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CAREGIVER-CONDUCTED EXPERIMENTAL FUNCTIONAL ANALYSES OF INAPPROPRIATE MEALTIME BEHAVIOR

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The purpose of the current study was to replicate the use of parents as therapists for experimental functional analyses of inappropriate mealtime behavior with multiple participants while measuring procedural integrity. Clear functions were identified, and high percentages of procedural integrity were obtained.

DESCRIPTORS: caregivers, feeding, food selectivity, functional analysis

The results of studies by Girolami and Scotti (2001) and Piazza et al. (2003) have shown that modifications of the experimental functional analysis procedure described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) can be used to identify the reinforcers for inappropriate mealtime behavior (IMB). Piazza et al. observed caregivers and children diagnosed with feeding disorders during mealtimes to evaluate the extent to which the programmed consequences of the functional analysis were the same as the consequences that caregivers used during meals. Results suggested that the consequences implemented by caregivers during meals were the same as the programmed consequences in the functional analysis. Next, Piazza et al. used trained therapists as feeders to evaluate the effects of the caregiver-implemented consequences on IMB. Presumably, the rationale for using trained therapists was to insure a high degree of procedural integrity for the functional analysis.

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The results of recent studies, however, have shown that caregivers can be trained to implement functional analyses for severe behavior problems (e.g., Barretto, Wacker, Harding, Lee, & Berg, 2006; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004), and that caregivers can be trained to implement treatments for children with pediatric feeding disorders with high levels of procedural integrity (e.g., Anderson & McMillan, 2001; Mueller et al., 2003). Having caregivers conduct functional analyses has ecological validity because caregivers often conduct meals in the natural environment. However, only one study has demonstrated that caregivers can be trained to conduct functional analyses of IMB (Najdowski, Wallace, Doney, & Ghezzi, 2003), and only 1 child participated in that study. Further, measures of procedural integrity were not obtained. The purpose of the current study was to train multiple caregivers to conduct functional analyses with children with IMB and to examine the levels of procedural integrity of the caregiver-conducted functional analyses.

METHOD

Participants and Settings

Six children, Anabelle (2 years old), Kari (4 years old), Colin (4 years old), Matt (4 years old), Jack (4 years old), and Patrick (3 years old), and their mothers participated. Five of the children had been diagnosed with an autism spectrum disorder; Kari was typically developing. None of the children had medical conditions related to their food selectivity. They were self-feeders who met their caloric needs but exhibited food selectivity by type (each child ate approximately 4 to 12 foods). Each mother conducted 12 5-min sessions during lunch (Anabelle) or dinner (Kari, Colin, Matt, Jack, and Patrick) in their home kitchens.

Data Collection and Interobserver Agreement

Experimenters recorded acceptance when food passed the plane of the child's lips. *IMB* was defined as expulsions (food the size of a pea or larger beyond the plane of the lips following acceptance); vocal protests (crying, whining, or saying "no" or other negative words about food); covering the mouth with the hands; pushing or throwing utensils, dishes, or food away; gagging (retching or choking sounds or, in the absence of sound, hyperextending the neck or tensing the neck muscles); and vomiting (regurgitation of previously swallowed food). Experimenters scored an occurrence of gag, vomit, or negative vocalization when at least 3 s occurred between each instance of the behavior. Experimenters recorded frequency of acceptance and IMB on personal data assistants using Observe software and converted the frequency measures to responses per minute.

Experimenters recorded the following antecedents for mothers: (a) placing a plate of nonpreferred food in front of the child (scored in all conditions as correct if it occurred within the first 5 s of the session and as incorrect if it occurred after 5 s or was omitted); (b) stating that she was busy (scored in the attention condition as correct if it occurred within the first 5 s of the session and as incorrect if occurred after 5 s, was omitted, or was stated in any other condition besides the attention condition); (c) placing a plate of highly preferred foods in front of the child (scored in the control condition as correct if it occurred within the first 5 s of the session and as incorrect if it occurred after 5 s, was omitted, or was presented in any other condition besides the control condition); (d) providing noncontingent attention (scored in the control condition as correct during each 30-s interval that attention was delivered and as incorrect if it did not occur at a 30-s interval, if it occurred within 3 s of an IMB, or if it occurred in any other condition besides the control condition); and (e) giving demands using three-step prompting that involved a vocal, gestural, and physical prompt (scored in the demand condition as

correct if the mother delivered each instance of the prompt series to take a bite in the correct order and as incorrect if one prompt type was repeated, presented out of order, omitted, or presented in any condition other than the demand condition).

Experimenters recorded each of the following consequences delivered by mothers: (a) providing contingent attention (scored in the attention condition as correct if it occurred within 3 s of IMB and as incorrect if it occurred after 3 s of IMB, was omitted, or occurred in any condition other than the attention condition), (b) providing 30 s of escape (scored in the demand condition as correct if the mother provided it within 3 s of IMB and as incorrect if she provided it after 3 s of IMB, it was omitted, or it occurred in any condition other than the demand condition), and (c) praising food acceptance (scored in the demand condition as correct if the mother provided it within 3 s of acceptance and as incorrect if she provided it after 3 s of acceptance, omitted it, or provided it in any condition other than the demand condition).

Experimenters recorded the occurrence of antecedents and consequences on their personal data assistants. Experimenters scored the responses of the mothers depicted in data streams obtained from the software with respect to whether or not they occurred correctly in relation to child behaviors to calculate procedural integrity (number of correct responses divided by the number of correct responses plus incorrect responses including omissions, which was converted to a percentage).

Experimenters measured interobserver agreement during 83% of sessions. Agreement for acceptance and IMB was calculated using a block-by-block method, which involved dividing the smaller of the two observers' scores during each 10-s interval by the larger. The sum of the resulting quotients from each interval was added to the number of intervals with agreement, divided by the number of observation intervals (30), and converted to a percentage. Agreement for antecedents and consequences was calculated by dividing the number of agreements by the number of agreements plus disagreements and converting this ratio to a percentage. Mean interobserver agreements for IMB and correctly delivered antecedents and consequences were both 97%.

Experimental Functional Analysis

We evaluated the functional analysis using a multielement design, which included no-interaction, attention, control, and demand conditions. Functional analysis training lasted 1 hr, during which an experimenter read and modeled the procedures followed by the mother's role play. An experimenter provided feedback to mothers during the functional analysis when she made errors (data were not collected on the amount of feedback given, but the experimenter still scored errors regardless of whether or not feedback was provided).

At the beginning of each session, the child was seated at the dining table with a plate of nonpreferred food. We blocked the child into a small space and prevented egress from the area by placing chairs in the way. We also repositioned the plate to make sure that it was near the child during the attention condition and followed the child around with the plate during the demand condition. During the no-interaction condition, the child was left alone (the mother washed dishes), and no demands or consequences were delivered. During the attention condition, the mother said, "I've got a lot of dishes to do" and proceeded to clean dishes. Contingent on IMB, the mother approached the child and delivered vocal attention. During the control condition, a plate of highly preferred foods was presented. The mother sat with the child and provided noncontingent attention on a fixed-time 30-s schedule. No consequences were provided. During the demand condition, the mother sat with the child and delivered

continuous demands to take a bite of food using a three-step prompting procedure: (a) saying "take a bite," (b) gesturing the bite towards the child's mouth, and (c) placing the bite in the child's mouth (mothers never had to use physical guidance because all children engaged in IMB when mothers attempted to place the food in their children's mouths). Praise was provided contingent on consumption subsequent to vocal and gestural prompts, and nonpreferred food was removed for 30 s contingent on IMB.

RESULTS AND DISCUSSION

Mothers demonstrated a mean of 98% procedural integrity across conditions (range, 84% to 100%). Acceptance did not occur for any of the children's nonpreferred foods during any condition; however, acceptance of highly preferred foods occurred during all control sessions for all children (range, 1.6 to 7.6 responses per minute). Rate of IMB is depicted in Figure 1 and was highest during the demand condition (range, 1.2 to 3.2 responses per minute) for all children, suggesting that access to escape functioned as reinforcement for IMB. Treatments prescribed for all children included nonremoval of the spoon or demand fading, which effectively increased acceptance and decreased IMB (results may be obtained from the first author).

The results of the current investigation provide a demonstration that mothers can conduct functional analyses of IMB after minimal training. These results replicate those of other studies that have suggested that caregivers can be trained to implement functional analyses easily (e.g., Barretto et al., 2006; Wallace et al., 2004) and also provide evidence that caregivers can conduct functional analyses of IMB. Thus, clinicians might opt to use this assessment prior to implementing treatment, given the ease with which caregivers can be trained to conduct functional analyses of feeding problems.

The reinforcer identified for the IMB of all children was escape, which provides support for the hypothesis that feeding problems appear to be maintained by negative reinforcement (e.g., Hoch, Babbitt, Coe, Krell, & Hackbert, 1994). The results of the current investigation are in contrast to those found by previous investigations that showed that IMB often is maintained by multiple sources of reinforcement (Girolami & Scotti, 2001; Piazza et al., 2003). There may be a number of explanations for these discrepant findings.

First, both Girolami and Scotti (2001) and Piazza et al. (2003) used explicit, multicomponent prompts (e.g., the therapist placed the spoon within 4 cm of the child's mouth and said "take a bite") and presented nonpreferred foods, which remained at the child's lips during all test conditions until the child engaged in an IMB in the escape condition or until the end of the 30-s interval in all other conditions. In addition, Girolami and Scotti used statements in the attention condition that could be conceived as demands (e.g., "It's not that bad, you can do it").

By contrast, the functional analysis procedures used in the current investigation minimized prompting and aversive stimuli in nondemand test and control conditions, in that (a) the mother placed a plate of nonpreferred foods in front of the child at the start of each nondemand test condition, (b) she did not deliver prompts to "take a bite," and (c) she presented a plate of preferred food in the control condition. Also, mothers in the current investigation used neutral statements (e.g., "It's okay, sweetie") in the attention condition. Thus, it is possible that the functional analyses conducted by Girolami and Scotti (2001) and Piazza et al. (2003) produced false-positive results (i.e., positive reinforcement in the form of attention or access to tangible items was identified incorrectly as reinforcement for IMB), because prompts and putative aversive stimuli were present across all test and control

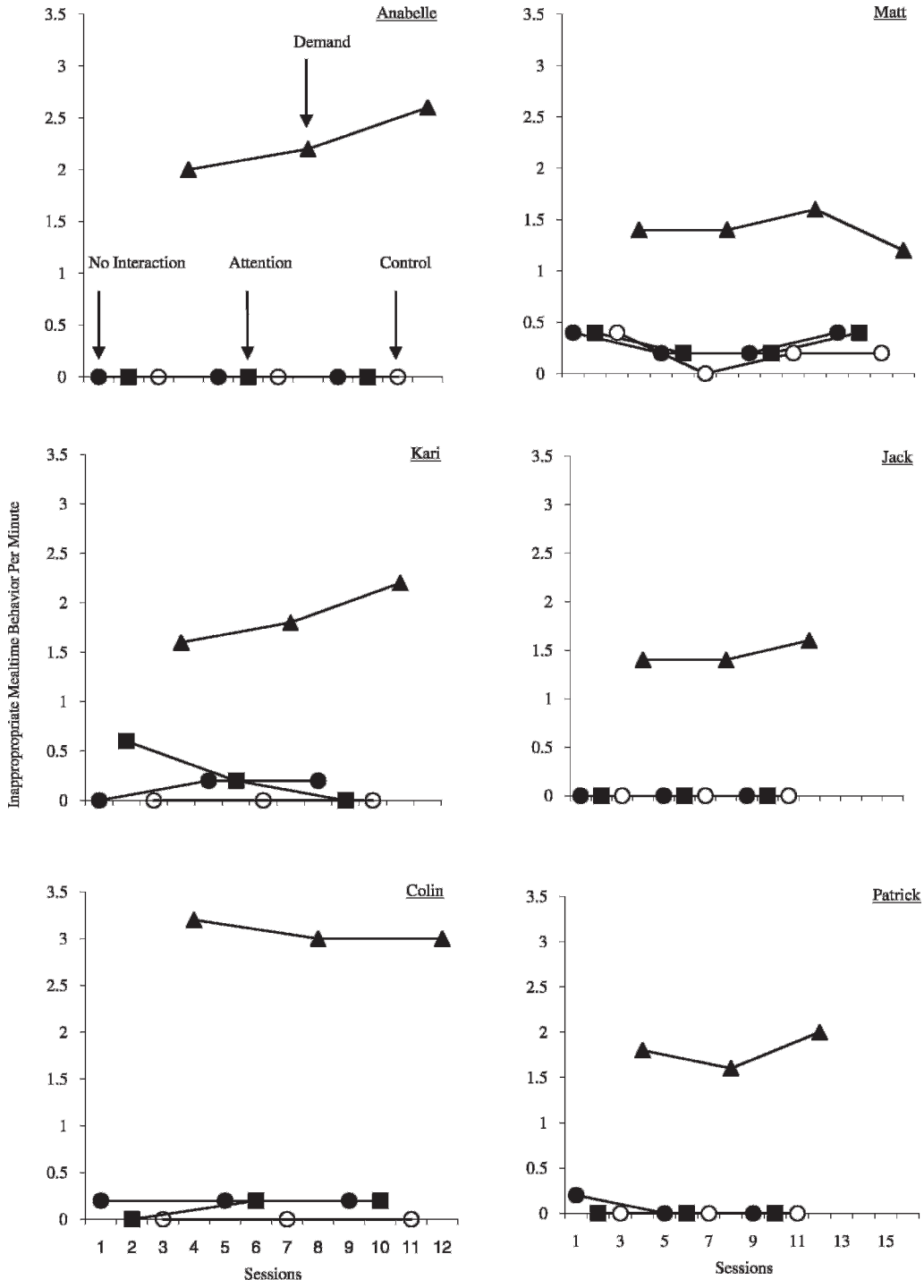

Figure 1. Inappropriate mealtime behaviors per minute for all participants during functional analysis conditions.

conditions (which may have evoked IMB across all conditions). However, results of the functional analyses in which aversive prompts were included across conditions (e.g., Piazza et al.) showed that differentiated responding did occur for most participants, with some participants demonstrating a single function and some participants demonstrating multiple functions of IMB.

It also is possible that the procedures used in the current investigation produced false negatives (i.e., failed to identify access to attention or tangible items as reinforcement), because the relevant discriminative stimuli or establishing operations (EOs) for IMB may not have been present across all conditions (and may have been different from the discriminative stimuli and EOs for IMB that occurred outside of meals). It might be important to include aversive prompts across all conditions of the functional analysis for IMB because a stimulus (e.g., attention) may function as reinforcement in one context (e.g., when prompted to eat during a meal) but not in another (e.g., when left alone with food on the table). To determine the accuracy of the two functional analysis procedures, future investigations could test the effects of function-based treatments that match their results.

Another explanation for the discrepant findings from the current and previous (Girolami & Scotti, 2001; Piazza et al., 2003) studies may be a function of the fact that mothers conducted the functional analyses in the current investigation and trained therapists conducted the functional analyses in previous investigations. Ringdahl and Sellers (2000) demonstrated that the function of problem behavior may vary with respect to whether or not a caregiver is acting as therapist during a functional analysis. Additional research needs to be conducted to evaluate the extent to which different results are produced from therapist- versus caregiver-conducted functional analyses for children with IMB.

One potential limitation of the current study is that leaving the seat was not included in the response definition for IMB, yet many of the children left their seats during the test conditions. This behavior was not included because once the child left his or her seat, he or she often did not return. Thus, most intervals would have been scored with IMB, and the functional analyses would have produced undifferentiated results. Another potential limitation of this study is that it did not include an evaluation of a tangible function. Children with food selectivity often are given foods that are likely to be eaten when other foods are refused. Thus, future investigators might consider testing a tangible function during functional analyses.

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