysts have used FCT to produce robust, rapid decreases in destructive behavior while maintaining practical reinforcement schedules for the FCR (Greer, Fisher, Saini, Owen, & Jones, 2016; Hagopian, Fisher, Thibault-Sullivan, Acquisto, & LeBlanc, 1998; Rooker, Jessel, Kurtz, & Hagopian, 2013).

Despite FCT's success in the clinic, treatment challenges occur when caregivers implement FCT in untrained settings, such as in the home, and when caregivers are unable to respond to the child's FCR, such as when caregivers must attend to the child's ill sibling. The potential for otherwise effective FCT-based interventions to result in later treatment relapse has increasingly become of interest to basic, translational, and applied researchers alike. As such, the durability of common treatments for destructive behavior is a point of focus in recent discussions of treatment maintenance (Nevin & Wacker; 2013; Wacker et al., 2011), with the goal of developing durable treatments whose effects maintain when challenged.

Toward that end, researchers have enhanced the durability of FCT-based interventions by improving the maintenance of treatment effects across (a) extended periods of extinction for the child's FCR (Fisher et al., 2018; Fisher, Greer, Fuhrman, Saini, & Simmons, in press; Fuhrman,

Fisher, & Greer, 2016; Lichtblau, Greer, & Fisher, in press; Mace et al., 2010; Romani et al., 2016; Wacker et al., 2011) and (b) changes in treatment contexts (Fisher, Greer, Fuhrman, & Querim, 2015; Greer et al., under review). Each of these previous studies addressed issues of durability from the perspective of mitigating the relapse of *child* behavior by manipulating aspects of how FCT is implemented. To our knowledge, no study has examined the relapse of *caregiver* behavior following training on FCT procedures. Ultimately, tactics for mitigating relapse that account for both child and caregiver behavior may be necessary for the complete eradication of treatment relapse because caregiver behavior sets the occasion for child destructive behavior and vice versa. We focus this paper on the variables affecting caregiver behavior as they relate to the consistent and correct implementation of FCT-based interventions, as well as the conditions likely to challenge caregiver treatment adherence.

Caregiver Treatment Adherence

Caregiver treatment adherence (i.e., precise and consistent delivery of treatment components; Allen & Warzak, 2000) is often necessary for treatment effects to maintain outside of clinical contexts. Treatment adherence to FCT-based interventions requires low levels of *undesirable caregiver behavior*, such as delivering reinforcers following the child's destructive behavior or withholding reinforcers following the child's FCR (i.e., commission and omission errors, respectively). Such undesirable caregiver behavior can result in the collateral recurrence of child destructive behavior following successful treatment with differential-reinforcement-based interventions, like FCT (Marsteller & St. Peter, 2012; St. Peter Pipkin, Vollmer, & Sloman, 2010).

Improving caregiver treatment adherence first requires identification of the variables maintaining undesirable caregiver behavior. Although undesirable caregiver behavior can be sensitive to child-mediated positive reinforcers, such as child affection (Wahler, 1976), it is more likely that undesirable caregiver behavior is negatively reinforced by the termination of child destructive behavior (Stocco & Thompson, 2015; Patterson, 1982, 2002). Support for this

interpretation comes from a variety of sources. For example, caregivers are likely to provide attention in the form of reprimands when attention terminates child (Sloman et al., 2005) or confederate (Miller, Lerman, & Fritz, 2010) destructive behavior. Teachers tend to provide attention or escape following increases in child destructive behavior (Addison & Lerman, 2009). Additionally, adults are less likely to deliver demands to children who engage in destructive behavior, and when they do, they issue tasks associated with less destructive behavior historically (Carr, Taylor, & Robinson, 1991). Attempts to improve caregiver treatment adherence, therefore, focus on ways to shift caregiver behavior from reinforcing destructive child behavior to reinforcing appropriate child behavior.

Caregiver Training

The goal of FCT caregiver training is to teach caregivers to respond to child behavior in ways that reinforce appropriate child behavior, such as the FCR or compliance, and reduce destructive behavior (e.g., via extinction or punishment). *Behavioral skills training* (BST) is a commonly used method for teaching caregivers to implement treatment components and typically consists of the following: (a) written instructions, (b) modeling, and (c) roleplay with feedback (Brookman-Frazee, Vismara, Drahota, Stahmer, & Openden, 2009; Ingvarsson, Cammilleri, & Smith, 2010). A typical BST session for FCT caregiver training occurs in a clinical setting and consists of the behavior analyst (a) describing the purpose and procedures of FCT, (b) modeling FCT implementation, (c) roleplaying as a child while the caregiver implements FCT, and (d) coaching the caregiver following any errors made during the roleplay. Behavioral skills training typically ends once the caregiver demonstrates mastery with implementing FCT components, which is evaluated using a pre-specified criterion (e.g., three consecutive trials with no undesirable caregiver behavior). Following BST, the caregiver then conducts FCT with the child, and the training afforded by BST is often sufficient for caregivers to implement FCT with high levels of treatment adherence, such that FCT treatment effects generalize to the caregivers (cf. Fisher et al., 2015; Greer et al., under review).

Although FCT treatment effects may appear to be firmly established with the caregiver following BST, caregiver treatment adherence can be challenged in a variety of ways. For example, contextual changes (e.g., returning home) can fail to evoke newly trained caregiver behavior (Cordisco, Strain, & Depew, 1988; Koegel, Glahn, & Nieminen, 1978; Miller & Sloane, 1976). Competing sources of reinforcement (e.g., attending to a sibling) or punishment (e.g., public disproval of the caregiver's implementation of extinction or punishment procedures for the child's destructive behavior) may make treatment adherence less likely to occur in the behavior analyst's absence (Allen & Warzak, 2000). Additionally, the recurrence of child destructive behavior (due to factors other than lapses in treatment implementation, such as contextual changes) may challenge caregiver treatment adherence. Taken together, these variables can be described as *treatment-adherence challenges*.

Such treatment-adherence challenges have been shown to disrupt caregiver treatment adherence. For example, caregivers often fail to demonstrate generalization of newly trained skills (e.g., differential reinforcement, extinction) to novel contexts without additional training in those contexts (Cordisco et al., 1988; Miller & Sloane, 1976). Descriptive studies have found that teachers sometimes revert to previous strategies, such as providing attention or escape following increases in destructive behavior, despite recent training to respond differently (Addison & Lerman, 2009). Additionally, caregivers may revert to previously extinguished responding when a newly trained response fails to terminate aversive child behavior (e.g., crying; Bruzek, Thompson, & Peters, 2009; Thompson, Bruzek, & Cotnoir-Bichelman, 2011), especially when previously extinguished responding has had a longer history of reinforcement (Bruzek et al., 2009; see also Todd, Winterbauer, & Bouton, 2012).

Enhanced BST

Given the potential for undesirable caregiver behavior to recur during treatment-adherence challenges, behavior analysts should also consider how best to refine caregiver training to mitigate relapse. The Centers for Disease Control and Prevention (2009) recommend a

component-oriented approach of integrating empirically supported methods into existing caregiver-training programs as a cost-effective alternative to developing adopting an entirely new caregiver-training program, which could require additional expenditures and training. One approach is to incorporate relapse-mitigation techniques derived from the basic, translational, or applied literature into the existing BST model of caregiver training. Recently, Podlesnik, Kelley, Jimenez-Gomez, and Bouton (2017) reviewed the literature on contextual control of treatment maintenance and described two refinements (multiple-context training and a treatment signal) that could be applied to clinical interventions individually or in combination. We suggest incorporating in-vivo performance feedback used in behavior-analytic staff training in addition to the refinements suggested by Podlesnik et al. to create an *enhanced BST* that might strengthen caregiver treatment adherence during challenges.

In-Vivo Performance Feedback

Although a comprehensive initial BST session is likely necessary for a caregiver to learn how to implement treatment components accurately, a critical next step is to evaluate performance under natural conditions (e.g., with the child) and have the trainer provide in-vivo *performance feedback* (Ingvarsson et al., 2010; Luiselli, 2015; Parsons, Rollyson, & Reid, 2012). In-vivo performance feedback consists of descriptive praise or other reinforcers following desirable behavior and corrective feedback following undesirable behavior. In a meta-analysis of caregiver-training approaches, programs that required caregivers to emit the skills under the requisite antecedent conditions with performance feedback produced more robust treatment effects than training programs without in-vivo practice and performance feedback (Kaminski, Valle, Filene, & Boyle, 2008).

Presumably, the behavior analyst's praise and corrective feedback might function as a reinforcer and punisher for desirable and undesirable caregiver behavior, respectively. Increasing the density of reinforcement for a response (e.g., desirable caregiver behavior, such as providing reinforcement following appropriate child behavior) can lead to greater persistence of that

behavior during a treatment challenge (e.g., extinction; Nevin, 1992). However, some findings suggest that the provision of additional reinforcers, such as praise, may inadvertently strengthen previously reinforced (e.g., undesirable) behavior if training occurs in the same stimulus context as baseline (e.g., Mace et al., 2010; Nevin, Tota, Torquato, & Shull, 1990). To counteract this potential strengthening effect of undesirable behavior, one could conduct training in a separate context (Mace et al., 2010) or deliver stimuli that function as punishers (e.g., corrective feedback) following undesirable behavior, which can mitigate the recurrence of undesirable behavior during a treatment challenge (Kestner, Redner, Watkins, & Poling, 2015) and strengthen allocation of responding toward alternative behavior (Bradshaw, Szabadi, & Bevan, 1979).

Multiple-Context Training

Without specific strategies to promote generalization, caregiver skills often fail to generalize beyond the original training context (Cordisco et al., 1988; Koegel et al., 1978; Miller & Sloane, 1976). Some of these failures may be explained in relation to *renewal*, or the recurrence of previously reinforced behavior when the stimulus context changes from the training context (Context B) to the original context (Context A) or to a novel context (Context C; Bouton, Winterbauer, & Todd, 2012). Although renewal effects have been examined historically in relation to respondent behavior, renewal of operant behavior has been evaluated in basic preparations with nonhuman animals (e.g., Bouton, Todd, Vurbic, & Winterbauer, 2011), as well as in applied settings with humans (see Podlesnik et al., 2017, for a review). In addition to renewing extinguished behavior, contextual changes can lead to renewal of previously punished behavior (Bouton & Schepers, 2015), which suggests that providing corrective feedback following undesirable caregiver behavior may be insufficient alone to maintain treatment adherence when the caregiver returns home. Renewal effects seem pertinent to caregiver training because caregiver training often occurs in a clinical setting prior to the caregivers returning home or entering a new public setting. However, a promising finding in basic research on renewal is that introducing training in multiple contexts can mitigate renewal effects (Bernal-Gamboa,

Nieto, & Uengoer, 2017; Shiban, Pauli, & Mühlberger, 2013; Thomas, Vurbic, & Novak, 2009) and applied work suggests that varying the contextual stimuli can be important for treatment effects to generalize to novel situations (Wacker et al., 2005). Translating these ideas into practice, the behavior analyst could teach the caregiver to implement FCT in several settings, ideally in contexts that closely approximate the home or other settings the family experiences frequently.

Treatment Signal

When training does not generalize readily to novel contexts, the inclusion of programmed discriminative stimuli (hereafter described as *treatment signals*) can facilitate the transfer of treatment effects to these contexts (Fisher et al., 2015; Greer et al., under review; Piazza, Hanley, & Fisher, 1996). For example, Fisher et al. (2015) evaluated the transfer of FCT treatment effects in a multiple-baseline-across-contexts design (e.g., settings, therapists). For two children, the addition of treatment signals (i.e., FCT with multiple schedules of reinforcement) led to improvements in discriminated FCRs as compared to FCT without treatment signals (i.e., FCT with mixed schedules of reinforcement). When implementing treatment signals in subsequent contexts, discriminated FCRs transferred rapidly to those contexts. The inclusion of a constant treatment signal (also called an extinction cue or remembering cue) during treatment (e.g., extinction in Context B) can successfully mitigate renewal in nonhuman animals when that signal carries over into a context not previously associated with that treatment (Brooks & Bouton, 1994; Collins & Brandon, 2002; Nieto, Uengoer, & Bernal-Gamboa, 2017). The inclusion of the treatment signal associated with extinction of FCRs during multiple-schedule FCT has also minimized resurgence of destructive behavior during FCT treatment challenges in which that signal was present (Fuhrman et al., 2016). For caregivers, providing a treatment signal that has been paired with training and performance feedback may help to mitigate relapse during a treatment-adherence challenge, with the signal serving as a prompt to continue adhering to treatment recommendations despite changes in contexts or child behavior.

Purpose of the Current Study

Given the potential for relapse of undesirable caregiver behavior during treatment-adherence challenges, and the likely collateral recurrence of child destructive behavior, experimental evaluations of caregiver treatment adherence to FCT-based interventions are warranted. In Chapter 2, we sought to emulate a clinical outpatient model in which caregivers learned to implement FCT-based interventions before then encountering treatment-adherence challenges. Confederate destructive behavior terminated following caregiver delivery of reinforcers for (a) confederate destructive behavior in a home-like context during Phase 1, (b) confederate destructive and alternative behavior in a clinical context during Phase 2, and (c) neither confederate destructive nor alternative behavior (i.e., extinction of caregiver treatment adherence) in the original, home-like context during Phase 3. This preparation approximates the sequence of events caregivers often experience when trained to implement FCT. That is, BST is often implemented in a clinical setting, but caregivers are expected to implement FCT across settings, such as at home. Additionally, temporary increases in child destructive behavior due to these same contextual changes may or may not be sensitive to the continued implementation of FCT procedures, at least initially. Persistent destructive behavior despite high levels of caregiver treatment adherence approximates extinction of negatively reinforced caregiver behavior, which we also arranged in Phase 3. We evaluated the relapse of undesirable caregiver behavior using confederates as children who engaged in analog destructive behavior, thereby controlling child destructive behavior and, by extension, opportunities for undesirable caregiver behavior across phases (cf. Jarmolowicz et al., 2008; Miller et al., 2010). Additionally, the use of confederates circumvented the issue of arranging experimental procedures with families that would promote child destructive behavior for the sake of examining relapse of caregiver behavior (e.g., having caregivers introduce treatment challenges for their child to evoke child destructive behavior and then assess caregiver treatment adherence during heightened levels of destructive behavior).

In Chapter 3, we sought to mitigate the relapse of undesirable caregiver behavior by using the preparation described above, but we enhanced caregiver training with procedures derived from relapse and staff-training research. We overlaid continued trainer performance feedback during FCT implementation, had caregivers implement FCT in varied settings beyond the clinical context (e.g., a simulated child's playroom), and had caregivers wear a wristband that was paired with BST and performance feedback that could serve as signal for the caregiver to continue with treatment recommendations across varying contextual stimuli. We compared this enhanced BST to the BST preparation from Chapter 2 using a between-groups design.

CHAPTER 1: GENERAL METHOD

Participants and Settings

Caregiver Participants

We recruited caregivers whose children were enrolled in, or on the waiting list for, a university-affiliated clinic specializing in the assessment and treatment of severe behavior disorders. All caregivers were at least 19 years old and completed the informed-consent process prior to their participation. Per clinic policy, we provide specific training on each child's individualized treatment procedures to caregivers. Caregiver participants received this same training on their child's treatment procedures only after their participation in the present study. We compensated caregivers received $20 per hour for their participation, and each caregiver's participation lasted approximately two hours.

Confederate Therapists

One experimenter served as the confederate for all sessions in baseline (Phase 1), FCT (Phase 2), and in the treatment-adherence challenge (Phase 3) for each caregiver. To facilitate discrimination between the home-like and training contexts (described below), the confederate wore a pink t-shirt with a white hat in Phases 1 and 3 and a yellow t-shirt with a blue hat in Phase 2. A behavior technician wearing scrubs served as the confederate during BST, which followed Phase 1 but preceded Phase 2.

Settings

Please see Figure 1 for a visual representation of experimental contexts. We conducted Phases 1 and 3 in a home-like context that simulated a living room and it contained a couch or armchair, coffee and end table, flower vases, tan rug, wall and table decorations, and yellow lighting. We conducted BST and Phase 2 in a clinical context that contained plastic tables and chairs and white fluorescent lighting, and, for all but one caregiver, padded walls and floors. When implementing multiple-context training in Chapter 3, we conducted BST and the first two sessions of Phase 2 in the clinical context, and then the latter two sessions of Phase 2 in two

additional simulated contexts. The playroom-like context simulated a child's toy room and included child-sized tables and chairs, a set of toy bins, toys dispersed around the room, an alphabet-themed child rug, and purple lighting. The office-like context simulated a work setting and included a finished wooden table, office chairs, patterned rug, artificial plants, and blue lighting. All contexts included a one-way observation window for discrete data collection, a two-way intercom system for performance feedback, a bag of candy to be used as edible reinforcers (note that Nicole was the only caregiver who delivered the edibles to the confederate during the evaluation), and an iPad for the caregiver to use as a leisure item.

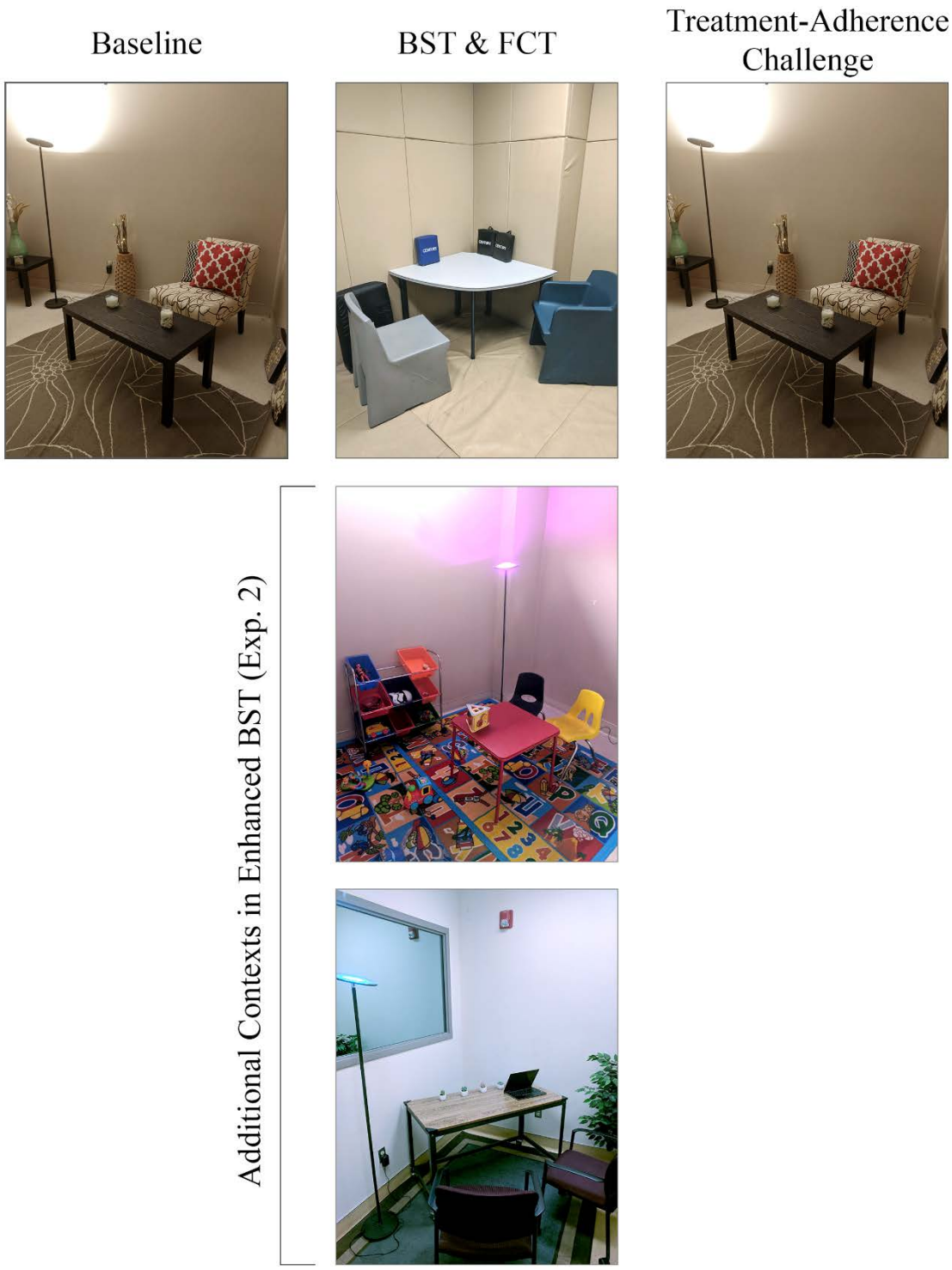

Figure 1. Experimental Settings. Depiction of the home-like context during baseline (Phase 1), the clinical context during behavioral skills training (BST) and functional communication training (FCT; Phase 2), and the home-like context during the treatment-adherence challenge (Phase 3). For Chapter 3's enhanced-BST group, we also conducted FCT sessions in playroom-like and office-like contexts.

Response Measurement

Caregiver Behavior

Our primary dependent variable was *undesirable caregiver behavior*, which we defined as the caregiver providing the confederate's reinforcer (attention or an edible) within 2 s of the confederate's destructive behavior and failing to provide the reinforcer within 2 s of the confederate's FCR (commission and omission errors, respectively). For caregivers who delivered attention, we scored any physical (e.g., hand squeezes, back rubs, high fives) or vocal (e.g., reprimands, soothing statements) attention following destructive behavior, or omission of high fives following confederate FCRs, as undesirable caregiver behavior. For the caregiver named Nicole in Chapter 2, who delivered edible items, we scored any extension of an edible toward the confederate following destructive behavior, and failure to deliver this edible following confederate FCRs, as undesirable caregiver behavior. Trained data collectors scored the frequency of undesirable caregiver behavior using BDataPro (Bullock, Fisher, & Hagopian, 2017), which converted frequency data to responses per min.

Confederate Behavior

Data collectors also measured the frequency of confederate destructive behavior and FCRs. *Confederate destructive behavior* consisted of self-injurious behavior (hitting or biting oneself) and property destruction (hitting or kicking furniture or surfaces; throwing items). *Functional communication responses* were vocal-verbal utterances for the specified reinforcer programmed for destructive behavior (e.g., "High Five?" for attention or "Skittle?" for an edible).

Interobserver Agreement and Procedural Fidelity

We video-recorded all sessions and randomly selected at least one third of sessions in each experimental phase for a second observer to collect reliability and procedural-fidelity data. We calculated interobserver agreement for each dependent variable by dividing the session into 10-s intervals and using the block-by-block proportional agreement method. We divided the smaller number of responses by the larger number of responses within each interval, summed the

results, divided by the sum by the total number of intervals, and then converted the resulting quotient to a percentage. The second data collector measured procedural fidelity of confederate behavior by scoring correct and incorrect confederate responses (i.e., terminating or continuing the scripted confederate behavior [described below] as programmed). For all enhanced-BST sessions in Chapter 3, we also measured procedural fidelity of the enhanced-BST delivery by scoring whether (a) the trainer delivered performance feedback as programmed in Phase 2, (b) the FCT sessions occurred in multiple contexts in Phase 2, and (c) the treatment signal was present in Phases 2 and 3. Please see Table 1 for a summary of these measures.

	Interobserver-Agreement Coefficients *M%* (range)			Procedural-Fidelity Coefficients *M%* (range)	
Caregiver	Undesirable Caregiver Behavior	Confederate Destructive Behavior	Confederate FCRs	Confederate Behavior	Enhanced-BST Components
Michelle	97 (89-100)	97 (89-100)	100	99 (98-100)	-
Debbie	99 (94-100)	89 (83-93)	98 (91-100)	100	-
Nicole	100	95 (80-100)	100	99 (96-100)	-
Chandler	96 (89-100)	97 (87-100)	100	100	-
Jaelyn	94 (89-100)	94 (78-100)	93 (78-100)	100	-
Casey	100	97 (89-100)	98 (83-100)	100	-
Margot	100	96 (89-100)	97 (87-100)	100	100
Ellie	98 (89-100)	91 (89-100)	97 (82-100)	100	100
Kate	99 (89-100)	96 (92-100)	99 (93-100)	-	-

Table 1. Interobserver Agreement and Procedural Fidelity.

Materials

Confederate Behavior Audio Scripts

We created automated audio tracks to prompt the confederate to emit particular responses (e.g., self-injurious behavior, property destruction, the FCR) at select times during sessions, which played via a Bluetooth earbud, audible only to the confederate. We derived the rate of confederate responding (30 responses per min) and the ratio of destructive-behavior topographies from the baseline data of the 25 applications of FCT included in Greer et al. (2016). We created at

least three randomized orders of these response topographies for each experimental phase and randomly selected one of the 3-min scripts prior to conducting a session.

Negative-Vocalization Audio Tracks

Because there were brief, 2-s pauses in confederate destructive behavior within the scripts for Phase 1, we played negative-vocalization audio tracks to minimize the possibility that these pauses would follow discrete instances of caregiver behavior and result in the adventitious (negative) reinforcement of caregiver behavior. Additionally, using audio of the negative vocalizations emitted by each caregiver's actual child could result in sessions approximating episodes of destructive behavior experienced by the caregiver outside of the study. Prior to baseline, we asked each caregiver to provide an audio or video sample of their child engaging in problem behavior. We obtained a recording from Chandler in Chapter 2 and Jaelyn and Margot in Chapter 3. For all other caregivers, we used an audio track of a male child crying, which we obtained at http://www.freesound.org under the Creative Commons licenses. All audio tracks lasted 3 min and consisted of a looped 20-s episode of screaming or other vocal behavior observed to co-occur with the problem behavior emitted by the caregiver's child (e.g., Margot's audio track included her child saying, "I'm going to break your glasses!"). We played the tracks through a wireless speaker in the room, controlled by either the confederate or the data collector.

Reinforcement Schedules

We delivered negative reinforcement in the form of a 20-s termination of confederate behavior and negative vocalizations according to a fixed-ratio-1 schedule for caregiver delivery of reinforcers following destructive behavior in Phases 1 and 2 and for honoring the child's FCR in Phase 2. We programmed this reinforcement schedule because child destructive behavior and FCRs terminated immediately following therapist reinforcer deliveries in nearly all the 25 applications included in Greer et al. (2016), suggesting that adult behavior in that study was negatively reinforced on a continuous or near-continuous schedule. We did not program extinction for commission errors (i.e., delivering reinforcers following confederate destructive

behavior) in Phase 2 because, as suggested above, child destructive behavior often ceased when caregivers delivered the reinforcer maintaining destructive behavior in Greer et al., regardless of the presence of alternative reinforcement.

General Procedures

We received approval from our institutional review board to withhold procedural details and study hypotheses from the caregivers during their participation. During the informed-consent process, the first author used verbiage similar to that used by Bruzek et al. (2009) to explain the purpose of the study:

> "We are conducting this study to learn how adults will respond to a simulated caregiving situation. We will ask you to do what comes naturally. Although the confederate will roleplay as a child with destructive behavior, he will never physically touch you. At the end of the study, a member of the research study will meet with you to discuss all aspects of the study that may not have been clear while you were participating."

At the beginning of the appointment, the experimenter provided the caregiver with an iPad containing applications chosen by the caregiver for use during and between sessions. We included this aspect of the study to emulate the leisure activities that might otherwise compete with caregiver treatment adherence (e.g., at home). All sessions lasted 3 min, except for Nicole's Session 2 that ended early due to a technological error, and data collection continued during reinforcement deliveries. We limited sessions to 3 min to minimize caregiver discomfort to continued exposure to simulated destructive behavior and negative vocalizations. Because exposure to simulated destructive behavior and negative vocalizations may have been aversive for the caregivers, an experimenter intermittently confirmed with each caregiver throughout the course of the study that she or he was still interested in participating. Intersession intervals for Phases 1 and 2 lasted approximately 1-2 min to allow for data collectors to reset BDataPro or so that experimenters could prepare experimental settings, during which time caregivers could continue to engage with their leisure activities or use the restroom. There was no intersession

interval during Phase 3, which was conducted in nine consecutive minutes across three 3-min sessions.

CHAPTER 2: EVALUATING RELAPSE OF UNDESIRABLE CAREGIVER BEHAVIOR

Introduction

We conducted Chapter 2 to determine whether relapse of undesirable caregiver behavior would occur during a treatment-adherence challenge, despite caregivers having been trained to explicitly avoid these responses during BST. This experiment served as the first experimental analysis of caregiver treatment adherence to FCT procedures during a treatment-adherence challenge.

Method

Experimental Design

We evaluated relapse of undesirable caregiver behavior during a treatment-adherence challenge (Phase 3), which included a return to the home-like context that was associated with past reinforcement of undesirable caregiver behavior in Phase 1, and extinction of caregiver treatment adherence. Additionally, we staggered the implementation of Phase 2 across caregivers using a nonconcurrent multiple-baseline-across-subjects design to evaluate the effects of BST on undesirable caregiver behavior, and to determine whether longer histories of reinforcement for confederate destructive behavior would produce higher levels of relapse, as suggested by previous research (Bruzek et al., 2009; Todd et al., 2012).

Participants

Four caregivers (three women, one man) completed Chapter 2 whose children were enrolled in (Debbie and Chandler), or on the waiting list for (Michelle and Nicole), a university-affiliated clinic specializing in the assessment and treatment of severe behavior disorders. Three other caregivers participated but did not complete the study. We excluded two caregivers based on an absence of undesirable caregiver behavior in baseline, and one caregiver withdrew voluntarily due to scheduling conflicts.

Procedures

Baseline (Phase 1). Baseline occurred in a home-like context. The confederate engaged in scripted destructive behavior and played the negative-vocalization audio track continuously. The maximum number of confederate destructive responses per session was 90 (30 responses per min). For Michelle, Debbie, and Chandler, we selected whichever stimulus (i.e., attention or edible) the caregiver delivered first to serve as the reinforcer for confederate destructive behavior. Because all three caregivers delivered attention exclusively, we programmed the delivery of an edible as the reinforcer for the confederate destructive behavior with Nicole to evaluate treatment adherence with another common social-positive reinforcer. Caregiver delivery of the specified reinforcer following confederate destructive behavior terminated destructive behavior and paused the negative-vocalizations audio track for 20 s. During baseline, some caregivers provided directives to the confederate during the reinforcement interval (e.g., “Come sit down,” “Let’s count the Skittles”); in these cases, the confederate allowed the caregiver to physically guide him but did not actively engage with the caregiver. After the 20 s elapsed, scripted destructive behavior and the negative-vocalizations audio track resumed.

BST. A Board Certified Behavior Analyst (BCBA®) trained the caregiver on the implementation of FCT procedures in a clinical context using BST. Behavioral skills training consisted of strategies commonly used to teach caregivers to implement treatment components and lasted approximately 10 min. First, the BCBA® described the purpose of FCT and how to implement differential reinforcement for the FCR and extinction of destructive behavior. Second, the BCBA® modeled these strategies with a behavior technician who simulated child behavior across six trials, some containing immediate confederate FCRs and others with scripted destructive behavior prior to FCRs. The BCBA® described how she was applying differential-reinforcement procedures after each trial, along with the rationale (e.g., “Notice that I ignored aggression, but I delivered attention when he asked nicely. Over time, responding in this way will help him learn that the only way to get your attention is by asking nicely”). Third, the caregiver implemented FCT procedures with the behavior technician (i.e., the roleplay component of BST),

who engaged in six trials of simulated responses, with FCRs programmed first on three of the trials and destructive behavior programmed prior to the FCR on the other three trials. The order of these trial types was random; however, the BCBA® provided the caregiver with immediate feedback following each trial. Behavioral skills training ended when the caregiver completed all six trials with 100% accuracy. No caregiver required additional training trials. Had a caregiver made an error during roleplay, the BCBA® would have provided immediate corrective feedback before conducting another identical trial on which the caregiver erred until the caregiver responded correctly under those stimulus conditions (i.e., remedial trials). Please see the appendix for the BST protocol that the BCBA® used to train the caregivers.

FCT (Phase 2). Following BST, the caregiver implemented FCT with the confederate in a clinical context. Neither the BCBA® nor the behavior technician associated with BST were present during these sessions. The confederate emitted both destructive behavior and FCRs during FCT, but we adjusted the ratio of both responses to simulate changes in child behavior that might reasonably occur across treatment sessions. Recall that confederate destructive behavior could occur up to 90 times in each baseline session. For the first FCT session, we programmed equal numbers of confederate FCRs (45) and destructive responses (45) to simulate an initial treatment effect of FCT on confederate behavior. We then increased the ratio of FCRs to destructive responses in the second FCT session (56 FCRs and 34 destructive responses) and again in the third FCT session (70 FCRs and 20 destructive responses). Across all three FCT session, providing the specified reinforcer for confederate destructive behavior or the FCR terminated both responses for 20 s. Additionally, we decreased the volume of the negative vocalizations audio track by 25% across each FCT session. By changing confederate behavior in this way, caregivers experienced the beneficial effects of continued treatment adherence to FCT, which is a common outcome of FCT caregiver training in the clinic.

Treatment-adherence challenge (Phase 3). Following FCT, caregivers returned to the home-like context with the confederate. The treatment-adherence challenge was similar to FCT,

except the confederate's behavior was no longer sensitive to caregiver treatment adherence. That is, confederate destructive behavior and FCRs continued, irrespective of how the caregiver responded (i.e., the confederate appeared inconsolable). Additionally, confederate destructive behavior and FCRs, as well as the volume of the negative vocalizations, matched those occurring in the first FCT session, but confederate scripts in this condition always began with destructive behavior. We limited the number of sessions in this condition to three to minimize prolonged exposure to inescapable destructive behavior and negative vocalizations, as suggested by our institutional review board. At the end of the treatment-adherence challenge, the experimenter informed the caregiver that the study was over, debriefed the caregiver on the full purpose of the study, asked follow-up questions about the caregiver's experience in the study, and arranged compensation.

Results and Discussion

Figure 2 depicts the nonconcurrent multiple-baseline-across-subjects design. All caregivers engaged in high rates of undesirable caregiver behavior during baseline. Behavioral skills training resulted in zero or near-zero rates of undesirable caregiver behavior during the Phase 2 for all caregivers. Despite BST's effects on undesirable caregiver behavior in the clinical context during Phase 2, three of four caregivers engaged in undesirable caregiver behavior during Phase 3 upon returning to the home-like context in which caregiver treatment adherence was placed on extinction. Similar to Bruzek et al. (2009) and Todd et al. (2012), we observed the highest levels of relapse with the caregivers who had the longest histories of reinforcement for undesirable caregiver behavior.

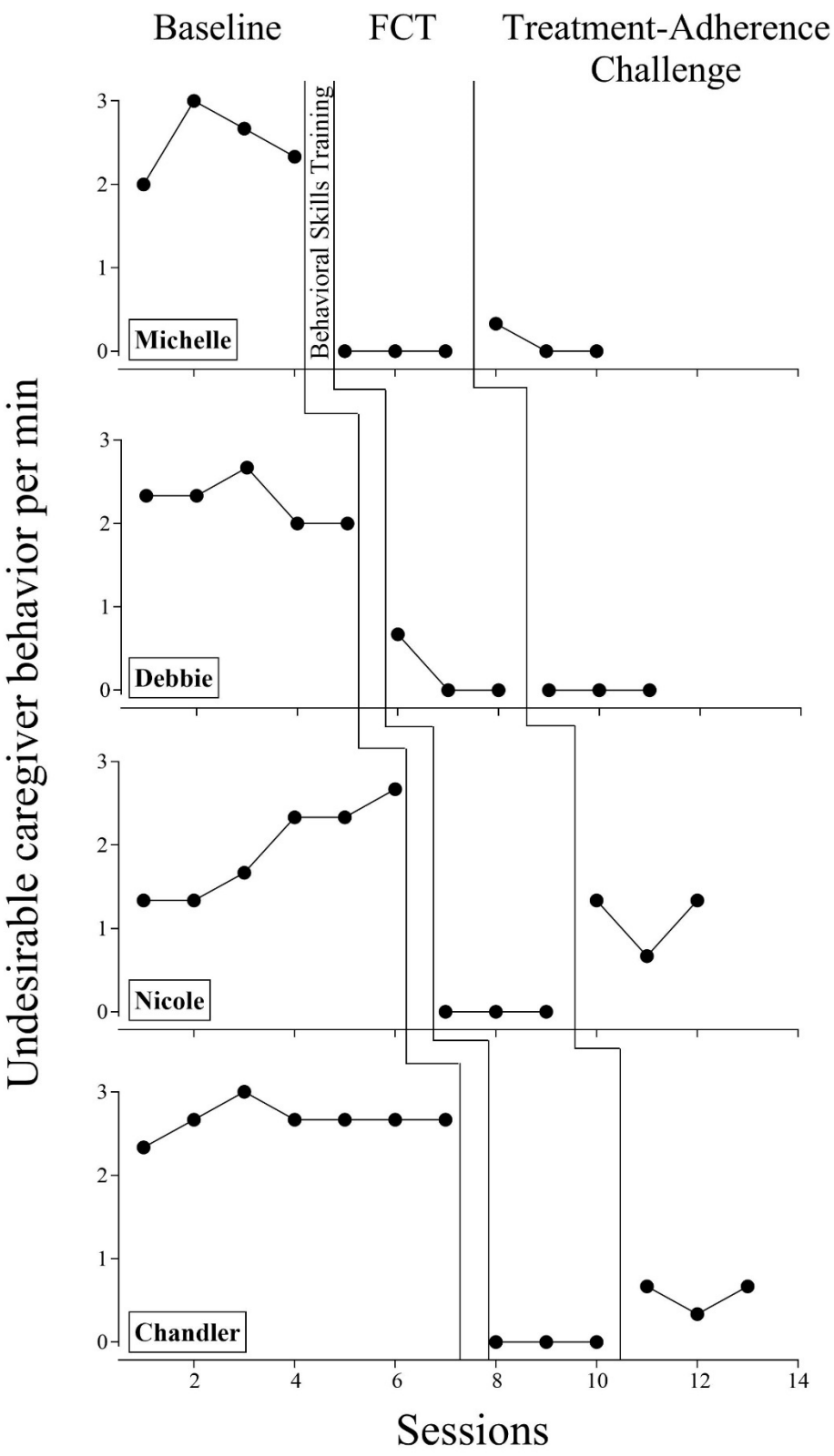

Figure 2. Results of Chapter 2 (Undesirable Caregiver Behavior Across Caregivers).

Figures 3 through 6 depict additional data for each caregiver. The top panel of each figure depicts the overall rate of undesirable caregiver behavior, and the middle panel represents the percentage of errors of commission (i.e., delivering reinforcers following destructive behavior) and omission (i.e., failing to deliver reinforcers following FCRs) that comprised undesirable caregiver behavior. The bottom panel displays the frequency of confederate behavior by type (i.e., destructive behavior or FCRs) to aid in the inspection of the caregiver data displayed above. Fewer confederate responses occurred in Phases 1 and 2 than in Phase 3 because data collection continued during reinforcement intervals (which were not programmed in Phase 3), and sessions were capped at 3 min.

During Phase 3, Michelle (Figure 3) engaged in a commission error immediately following the first confederate destructive response within the home-like context. Following this undesirable caregiver behavior, Michelle made no subsequent errors.

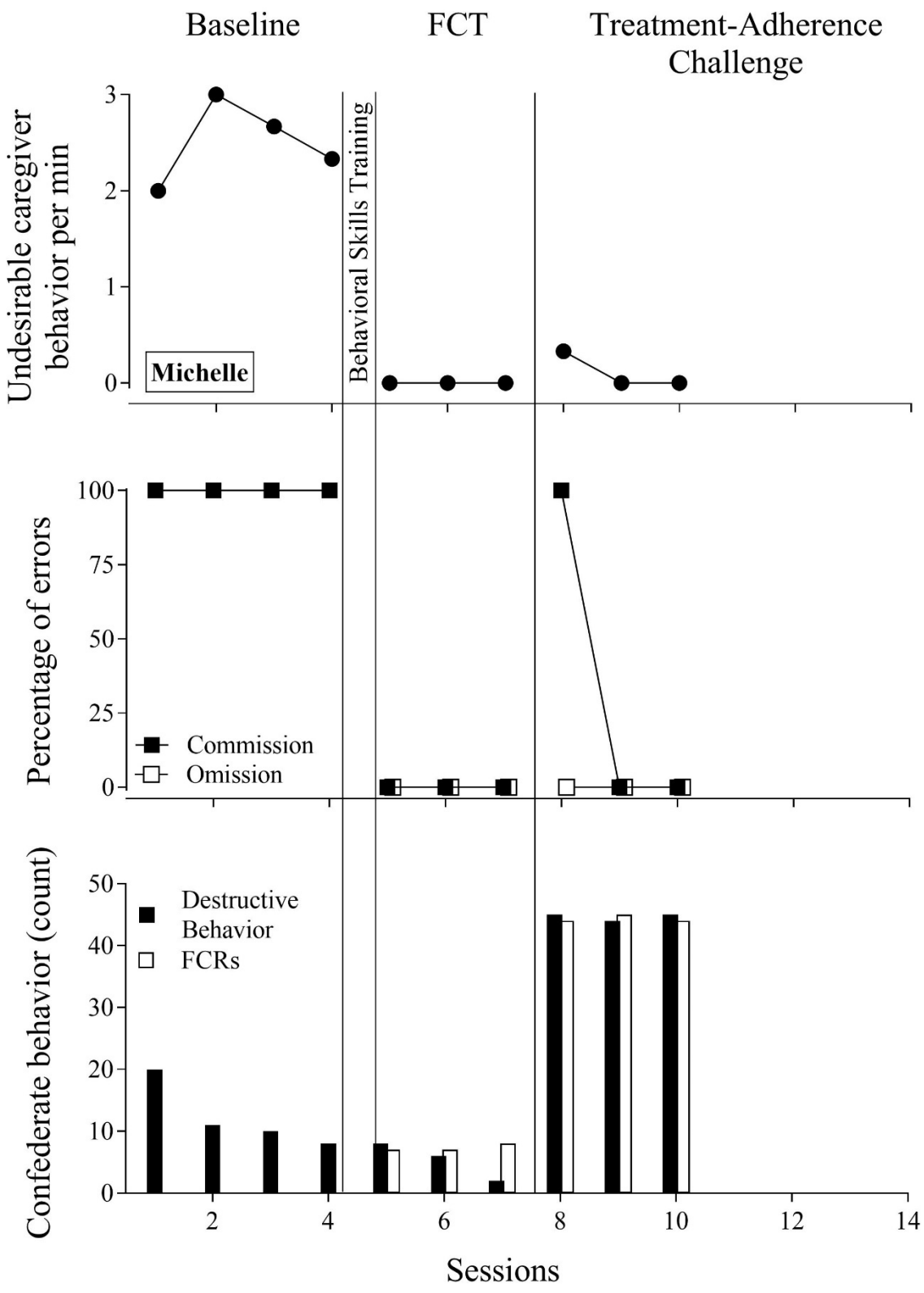

Figure 3. Michelle's Evaluation.

Debbie (Figure 4) failed to reinforce two confederate FCRs during the initial Phase 2 session; however, she exhibited no further undesirable caregiver behavior during Phases 2 or 3. It is worth noting that Debbie stated to the experimenter during the debriefing that, while participating in this study, she had received training on how to ignore her child's destructive behavior (i.e., attention extinction) and that she had practiced this skill with her child in their home. It is unclear to what extent this contributed to the lack of relapse observed with Debbie.

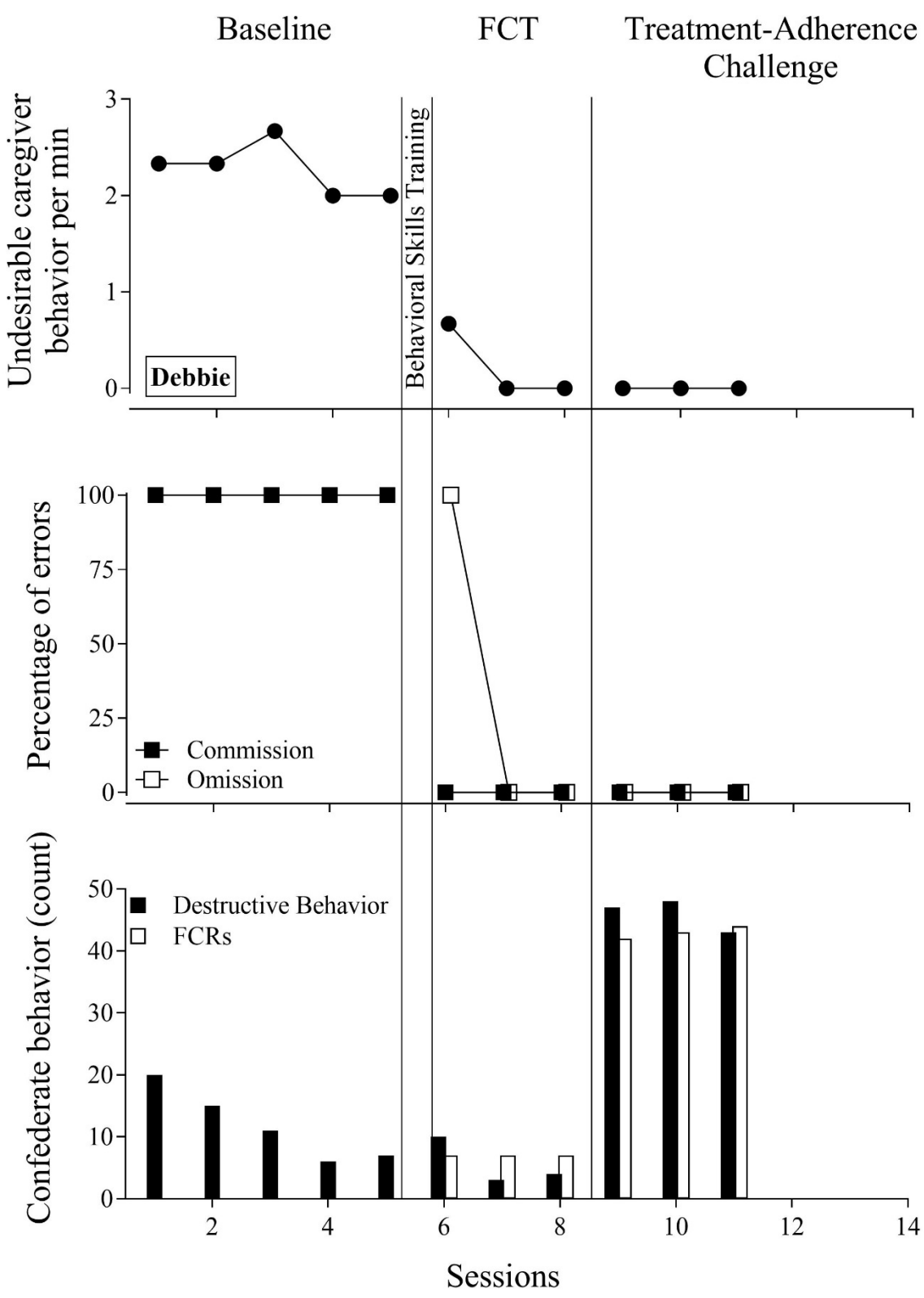

Figure 4. Debbie's Evaluation.

Nicole (Figure 5) displayed high and persistent rates of undesirable caregiver behavior within Phase 3 (M = 1.1 responses per min). As seen in Nicole's second graph panel, she engaged in increasing rates of commission errors but also made numerous omission errors. Recall that Nicole was the only caregiver for whom we programmed an edible-tangible function for confederate behavior. Across the phases, the confederate always consumed the edible when Nicole delivered one. However, in Phase 3, this had the effect of decreasing the number of confederate FCRs due to consumption of the edibles delaying additional vocal FCRs. This did not affect the number of confederate destructive responses because the confederate was able to engage in destructive behavior while consuming the edible. Nevertheless, Nicole was the only caregiver who made omission errors during Phase 3. Delivering the edibles may have required more effort than providing attention, contributing to the increase in omission errors during Phase 3.

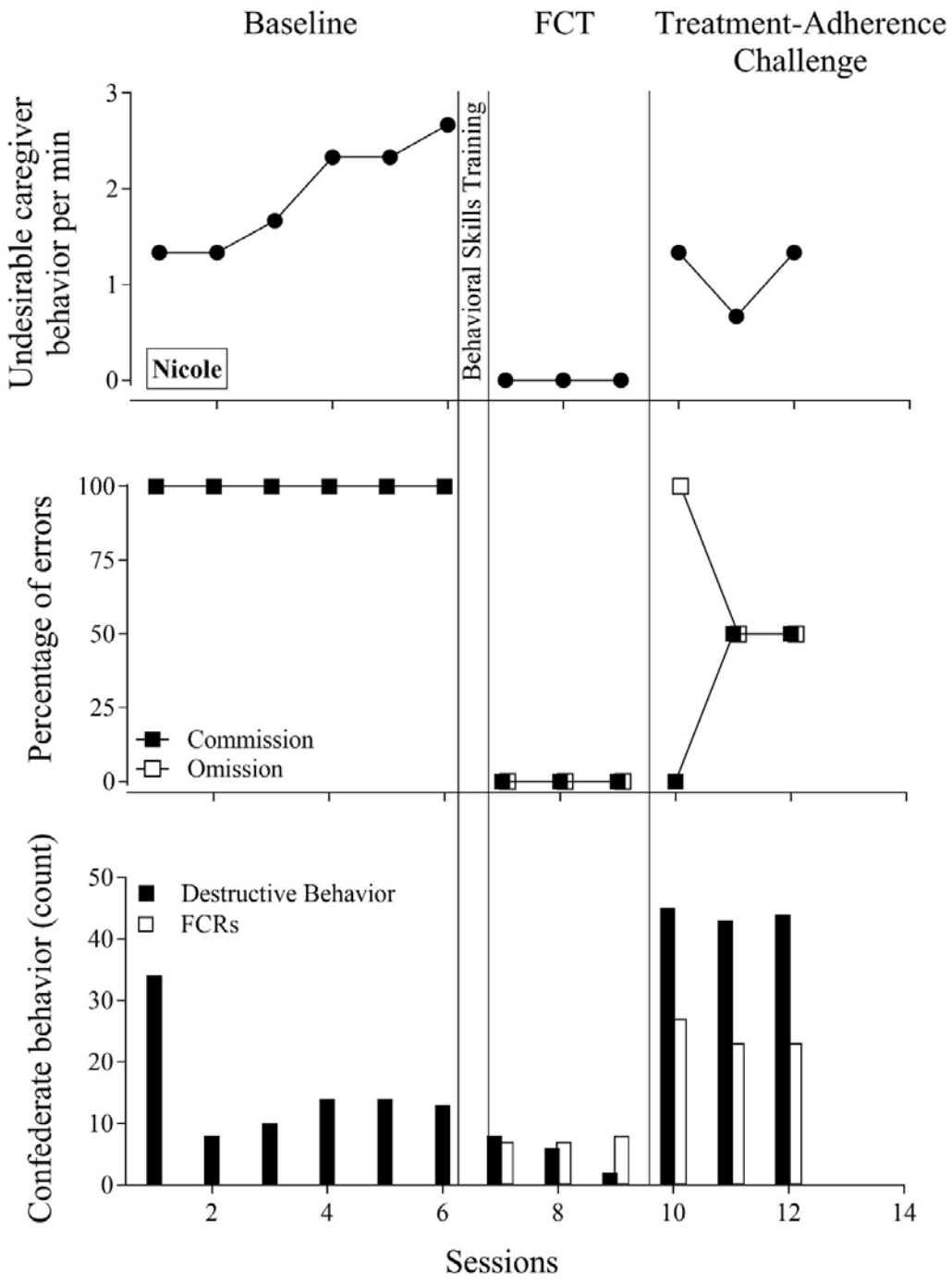

Figure 5. Nicole's Evaluation. Nicole's second baseline session ended early due to a data-collection error, resulting in lower frequencies of confederate destructive behavior than would have otherwise occurred.

Chandler (Figure 6) engaged in elevated and persistent rates of undesirable caregiver behavior during Phase 3 (M = 0.6 responses per min), all of which were commission errors.

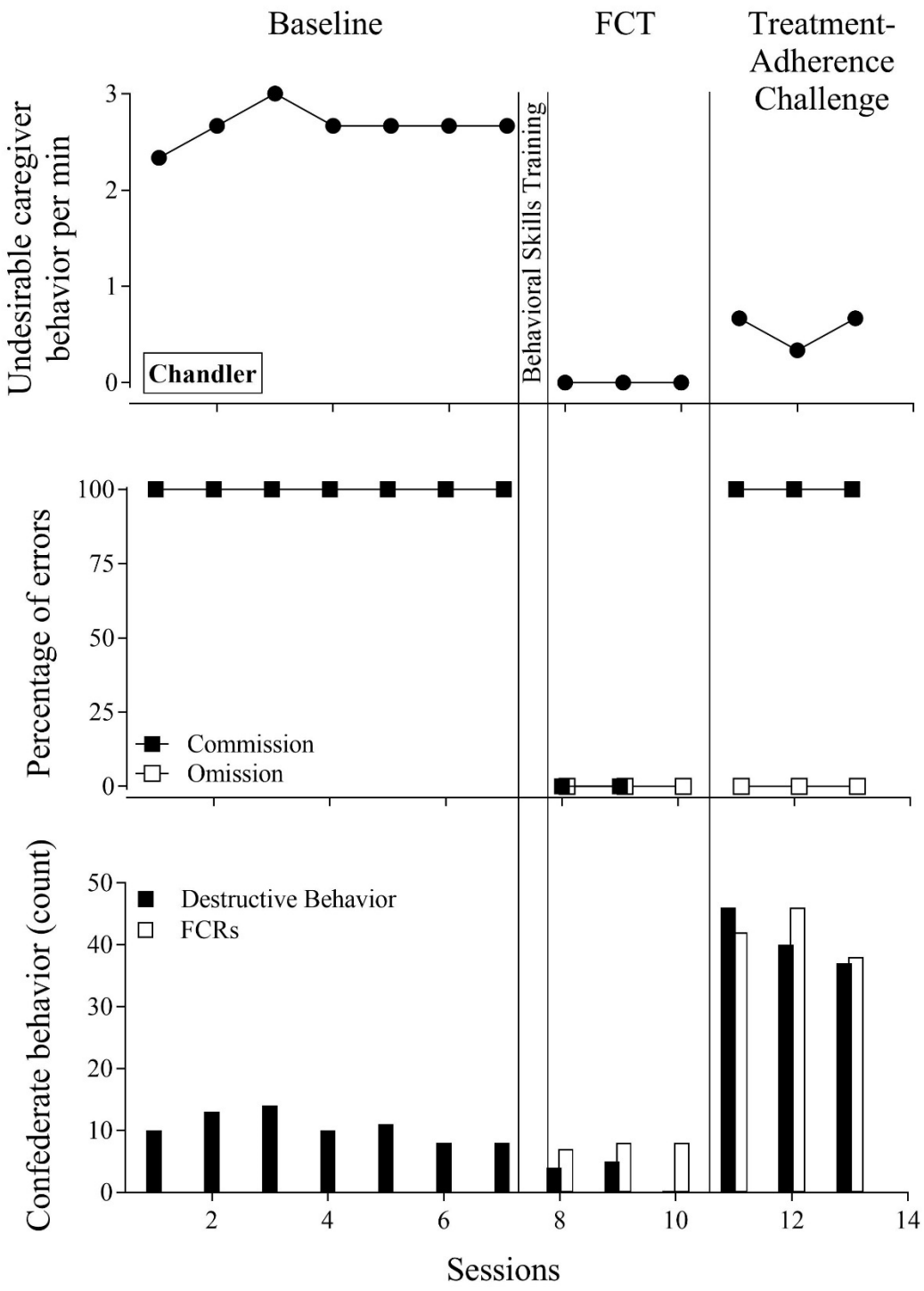

Figure 6. Chandler's Evaluation. We did not depict commission errors in the second graph panel for Session 10 because the confederate did not emit destructive behavior (see black bars in

bottom graph panel). This occurred because the script used during this session did not program destructive behavior until later in the session and Chandler responded efficiently to the earlier-programmed FCRs.

Of the three caregivers who displayed relapse of undesirable caregiver behavior, three caregivers made commission errors and one caregiver made both commission and omission errors, all constituting an increase in undesirable caregiver behavior relative to the preceding Phase 2 that occurred in a clinical context. This is concerning because these types of errors during treatments like FCT can lead to collateral relapse in child destructive behavior (Marsteller & St. Peter, 2012; St. Peter Pipkin et al., 2010).

CHAPTER 3: MITIGATING RELAPSE OF UNDESIRABLE CAREGIVER BEHAVIOR

Introduction

Chapter 2 served as a laboratory model for how to study relapse of undesirable caregiver behavior within an experimentally rigorous preparation, and it demonstrated that relapse can occur despite using BST to train caregivers to implement FCT precisely and providing adult caregivers rules on how to respond to the confederate (e.g., “Ignore problem behavior and wait for him to request your attention”). Chapter 2 also provided a control procedure to which behavior analysts could examine potential training refinements. Therefore, we conducted Chapter 3 to determine whether an enhanced training package consisting of performance feedback, multiple-context training, and a treatment signal could mitigate the relapse of undesirable caregiver behavior during a treatment-adherence challenge.

Method

Experimental Design

Using a between-groups design, we recruited caregivers in dyads and randomly assigned one caregiver to experience BST and the other to experience enhanced BST. Within each group, we staggered the implementation of Phase 2 across caregivers using a nonconcurrent multiple-baseline-across-subjects design.

Participants

Five female caregivers completed the study whose children were enrolled in (Jaelyn and Margot) or on the waiting list for (Casey, Ellie, and Kate) a university-affiliated clinic specializing in the assessment and treatment of severe behavior disorders. Two other caregivers participated but did not complete the study; one voluntarily withdrew herself from the study during baseline, and we excluded an additional caregiver from participating because she did not respond to the confederate during baseline.

Procedures

Baseline (Phase 1). Phase 1 was identical to Chapter 2 for both BST and enhanced-BST groups.

BST. BST was identical to Chapter 2 for the BST group. For the enhanced-BST group, BST was similar to Chapter 2 except that the BCBA® had the caregiver pick a treatment signal from an array (e.g., rubber wristbands and snap bracelets of various colors and patterns) and explained the treatment signal to the caregiver (e.g., "This wristband is a signal to remind you to implement the procedures as we taught them to you…"). The treatment signal remained visible to the caregiver on her wrist for the duration of the training.

FCT (Phase 2). For the BST group, Phase 2 was identical to Chapter 2 except that we conducted four sessions in Phase 2 as opposed to three sessions. We made this change because Jaelyn displayed high levels of undesirable caregiver behavior during her initial Phase 2 sessions, which resulted in us conducting four sessions total to demonstrate a decrease in her undesirable caregiver behavior relative to her baseline. To account for this additional exposure to Phase 2, we conducted four Phase 2 sessions for every caregiver in Chapter 3. For the enhanced-BST group, Phase 2 differed from the BST group in three ways. First, the trainer presented the caregiver with the treatment signal, which the caregiver wore on her wrist for the duration of the session. Second, we implemented multiple-context training in which the first two sessions in Phase 2 occurred in the clinical context before conducting one session each in an office context and playroom context. We randomized which of these latter contexts occurred first. We arranged multiple-context training in this way to simulate how our clinic tends to conduct caregiver training and generalization, with initial sessions occurring in a padded therapy room when the risk for child destructive behavior remains high before then extending treatment to more naturalistic settings when destructive behavior occurs less frequently. Third, the BCBA® from the BST phase remained present to provide in-vivo performance feedback to the caregiver from behind the one-way mirror via the intercom system. For example, if the caregiver withheld attention following a bout of confederate destructive behavior but then immediately reinforced

the confederate's FCR, the BCBA® said, "You did a nice job there by ignoring problem behavior and waiting for an appropriate request"). We thinned the schedule of performance feedback across Phase 2 such that feedback occurred every 1, 1.5, and 2 min during the first, second, and third sessions, respectively, and was absent during the final session. Thinning feedback in this way approximated our clinic's procedures for fading the behavior analyst's presence from therapy sessions during caregiver training. Although no caregiver in the enhanced-BST group engaged in undesirable caregiver behavior during Phase 2, the BCBA® would have provided immediate corrective feedback following an error. At the end of each session, the BCBA® provided a summary of the caregiver's performance during the session (e.g., "That session looked great! Just like we taught you during training, you ignored him whether he was hitting himself or throwing things, and you gave him attention right away when he used his words").

Treatment-adherence challenge (Phase 3). For the BST group, Phase 3 was identical to Chapter 2. Phase 3 was similar for the enhanced-BST group except that the BCBA® provided the caregiver with the treatment signal to wear on her wrist prior to the first session, and the signal remained present for the entire phase.

Results and Discussion

Figure 7 depicts the nonconcurrent multiple-baseline-across-subjects design for the BST group (left) and the enhanced-BST group (right).

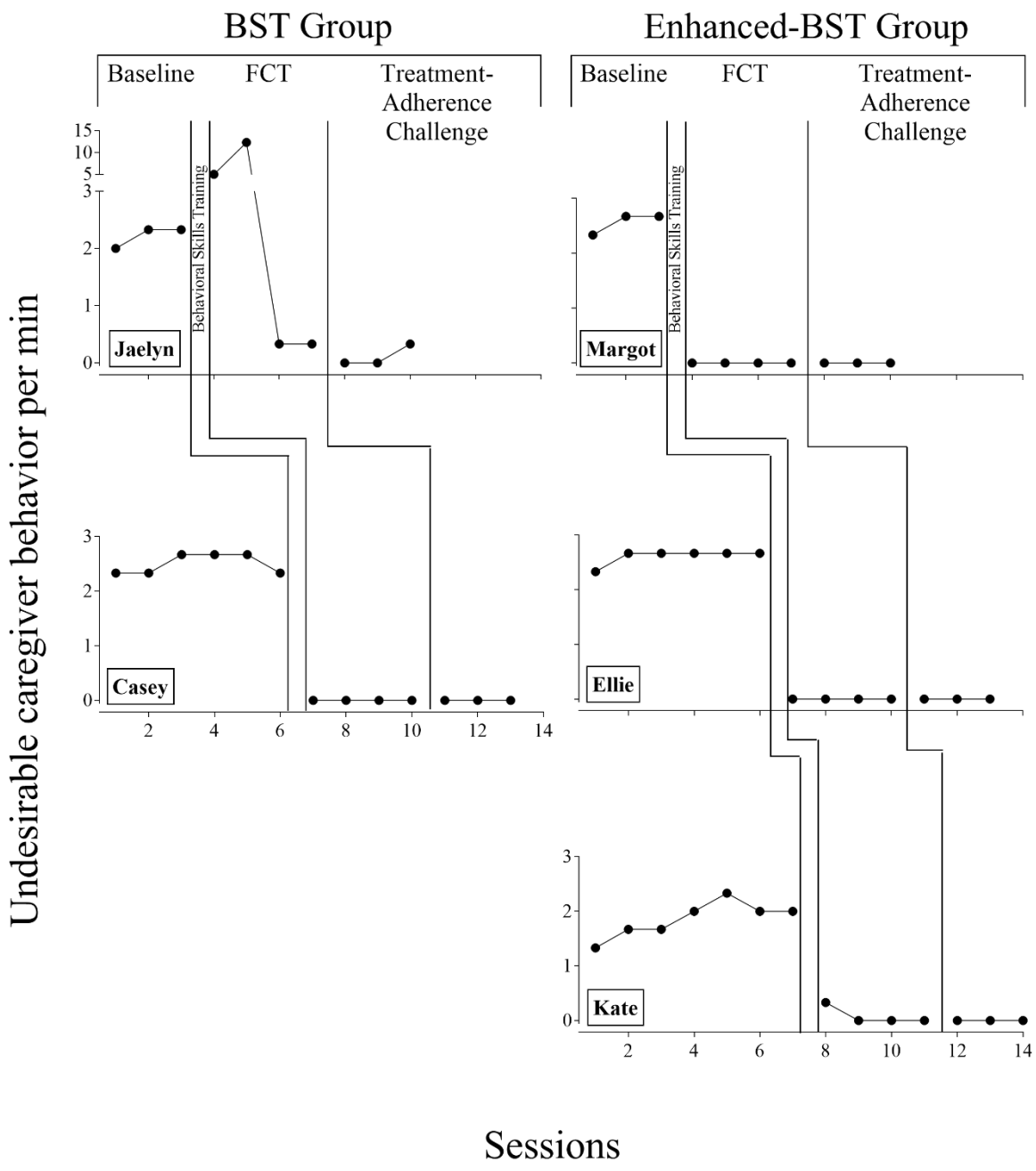

Figure 7. Results of Chapter 3 (Undesirable Caregiver Behavior Across Caregivers).

In Figures 8 through 11, we plotted these data (top panels) in addition to the types of errors that comprised undesirable caregiver behavior (middle panel), and the number of confederate responses (bottom panel) for each caregiver. All caregivers engaged in high rates of

undesirable caregiver behavior (i.e., provided attention following destructive behavior) during baseline. Unlike in Chapter 2, BST did not always result in immediate suppression of undesirable caregiver behavior during Phase 2. Jaelyn from the BST group (Figure 8) made persistent omission errors during the initial FCT sessions, along with one commission error. During Phase 3, Jaelyn initially adhered to treatment recommendations until Session 10 when she delivered attention following confederate destructive behavior. Although Jaelyn's undesirable caregiver behavior was never fully suppressed in Phase 2 (Figure 8, top panel), her responses in the final Phase 2 sessions consisted of omission errors whereas the undesirable caregiver behavior during Phase 3 was an error of commission (see Figure 8, middle panel). Thus, the level of undesirable caregiver behavior during her Session 10 in Phase 3 was similar to the latter sessions of Phase 2, but we commission errors in increased during Phase 3 relative to the final sessions of Phase 2.

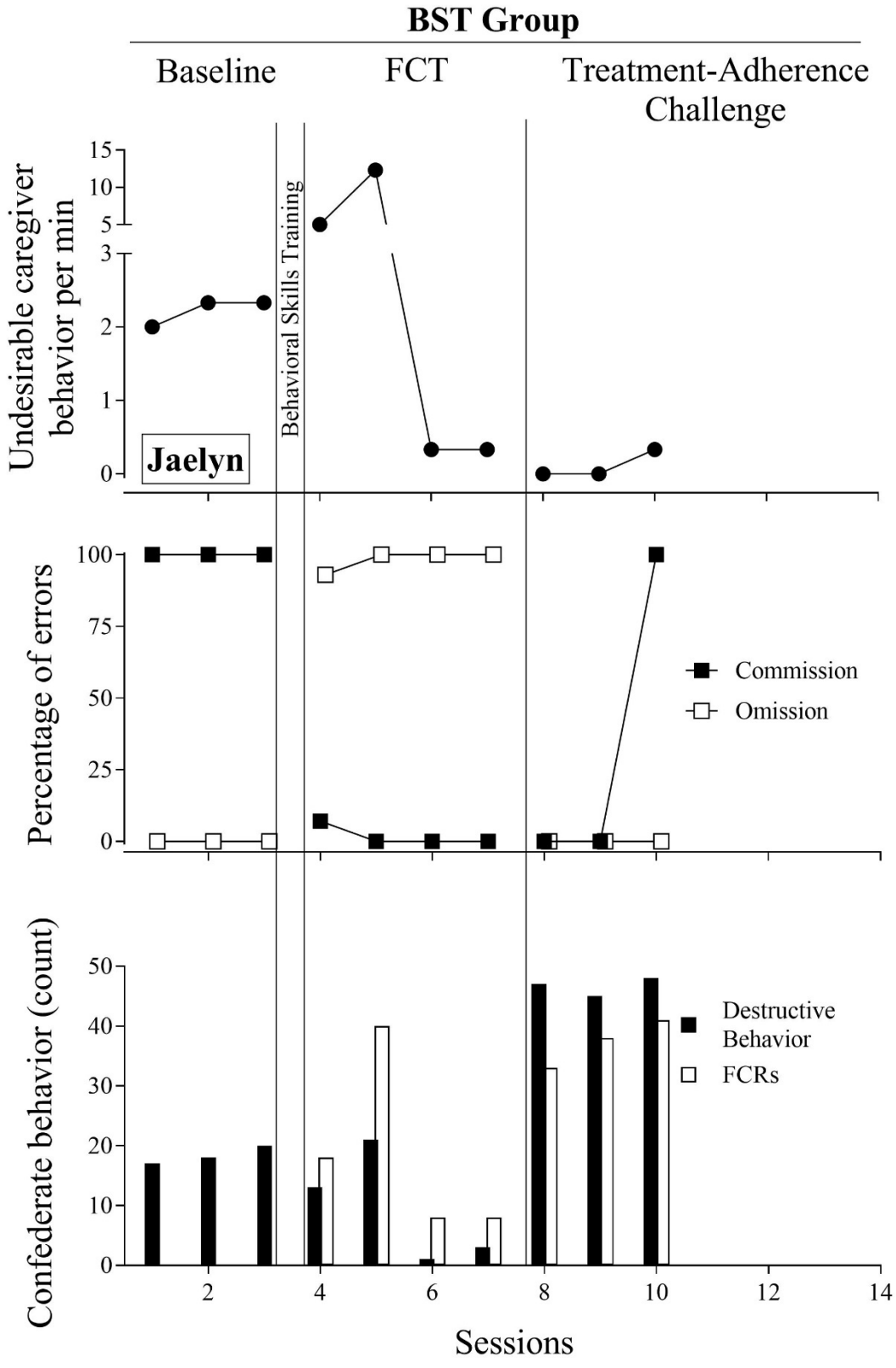

Figure 8. Jaelyn's Evaluation.

The other caregiver in the BST group, Casey (Figure 9), did not display relapse despite her longer history of reinforcement for undesirable caregiver behavior in Phase 1 relative to Jaelyn. This finding is not entirely surprising when considering that one of four caregivers in Chapter 2 (i.e., Debbie) did not display relapse during Phase 3; however, it is also worth noting that Casey mentioned during the debriefing that she was about to deliver attention following destructive behavior when the final session ended, suggesting that a longer Phase 3 may have detected relapse.

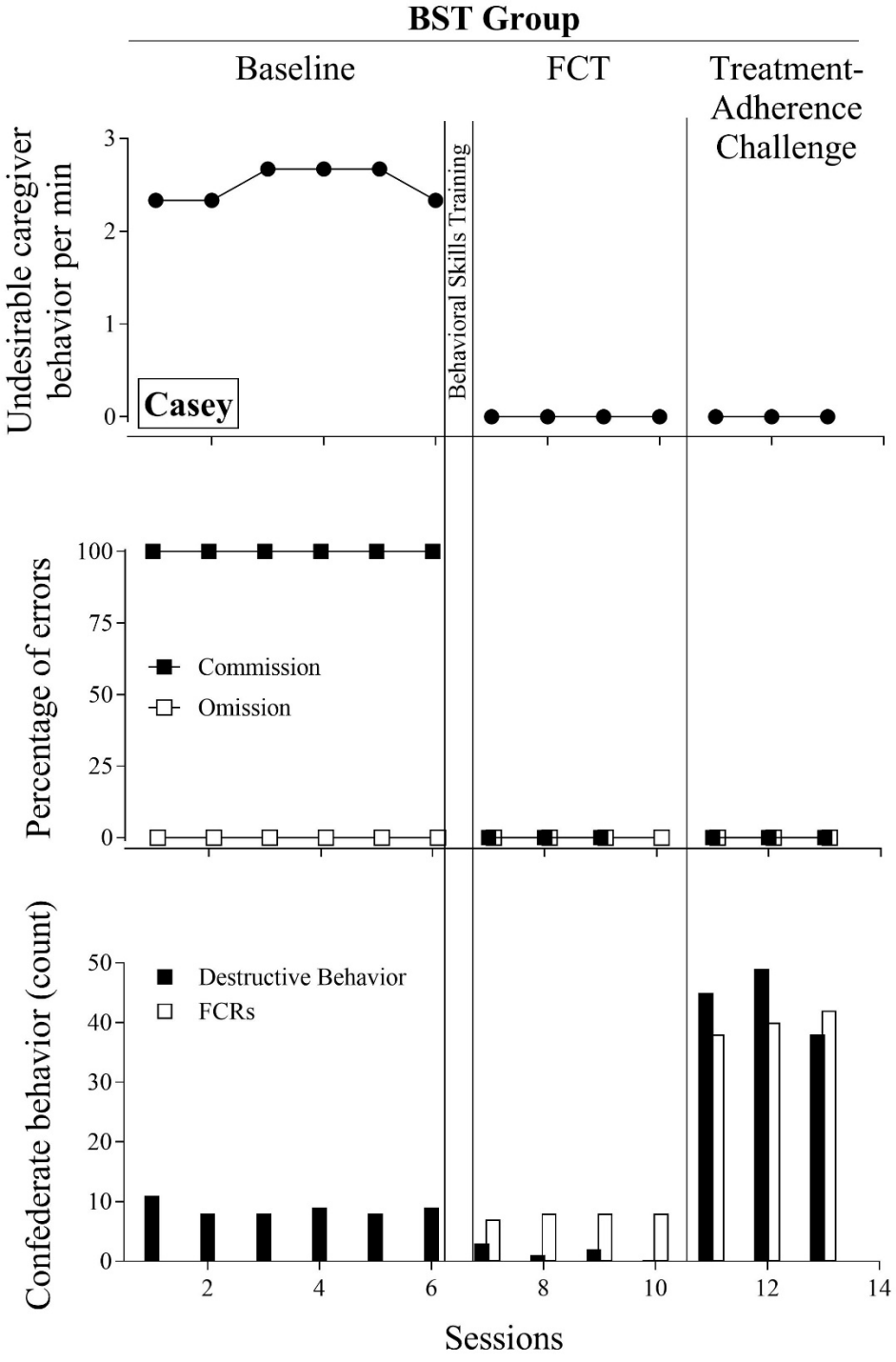

Figure 9. Casey's Evaluation. We did not depict commission errors in the second graph panel for Session 10 because the confederate did not emit destructive behavior (see black bars in bottom graph panel). This occurred because the script used during this session did not program destructive behavior until later in the session and Casey responded efficiently to the earlier-programmed FCRs.

The refinements included in enhanced BST have empirical support in reducing target behavior during training, mitigating relapse, or both (e.g., performance feedback in Kaminski et al., 2008, multiple-context training in Shiban et al., 2013; treatment signals in Fuhrman et al., 2016). The combination of these independent variables for Margot (Figure 10), Ellie (Figure 11), and Kate (Figure 12) in the enhanced-BST group resulted in persistence with treatment recommendations and no undesirable caregiver behavior during Phases 2 or 3.

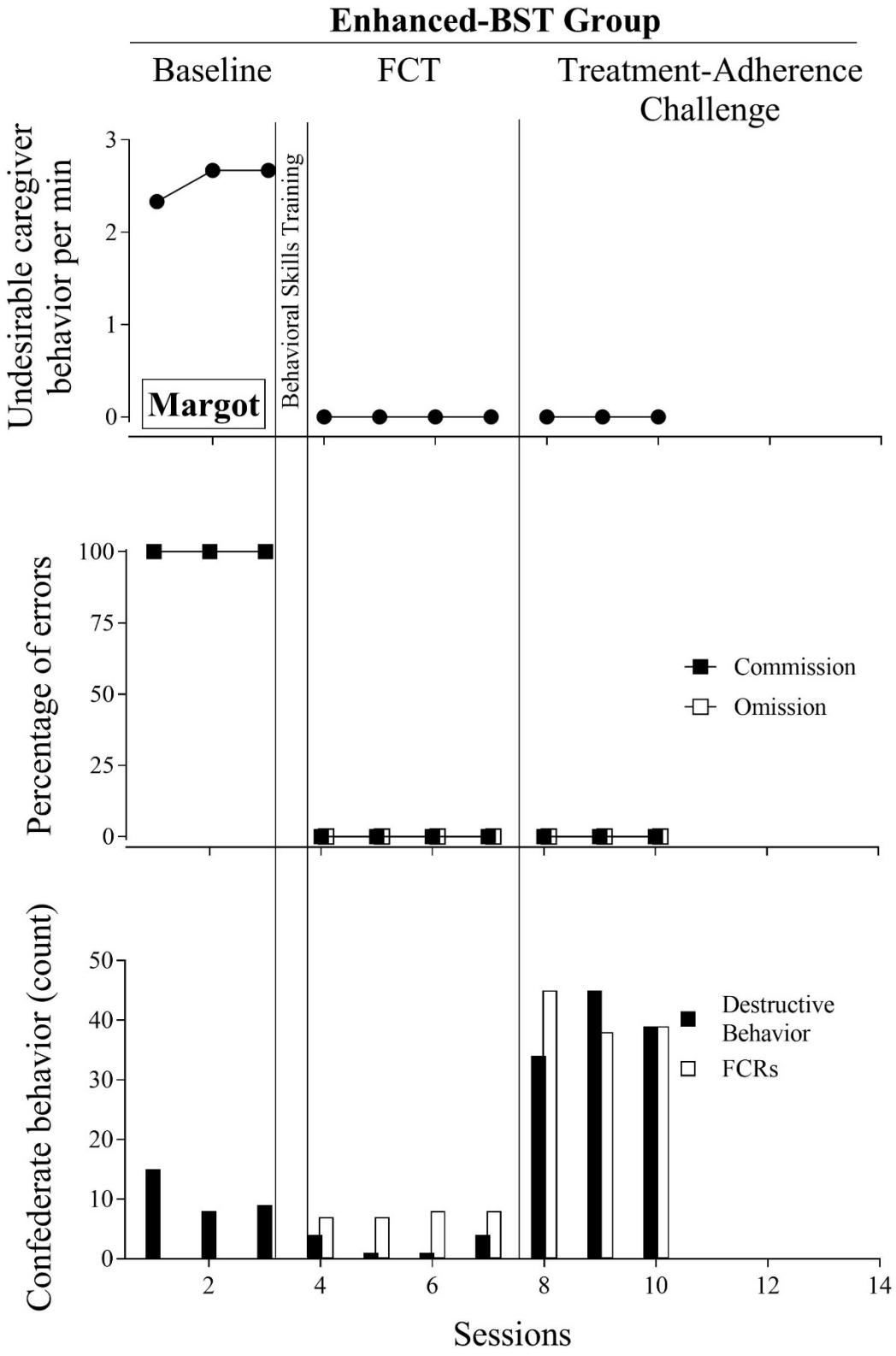

Figure 10. Margot's Evaluation.

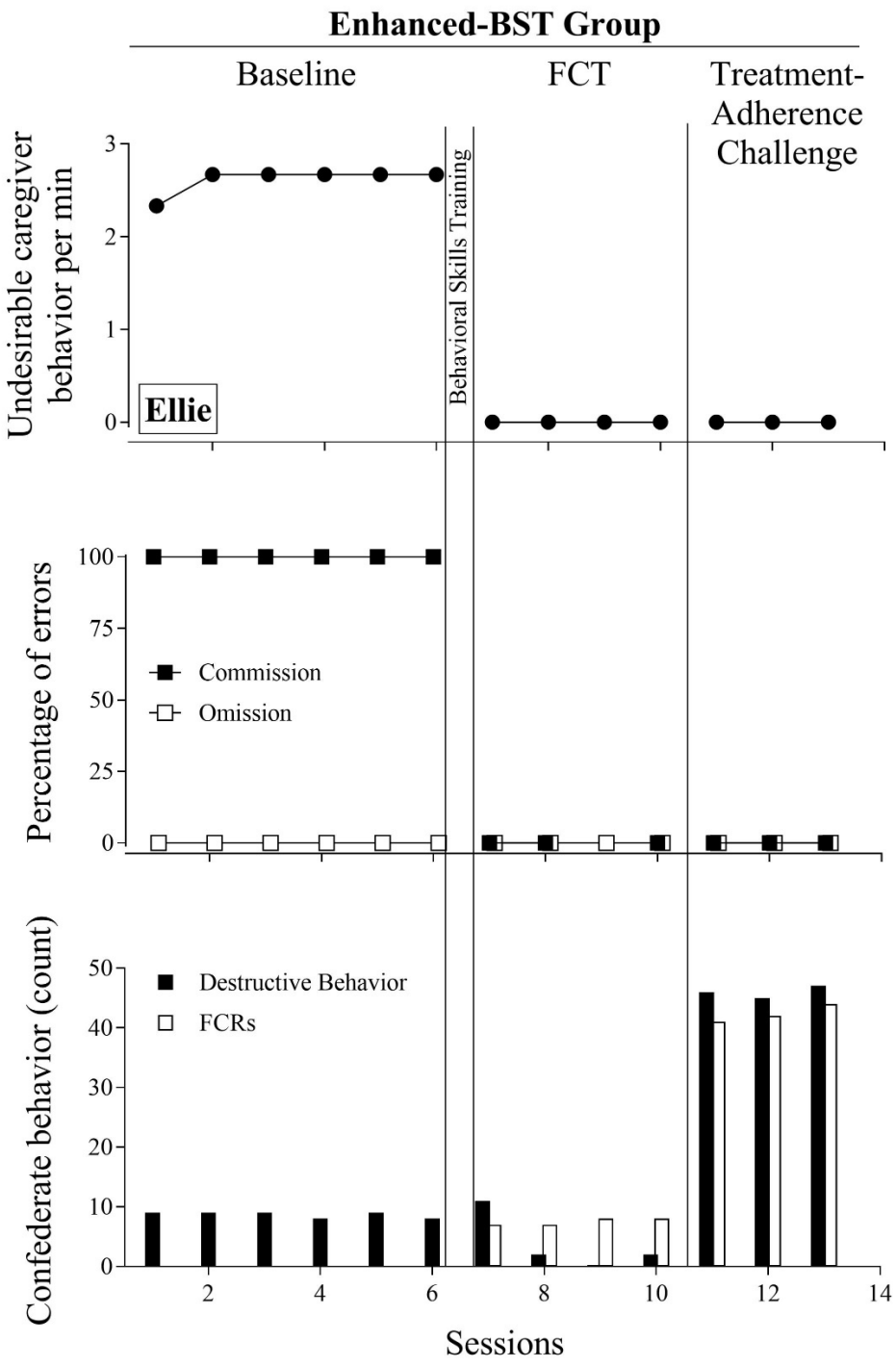

Figure 11. Ellie's Evaluation. We did not depict commission errors in the second graph panel for Session 9 because the confederate did not emit destructive behavior (see black bars in bottom graph panel). This occurred because the script used during this session did not program destructive behavior until later in the session and Ellie responded efficiently to the earlier-programmed FCRs.

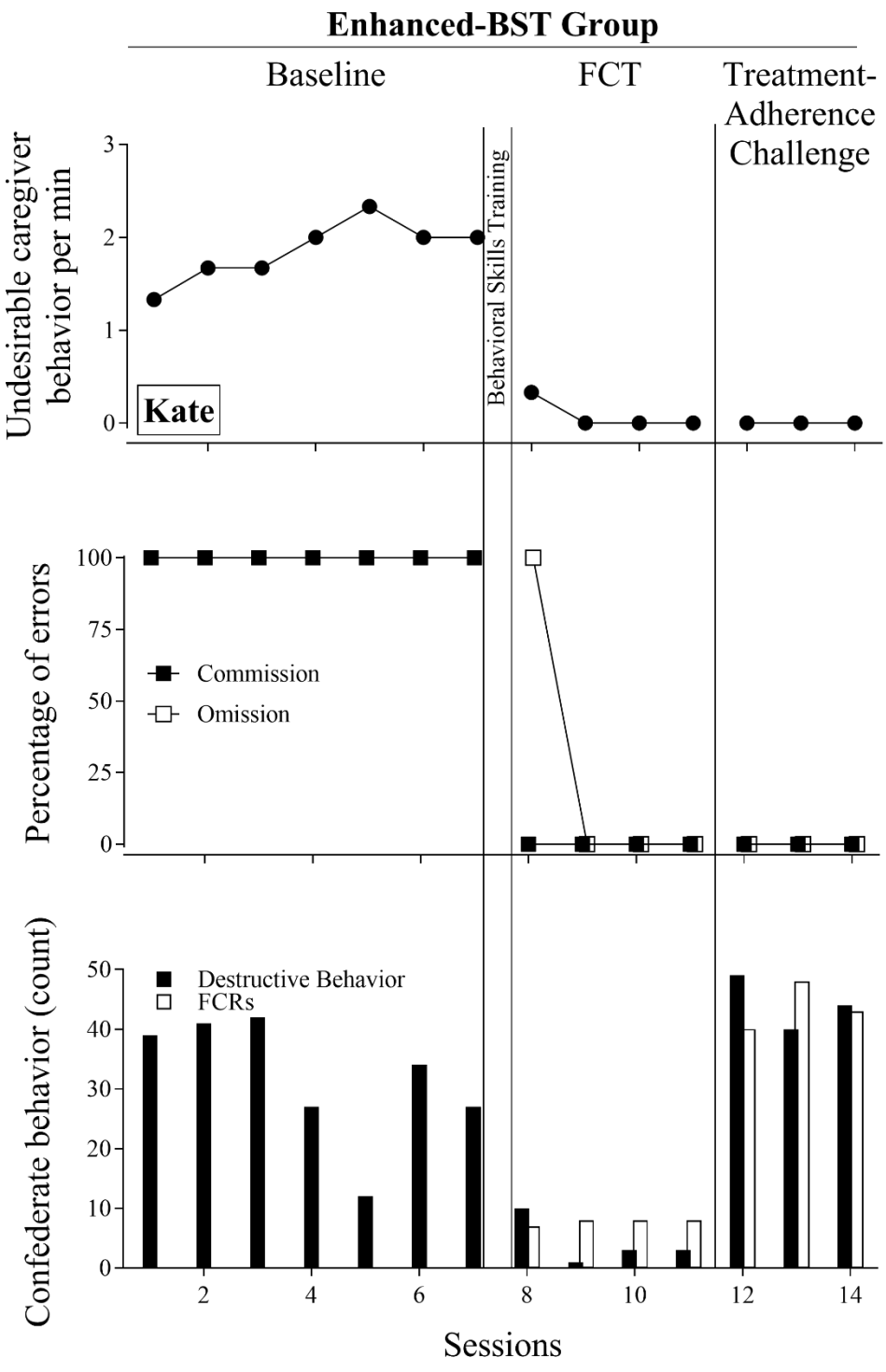

Figure 12. Kate's Evaluation.

However, visual analysis of the data for Chapter 3's dyads in Figure 7 makes the efficacy of enhanced BST difficult to discern due to the small sample size. In Figure 13, we collapsed the relapse data from caregivers who experienced BST in Experiments 1 and 2 and depicted these results alongside the Phase 3 data from caregivers who experienced enhanced BST in Chapter 3. We conducted a one-tailed binomial-distribution test of the data by categorizing each caregiver's Phase 3 as displaying relapse (i.e., undesirable caregiver behavior in at least one of the three Phase 3 sessions) or no relapse (i.e., no undesirable caregiver behavior in any of the three Phase 3 sessions). Four of six caregivers who experienced BST displayed relapse (i.e., $p = .67$); if that value represents the true probability of caregivers showing relapse if enhanced BST was ineffective, the probability of zero of three caregivers in the enhanced-BST group demonstrating relapse would be .04. Therefore, the difference in relapse between BST and enhanced-BST groups in this preliminary examination is statistically significant, but a larger sample of caregivers will likely be needed to provide a more definitive answer regarding the effects of enhanced BST.

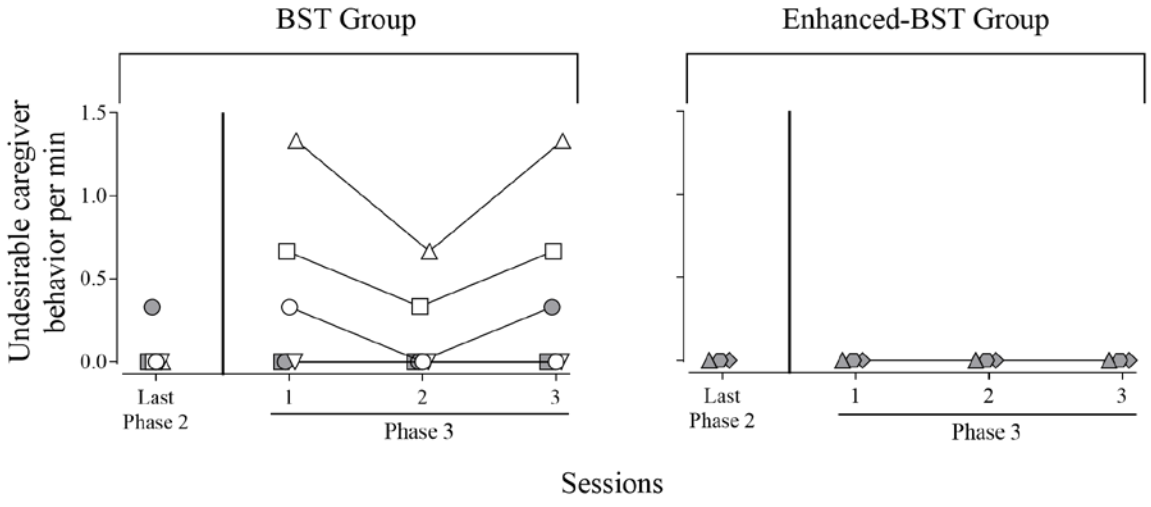

Figure 13. Summary Relapse Data. White and gray data plots represent caregivers from Chapters 2 and 3, respectively. Each symbol shape (e.g., square) represents an individual caregiver.

CHAPTER 4: GENERAL DISCUSSION

Summary

Clinical outpatient services often involve brief appointments at a clinic during which time a behavior analyst works with the referred child to develop an effective intervention for destructive behavior, which is often based on FCT. The behavior analyst then provides caregiver training (e.g., teaching differential-reinforcement and extinction procedures) prior to the family returning home. However, leaving the clinical context may cause the renewal of undesirable behavior on the part of the child (e.g., Kelley, Liddon, Ribeiro, Greif, & Podlesnik, 2015) or the caregiver. In Chapter 2, we simulated this progression of events with caregivers of children who engage in severe destructive behavior and we demonstrated relapse of undesirable caregiver behavior with three of four caregivers, despite all caregivers demonstrating precise implementation of FCT procedures with the confederate child in the immediately preceding FCT phase. In Chapter 3, we replicated these procedures with two additional caregivers assigned to the BST group and we observed one case in which undesirable caregiver behavior relapsed. Taken together, BST alone was insufficient to promote treatment adherence and mitigate relapse in 67% of cases. Similar to previous studies examining history of reinforcement for target responding on later relapse (Bruzek et al., 2009; Todd et al., 2012), we observed the highest levels of relapse with the caregivers in Chapter 2 who had the longest histories of reinforcement for undesirable caregiver behavior (however, see a failure to replicate this finding with Casey in Chapter 3). Additional data are needed to replicate this finding with a larger sample of caregivers, but these preliminary results are concerning from an applied standpoint because families awaiting services for children with severe behavior disorders can wait months or even years for high-quality care. The fact that undesirable caregiver behavior may be more susceptible to later relapse when care is delayed has important implications for the extent to which behavior analysts should prepare for, and potentially guard against, this possibility.

Implications

Decrements in caregiver treatment adherence, such as those observed in the present study, can lead to the collateral relapse of child destructive behavior (Marsteller & St. Peter, 2012; St. Peter Pipkin et al., 2010). In fact, one can conceptualize all translational evaluations of resurgence involving destructive behavior (e.g., Fuhrman et al., 2016) to be evaluations of the susceptibility of recently treated behavior to a breakdown in caregiver treatment adherence, as the final phase of the resurgence preparation involves the caregiver or therapist committing a series of omission errors (i.e., failing to reinforce the FCR). Resurgence of destructive behavior following successful treatment with FCT is becoming an increasingly well-documented finding (for a summary of four such studies, see Fisher et al., 2018).

One particularly concerning finding is that all four caregivers who showed relapse of undesirable caregiver behavior reinforced confederate destructive behavior (i.e., made a commission error) at least once. Translational research on the effect of error type on treatment efficacy has shown commission errors to be more detrimental than omission errors (St. Peter Pipkin et al., 2010). However, commission errors are not included in most translational preparations of relapse (e.g., resurgence and renewal). In further extending basic research on the relapse of operant behavior to applied settings, future researchers should broaden the types of relapse preparations used to help better explore the role of error type on later relapse following FCT-based interventions. Adapting the rapid-reacquisition preparation commonly used with respondent behavior (e.g., Napier, Macrae, & Kehoe, 1992) to examine the relapse of operant behavior may be one such avenue, especially if commission errors are indeed the more prevalent of the two error types.

Further analysis of error types in Phase 3 revealed an interesting difference across caregivers. In Chapter 2, Michelle and Chandler both delivered a reinforcer following the first instance of confederate destructive behavior within the home-like context, prior to the confederate emitting an FCR. Conversely, Nicole made omission errors during Session 10 and

only began making commission errors in Session 11 after continued exposure to extinction. In Chapter 3, Jaelyn made a commission error in Session 10 following continued exposure to extinction. Taken together, it appears that contextual control (i.e., renewal) may have contributed to the relapse of undesirable caregiver behavior for Michelle and Chandler (at least initially), whereas exposure to the contingency change may have led to relapse for Nicole and Jaelyn. A follow-up study could in one condition of treatment-adherence challenge (a) continue to terminate confederate behavior following caregiver reinforcer deliveries while returning to a home-like context (i.e., contextual changes only) and in another condition (b) remain in the clinical context but program continued child destructive behavior and FCRs, irrespective of caregiver behavior (i.e., contingency suspension only). This would allow for an evaluation of the relative effects of contextual change and contingency suspension, respectively. In practice, we assume that these processes often occur simultaneously during outpatient service delivery because the family returns home from the clinic, and treatment adherence may be challenged by continued child destructive behavior within that context (i.e., renewal of child destructive behavior). Prior basic and translational research has shown that the combination of a context change and the discontinuation of reinforcement for alternative behavior can produce large increases in target responding, a phenomenon referred to as super-resurgence (Kincaid, Lattal, & Spence, 2015; Saini & Fisher, 2016).

Mitigating Relapse with Enhanced BST

Given the relapse observed in Chapter 2, and the implications of caregiver relapse on collateral relapse of child destructive behavior, it is important to examine how to strengthen treatment adherence to behavioral interventions. We proposed enhancing BST with three refinements derived from the behavior-analytic literature that address relapse produced by contextual and contingency changes: performance feedback to strengthen the caregiver's desirable behavior and weaken the caregiver's undesirable behavior, and multiple-context training with a treatment signal to reduce relapse produced by contextual control of undesirable

caregiver behavior. No caregiver in the enhanced-BST group demonstrated relapse during Phase 3 (p = .04), suggesting that this approach may be beneficial for improving caregiver treatment adherence. Thus, these preliminary data are encouraging, but a larger sample of caregivers in Chapter 3 would provide more conclusive support for the use of enhanced BST.

Engendering Greater or More Consistent Relapse

As described above, two of the six caregivers who experienced BST did not display relapse and the levels of relapse observed with some caregivers (e.g., Jaelyn) were not exceedingly high. Procedural refinements may increase the likelihood of observing relapse in the BST group. First, extending the number of sessions within the treatment-adherence challenge would have allowed us to account for the possibility of bitonic response-rate functions (i.e., initial increases in target responding followed by a decrease; see Podlesnik & Kelley, 2015) that could not occur within the initial three sessions. In a recent study by Fisher, Greer, Fuhrman et al. (in press), the highest rate of target responding during a resurgence test occurred after the first session for six of the eight participants. Furthermore, the highest rate of target responding during the resurgence test for three participants occurred after the first three sessions, suggesting that conducting only three sessions during Phase 3 in the present study may have limited our ability to observe higher levels of relapse of undesirable caregiver behavior. For the caregivers who did not display relapse, additional exposure to extinction may have resulted in eventual undesirable caregiver behavior. For example, during the study debriefing, Casey from Chapter 3's BST group noted that she was just about to deliver reinforcement following the confederate's destructive behavior when Phase 3 ended.

Extending this final phase to better capture the extinguishing of undesirable caregiver behavior and detect delayed relapse may be worthwhile in future studies. However, it is also important to consider potential caregiver discomfort during Phase 3. During the debriefing, we asked each caregiver to indicate how unpleasant Phase 3 was on a scale from 1 (not unpleasant) to 10 (very unpleasant) and all caregivers except Debbie provided a score. The mean rating was

5.9, with Chandler, Ellie, and Michelle providing low scores of 1, 3, and 4, respectively. However, Nicole, Margot, Jaelyn, and Casey reported high scores of 7, 7, 9, and 10, respectively, suggesting that a 9-min phase of continued confederate behavior and negative vocalizations could be rather aversive for some caregivers. Therefore, researchers should cautiously determine how to extend Phase 3 to allow for more observations of relapse while also limiting caregiver discomfort.

Second, we could have programmed a higher-effort intervention such as FCT arranged for negatively reinforced destructive behavior, which often requires physical guidance to ensure that escape extinction remains in place. This would likely constitute a more effortful extinction component for the caregivers to implement than withholding social-positive reinforcers, which could impact the susceptibility of relapse. Future researchers should evaluate the relapse of undesirable caregiver behavior with higher-effort or more complex interventions (e.g., those that require punishment procedures such as response cost or restraints) to determine if such procedures increase the probability of relapse relative to the FCT intervention designed for these experiments.

Third, although we programmed extinction (i.e., continued confederate destructive behavior and FCRs) for caregiver behavior during the treatment-adherence challenge to simulate an inconsolable child, such insensitivity to caregiver behavior may be unrepresentative of actual child behavior. As described previously, a reanalysis of data from Greer et al. (2016) indicated that destructive behavior rarely continued following the therapist's delivery of reinforcement. A more representative treatment-adherence challenge might involve the termination of confederate destructive behavior and FCRs when caregivers deliver reinforcement. An interesting follow-up study, therefore, could arrange a treatment-adherence challenge without extinction for caregiver behavior to observe the likelihood of relapse in a home-like context following escalated destructive behavior.

Non-Responders

Although we have described options above aimed at increasing the likelihood of observing relapse in undesirable caregiver behavior during future studies, the finding that relapse did not occur for two of the six caregivers in the BST group in the current study is not entirely surprising given that BST incorporated rule deliveries that may have influenced treatment adherence (e.g., “Ignore problem behavior;” “provide attention only for appropriate requests”) and also because relapse does not always occur under ideal conditions within the behavior-analytic literature. For example, a recently submitted study by Fisher et al. (under review) observed increases in target behavior in only four of seven relapse tests. As described by Fisher et al., some tightly controlled nonhuman animal studies fail to observe relapse in a large subset of subjects (e.g., Craig & Shahan, 2016). Thus, we might expect to see some caregivers not engage in undesirable caregiver behavior during treatment-adherence challenges, and that we may need to recruit several more dyads of caregivers for Chapter 3 to fully evaluate enhanced BST’s efficacy in mitigating relapse. Because non-responders in relapse preparations seem to occur in basic research with nonhuman animals, translational research such as the current study, and applied research with clinical populations, it would be useful to determine how best to predict and account for non-responders when designing research studies on relapse so that the efficacy of other independent variables can be detected. Importantly, determining ways of mitigating relapse of caregiver in conjunction with treatments designed to mitigate relapse of child behavior may produce optimal outcomes for families of children with severe destructive behavior.

BIBLIOGRAPHY

Addison, L., & Lerman, D. C. (2009). Descriptive analysis of teachers' responses to problem behavior following training. *Journal of Applied Behavior Analysis, 42*, 485–490. http://doi.org/10.1901/jaba.2009.42-485

Allen, K. D., & Warzak, W. J. (2000). The problem of parental nonadherence in clinical behavior analysis: Effective treatment is not enough. *Journal of Applied Behavior Analysis, 33*, 373–391. http://doi.org/10.1901/jaba.2000.33-373

Beavers, G. A., Iwata, B. A., & Lerman, D. C. (2013). Thirty years of research on the functional analysis of problem behavior. *Journal of Applied Behavior Analysis, 46*, 1–21. http://doi.org/10.1002/jaba.30

Bernal-Gamboa, R., Nieto, J., & Uengoer, M. (2017). Effects of extinction in multiple contexts on renewal of instrumental responding. *Behavioural Processes, 142*, 64–69. https://doi.org/10.1016/j.beproc.2017.06.003

Bouton, M. E., Todd, T. P., Vurbic, D., & Winterbauer, N. E. (2011). Renewal after the extinction of free operant behavior. *Learning and Behavior, 39*, 57–67. http://doi.org/10.3758/s13420-011-0018-6

Bouton, M. E., Winterbauer, N. E., & Todd, T. P. (2012). Relapse processes after the extinction of instrumental learning: Renewal, resurgence, and reacquisition. *Behavioural Processes, 90*, 130–141. http://doi.org/10.1016/j.beproc.2012.03.004

Bradshaw, C. M., Szabadi, E., & Bevan, P. (1979). The effect of punishment on free-operant choice behavior in humans. *Journal of the Experimental Analysis of Behavior, 31*, 71–81. http://doi.org/10.1901/jeab.1979.31-71

Brookman-Frazee, L., Vismara, L., Drahota, A., Stahmer, A., & Openden, D. (2009). Parent training interventions for children with autism spectrum disorders. In J. L. Matson (Ed.), *Applied behavior analysis for children with autism spectrum disorders* (pp. 237–258). New York: Springer.

Brooks, D. C., & Bouton, M. E. (1994). A retrieval cue for extinction attenuates response recovery (renewal) caused by a return to the conditioning context. *Journal of Experimental Psychology: Animal Behavior Processes, 20,* 366–379. http://doi.org/10.1037/0097-7403.20.4.366

Bruzek, J. L., Thompson, R. H., & Peters, L. C. (2009). Resurgence of infant caregiving responses. *Journal of the Experimental Analysis of Behavior, 92,* 327–43. http://doi.org/10.1901/jeab.2009-92-327

Bullock, C. E., Fisher, W. W., & Hagopian, L. P. (2017). Description and validation of a computerized behavioral data program: "BDataPro". *The Behavior Analyst, 40,* 275–285. http://doi.org/10.1007/s40614-016-0079-0

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18,* 111–126. http://doi.org/10.1901/jaba.1985.18-111

Carr, E. G., Taylor, J. C., & Robinson, S. (1991). The effects of severe behavior problems in children on the teaching behavior of adults. *Journal of Applied Behavior Analysis, 24,* 523–535. http://doi.org/10.1901/jaba.1991.24-523

Centers for Disease Control and Prevention. (2009). *Parent training programs: Insight for practitioners*. Atlanta: Centers for Disease Control and Prevention.

Collins, B. N., & Brandon, T. H. (2002). Effects of extinction context and retrieval cues on alcohol cue reactivity among nonalcoholic drinkers. *Journal of Consulting and Clinical Psychology, 70,* 390–397. http://doi.org/10.1037//0022-006X.70.2.390

Cordisco, L. K., Strain, P. S., & Depew, N. (1988). Assessment for generalization of parenting skills in home settings. *Journal of the Association for Persons with Severe Handicaps, 13,* 202–210. http://doi.org/10.1177/154079698801300311

Fisher, W. W., Greer, B. D., Craig, A. R., Retzlaff, B. J., Fuhrman, A. M., Lichtblau, K. R., & Saini, V. (2018). On the predictive validity of behavioral momentum theory for

mitigating resurgence of problem behavior. *Journal of the Experimental Analysis of Behavior*, *109*, 281–290. https://doi.org/10.1002/jeab.303

Fisher, W. W., Greer, B. D., Fuhrman, A. M., & Querim, A. C. (2015). Using multiple schedules during functional communication training to promote rapid transfer of treatment effects. *Journal of Applied Behavior Analysis*, *48*, 713–733. http://doi.org/10.1002/jaba.254

Fisher, W. W., Greer, B. D., Fuhrman, A. M., Saini, V., & Simmons, C. A. (in press). Minimizing resurgence of destructive behavior using behavioral momentum theory. *Journal of Applied Behavior Analysis*.

Fisher, W. W., Saini, V., Greer, B. D., Sullivan, W. E., Roane, H. S., Fuhrman, A. M., . . . Kimball, R. T. (under review). Baseline reinforcement rate and resurgence of destructive behavior.

Fuhrman, A. M., Fisher, W. W., & Greer, B. D. (2016). A preliminary investigation on improving functional communication training by mitigating resurgence of destructive behavior. *Journal of Applied Behavior Analysis*, *49*, 884–899. http://doi.org/10.1002/jaba.338

Greer, B. D., Fisher, W. W., Briggs, A. M., Lichtblau, K. R., Phillips, L. A., & Mitteer, D. R. (under review). Using schedule-correlated stimuli during functional communication training to promote the rapid transfer of treatment effects.

Greer, B. D., Fisher, W. W., Saini, V., Owen, T. M., & Jones, J. K. (2016). Functional communication training during reinforcement schedule thinning: An analysis of 25 applications. *Journal of Applied Behavior Analysis*, *49*, 105–121. http://doi.org/10.1002/jaba.265

Hagopian, L. P., Fisher, W. W., Thibault-Sullivan, M., Acquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of twenty-one inpatient cases. *Journal of Applied Behavior Analysis, 31*, 211–235. http://doi.org/10.1901/jaba.1998.31-211

Hanley, G. P., Iwata, B. A., & McCord, B. E. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis, 36*, 147–185. http://doi.org/10.1901/jaba.2003.36-147

Ingvarsson, E. T., Cammilleri, A. P., & Smith, C. M. (2010). University training to prepare autism specialists: Behavior analysis and performance-based change. *European Journal of Behavior Analysis*, *11*, 261–276. http://doi.org/10.1080/15021149.2010.11434350

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982/1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197–209. http://doi.org/10.1901/jaba.1994.27-197 (Reprinted from *Analysis and Intervention in Developmental Disabilities, 2*, 3–20, 1982).

Jarmolowicz, D. P., Kahng, S., Ingvarsson, E. T., Goysovich, R., Heggemeyer, R., & Gregory, M. K. (2008). Effects of conversational versus technical language on treatment preference and integrity. *Intellectual and Developmental Disabilities, 46*, 190–199. http://doi.org/10.1352/2008.46:190–199

Kaminski, J. W., Valle, L. A., Filene, J. H., & Boyle, C. L. (2008). A meta-analytic review of components associated with parent training program effectiveness. *Journal of Abnormal Child Psychology, 36*, 567–589. http://doi.org/10.1007/s10802-007-9201-9

Kelley, M. E., Liddon, C. J., Ribeiro, A., Greif, A. E., & Podlesnik, C. A. (2015). Basic and translational evaluation of renewal of operant responding. *Journal of Applied Behavior Analysis, 48*, 390–401. http://doi.org/10.1002/jaba.209

Kincaid, S. L., Lattal, K. A., & Spence, J. (2015). Super-resurgence: ABA renewal increases resurgence. *Behavioural Processes, 115*, 70–73. http://doi.org/10.1016/j.beproc.2015.02.013

Koegel, R. L., Glahn, T. J., & Nieminen, G. S. (1978). Generalization of parent-training results. *Journal of Applied Behavior Analysis, 11*, 95–109. http://doi.org/10.1901/jaba.1978.11-95

Lichtblau, K. R., Greer, B. D., & Fisher, W. W. (in press). Resurgence of destructive behavior following functional communication training implemented with and without extinction. *Journal of Applied Behavior Analysis*.

Mace, F. C., McComas, J. J., Mauro, B. C., Progar, P. R., Taylor, B., Ervin, R., & Zangrillo, A. N. (2010). Differential reinforcement of alternative behavior increases resistance to extinction: Clinical demonstration, animal modeling, and clinical test of one solution. *Journal of the Experimental Analysis of Behavior*, *93*, 349–367. http://doi.org/10.1901/jeab.2010.93-349

Marsteller, T. M., & St. Peter, C. C. (2012). Resurgence during treatment challenges. *Mexican Journal of Behavior Analysis, 38,* 7–23.

Miller, J. R., Lerman, D. C., & Fritz, J. N. (2010). An experimental analysis of negative reinforcement contingencies for adult-delivered reprimands. *Journal of Applied Behavior Analysis, 43,* 769–773. http://doi.org/10.1901/jaba.2010.43-769

Miller, S. J., & Sloane, H. N. (1976). The generalization effects of parent training across stimulus settings. *Journal of Applied Behavior Analysis, 9,* 355–70. http://doi.org/10.1901/jaba.1976.9-355

Napier, R. M., Macrae, M., & Kehoe, E. J. (1992). Rapid reacquisition in conditioning of the rabbit's nictitating membrane response. *Journal of Experimental Psychology: Animal Behavior Processes, 18,* 182–192. https://doi.org/10.1037/0097-7403.18.2.182

Nevin, J. A. (1992). An integrative model for the study of behavioral momentum. *Journal of the Experimental Analysis of Behavior, 57,* 301–316. https://doi.org/10.1901/jeab.1992.57-301

Nevin, J. A., Tota, M. E., Torquato, R. D., & Shull, R. L. (1990). Alternative reinforcement increases resistance to change: Pavlovian or operant contingencies? *Journal of the Experimental Analysis of Behavior, 53,* 359–379. https://doi.org/10.1901/jeab.1990.53-359

Nevin, J. A., & Wacker, D. P. (2013). Response strength and persistence. In G. J. Madden, W. V. Dube, T. D. Hackenberg, G. P. Hanley, & K. A. Lattal (Eds.), *APA handbook of behavior analysis, Vol. 2: Translating principles into practice* (pp. 109–128). Washington, DC: American Psychological Association.

Nieto, J., Uengoer, M., & Bernal-Gamboa, R. (2017). A reminder of extinction reduces relapse in an animal model of voluntary behavior. *Learning and Memory*, *24*, 76-80. http://doi.org/10.1101/lm.044495.116

Patterson, G. R. (1982). *Coercive family process.* Eugene, OR: Castalia.

Patterson, G. R. (2002). The early development of coercive family process. In J. B. Reid, G. R. Patterson, & J. Snyder (Eds.), *Coercive family process* (pp. 25–44). Washington, DC: American Psychological Association.

Piazza, C. C., Hanley, G. P., & Fisher, W. W. (1996). Functional analysis and treatment of cigarette pica. *Journal of Applied Behavior Analysis, 29*, 437–450. http://doi.org/10.1901/jaba.1996.29-437

Podlesnik, C. A., & Kelley, M. E. (2015). Translational research on the relapse of operant behavior. *Revista Mexicana de Análisis de la Conducta*, *41*, 226–251.

Podlesnik, C. A., Kelley, M. E., Jimenez-Gomez, C., & Bouton, M. E. (2017). Renewed beahvior produced by context change and its implications for treatment maintenance: A review. *Journal of Applied Behavior Analysis*, *50*, 675-697. http://doi.org/10.1002/jaba.400

Romani, P. W., Ringdahl, J. E., Wacker, D. P., Lustig, N. H.,Vinquist, K. M., Northup, J., . . . Carrion, D. P. (2016). Relations between rate of negative reinforcement and the persistence of task completion. *Journal of Applied Behavior Analysis*, *49*, 122–137. http://doi.org/10.1002/jaba.252

Rooker, G. W., Jessel, J., Kurtz, P., & Hagopian, L. P. (2013). Functional communication training with and without alternative reinforcement and punishment: An analysis of 58

applications. *Journal of Applied Behavior Analysis, 46*, 708–722. http://doi.org/10.1002/jaba.76

Saini, V., & Fisher, W. W. (2016). Evaluating the effects of discriminability on behavioral persistence during and following time-based reinforcement. *Journal of the Experimental Analysis of Behavior, 106*, 195–209. http://doi.org/10.1002/jeab.225

Shiban, Y., Pauli, P., & Mühlberger, A. (2013). Effect of multiple context exposure on renewal in spider phobia. *Behaviour Research and Therapy, 51*, 68–74. http://doi.org/10.1016/j.brat.2012.10.007

Sloman, K. N., Vollmer, T. R., Cotnoir, N. M., Borrero, C. S. W., Borrero, J. C., Samaha, A. L., & St. Peter, C. C. (2005). Descriptive analyses of caregiver reprimands. *Journal of Applied Behavior Analysis, 38*, 373–383. http://doi.org/10.1901/jaba.2005.118-04

St. Peter Pipkin, C., Vollmer, T. R., & Sloman, K. N. (2010). Effects of treatment integrity failures during differential reinforcement of alternative behavior: A translational model. *Journal of Applied Behavior Analysis, 43*, 47–70. http://doi.org/10.1901/jaba.2010.43-47

Stocco, C. S., & Thompson, R. H. (2015). Contingency analysis of caregiver behavior: implications for parent training and future directions. *Journal of Applied Behavior Analysis, 48*, 417–435. http://doi.org/10.1002/jaba.206

Thomas, B. L., Vurbic, D., & Novak, C. (2009). Extensive extinction in multiple contexts eliminates the renewal of conditioned fear in rats. *Learning and Motivation, 40*, 147–159. http://doi.org/10.1016/j.lmot.2008.10.002

Thompson, R. H., Bruzek, J. L., & Cotnoir-Bichelman, N. M. (2011). The role of negative reinforcement in infant caregiving: An experimental simulation. *Journal of Applied Behavior Analysis, 44*, 295–304. http://doi.org/10.1901/jaba.2011.44-295

Todd, T. P., Winterbauer, N. E., & Bouton, M. E. (2012). Effects of the amount of acquisition and contextual generalization on the renewal of instrumental behavior after extinction. *Learning & Behavior, 40*, 145–157. http://doi.org/10.3758/s13420-011-0051-5

Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice*, *1*, 16–23. http://doi.org/10.1007/BF03391716

Wacker, D. P., Berg, W. K., Harding, J. W., Barretto, A., Rankin, B., & Ganzer, J. (2005). Treatment effectiveness, stimulus generalization, and acceptability to parents of functional communication training. *Educational Psychology*, *25*, 233–256. http://doi.org/10.1080/0144341042000301184

Wacker, D. P., Harding, J. W., Berg, W. K., Lee, J. F., Schieltz, K. M., Padilla, Y. C., . . . Shahan, T. A. (2011). An evaluation of persistence of treatment effects during long-term treatment of destructive behavior. *Journal of the Experimental Analysis of Behavior, 96*, 261–282. http://doi.org/10.1901/jeab.2011.96-261

Wahler, R. G. (1976). Deviant child behavior within the family: Developmental speculations and behavior change strategies. In H. Leitenberg (Ed.), *Handbook of behavior modification and behavior therapy* (pp. 516–543). Englewood Cliffs, NJ: Prentice Hall.

APPENDIX: BEHAVIORAL SKILLS TRAINING PROTOCOL

Instructions

The BCBA® read the following to the caregiver:

"We will now teach you about functional communication training, or FCT. FCT is one of the most widely used treatments for problem behavior and consists of (a) delivering what the child wants for appropriate requests and (b) not delivering what the child wants for problem behavior. The current child with whom you are working engages in problem behavior to get [your attention/food]. He recently learned to appropriately request what he wants with his words by saying, "[High Five?/Skittle?]." From now on, we would like you to give him [attention/food] when he uses his words and avoid giving him [attention/food] when he has problem behavior.

"First, we will show you what this looks like and then we will give you a chance to practice. The behavior technician will pretend to be the child with problem behavior who recently learned to appropriately request [attention/food]."

Modeling

The BCBA® and behavior technician roleplayed an FCT session with the BCBA® providing the designated reinforcer assigned to that caregiver's condition (i.e., attention, tangibles). The behavior technician modeled three trials in which he or she first engaged in destructive behavior (resulting in the BCBA® implementing extinction) before emitting an FCR (resulting in the BCBA® immediately delivering reinforcement) and three trials in which he or she first engaged in an FCR (resulting in immediate reinforcement) with these scripts randomly assigned across six trials. The BCBA® described the FCT implementation and rationale after each trial and then prompted the caregiver to ask any questions about the procedures before proceeding to roleplay.

Roleplay

The behavior technician continued to serve as the confederate child during roleplay. The behavior technician engaged in scripted FCRs and destructive behavior as in the modeling component. Following a trial with no caregiver errors, the BCBA® provided descriptive praise (e.g., "Great job ignoring that aggression and waiting for him to ask nicely!"). Had caregivers emitted a commission error (i.e., reinforcing problem behavior), the BCBA® would have provided corrective feedback (e.g., "Remember, we don't want to give him what he wants for problem behavior; we should wait for an appropriate request"). Had caregivers emitted an omission error (i.e., not reinforcing an FCR), the BCBA® would have provided corrective feedback (e.g., "Remember, we want to give him what he wants right away when he asks nicely"). Had any error occurred, the BCBA® would have reinitiated the identical trial until the caregiver responded correctly to that trial (i.e., remedial trials). Roleplay ended following six correct trials (with no remedial trials), three of which began with problem behavior first and three of which began with FCRs first.