JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2012, **45,** 197–203 NUMBER 1 (SPRING 2012)

EFFECTS OF BEHAVIORAL SKILLS TRAINING ON PARENTAL TREATMENT OF CHILDREN'S FOOD SELECTIVITY

LAURA SEIVERLING

PENNSYLVANIA STATE UNIVERSITY, HARRISBURG

KEITH WILLIAMS

PENNSYLVANIA STATE UNIVERSITY, HERSHEY MEDICAL CENTER

PETER STURMEY

THE GRADUATE CENTER AND QUEENS COLLEGE,
CITY UNIVERSITY OF NEW YORK

AND

SADIE HART

PENNSYLVANIA STATE UNIVERSITY, HARRISBURG

We used behavioral skills training to teach parents of 3 children with autism spectrum disorder and food selectivity to conduct a home-based treatment package that consisted of taste exposure, escape extinction, and fading. Parent performance following training improved during both taste sessions and probe meals and was reflected in increases in children's acceptance of bites and decreases in their disruptive behavior. Parents also reported that increases in diet variety were maintained at follow-up.

Key words: food selectivity, parent training, behavioral skills training, autism

Food selectivity, defined as consumption of a narrow range of foods, is a common feeding problem in children with autism spectrum disorders (ASD; Williams & Seiverling, 2010). Paul, Williams, Riegel, and Gibbons (2007) used repeated taste exposure (i.e., repeated presentations of single bites of food), escape extinction, and fading to increase food acceptance in two children with ASD. In each session, the therapist presented one bite of food. After bite acceptance, the therapist allowed the participant to exit the room for 5 min. Therapists also presented probe meals to assess acceptance. After 15 treatment days, one participant met the mastery criterion with 65 foods, and the other met criterion for 49 foods. Pizzo, Williams, Paul, and Riegel (2009) reported similar findings when implementing the intervention for fewer days. Both of these studies took place in a pediatric feeding clinic with highly trained therapists conducting most taste sessions and probe meals; thus, it is unknown if parents could successfully implement a similar procedure in the home.

Although parents and caregivers are often responsible for providing most meals to their children, descriptions for training caregivers to conduct feeding interventions are generally lacking. Three studies on caregiver implementation of food selectivity interventions (Anderson & McMillan, 2001; McCartney, Anderson, & English, 2005; Najdowski et al., 2010) demonstrated that parents could be effective interventionists. In another study, Mueller et al. (2003) used behavioral skills training (BST), which involves instructions, modeling, rehearsal, and feedback, to train parents to implement a feeding

Address correspondence to Laura Seiverling, 777 W Harrisburg Pike, Middletown, Pennsylvania 17057 (e-mail: ljs44@psu.edu).

doi: 10.1901/jaba.2012.45-197

intervention. Specifically, the researchers taught parents to implement extinction and either differential reinforcement of alternative behavior or noncontingent reinforcement.

Given the success of taste exposure and BST, the goal of this study was to examine the effects of BST on parent implementation of a food selectivity treatment package that consisted of repeated taste exposure, escape extinction, and fading. Additional goals included providing an operationalized training procedure for teaching parents to conduct the intervention and examining the effects of the intervention on children's behavior.

METHOD

Participants, Setting, and Materials

Three mother–child dyads participated. All three boys had ASD and had been evaluated at a hospital-based feeding clinic. Parents had attempted unsuccessfully to implement a home-based plan involving access to preferred foods following acceptance of nonpreferred foods. Tommy, Lance, and Noah were 4, 8, and 5 years old, respectively. Tommy's and Noah's mothers were 33 and 40 years old, respectively, and were homemakers; Lance's mother was 41 years old and was a special education teacher. Sessions took place at the family's dinner table. Materials included utensils, a plate, cup, kitchen timer, target foods, and video camera.

Dependent Measures and Data Collection

All sessions were videotaped for data-collection purposes.

Parent behavior. The percentage of correct steps performed during taste sessions and probe meals were recorded. A taste session involved the mother presenting a single bite of food. Following the child's consumption of the presented bite, she allowed him to leave the eating area for 3 min. Mothers were to present pea-sized bites during taste sessions and to increase bite sizes to half a spoonful after the child ate a particular food within 30 s without disruptive behavior for three taste sessions. The child met mastery criteria for a particular food when he ate three half-spoonful bites within 30 s without disruption. The mother rotated foods presented from different food groups during taste sessions and replaced foods meeting mastery criterion with new foods from the various food categories. She was to ignore disruption and to re-present a new bite of the food contingent on expulsion. Following 10 taste sessions, she presented 10-min probe meals with novel foods during which the child was not required to take bites. The mother rotated five probe meal plates of five foods (i.e., presented Probe Meal A after 10 taste sessions, Probe Meal B after 20 taste sessions, etc.) and was instructed (a) to present a bite of food for 5 s to 30 s before moving to the next food on the plate, (b) to provide verbal praise for acceptance, and (c) to ignore disruption.

Child behavior. Acceptance of pea-sized and half-spoonful bites of foods (i.e., accepting the entire portion of presented food without any visible remnants of the food on the spoon and swallowing without spitting the food out) within 30 s and the number of bites of foods with disruptive responses during taste sessions were recorded. *Disruption* was defined as negative vocalization (e.g., saying "no!"), crying, pushing the food away, throwing utensils, or gagging. *Expulsion* was defined as any food outside the mouth following acceptance. During probe meals, observers marked whether the child accepted each presented bite. During taste sessions observers scored (a) the latency between the time that the parent presented the bite within 3 cm of the child's mouth and the time at which the child accepted the entire bite, (b) disruption as occurring or not, and (c) whether the child accepted the bite within 30 s. Acceptance of bites within 30 s also was scored during probe meals.

Design

A multiple baseline design across mother–child dyads was used to demonstrate experimental control.

Procedure

Prebaseline assessment. The experimenter gave the mother a list of 86 foods and asked her to indicate foods eaten by the child and family. Researchers and parents determined target foods by selecting foods reported eaten by the family but not by the child.

Baseline taste sessions. The experimenter gave each mother a written task analysis of taste sessions and asked her to conduct the procedure to the best of her ability. She was instructed to refrain from providing nontarget foods to the child for 2 hr before and after daily taste sessions and to conduct approximately 20 taste sessions per day; however, the daily number of taste sessions and probe meals sometimes varied slightly depending on the child's behavior.

Parent-fed baseline probe meals. During probe meals, the experimenter presented each mother with a probe meal task analysis and instructed her to conduct probe meals after every 10 taste sessions.

Parent training. The experimenter first read the taste session task analysis aloud, modeled two taste sessions with the child, and asked the mother to rehearse a taste session. The experimenter then provided three comments regarding correct performance and two comments regarding incorrect performance and repeated this cycle of modeling, rehearsal, and feedback. The mother then performed three taste sessions without the experimenter's feedback. During these sessions, the experimenter weighted the escape extinction step twice when adding the total number of steps performed correctly so that the mother could not meet the training criterion without actually having the child eat the bite. When the mother correctly performed an average of at least 90% of steps, the experimenter began probe meal training. The experimenter followed the same procedure during probe meal training; however, she modeled and had the mother rehearse with the child a 3-min probe meal instead of a 10-min meal. After the mother received feedback, she performed a second assessment of three taste sessions followed by a 10-min probe meal. If she correctly performed an average of at least 90% of steps during the assessment, training was considered complete.

Posttraining. Posttraining sessions were conducted in the same manner as baseline.

Follow-up. After treatment, the experimenter instructed each mother (a) to present three foods with which the child had met the mastery criteria during taste sessions or had eaten during probe meals during each home meal, (b) to have the child consume at least one bite of each presented food, (c) to attempt to present at least 20 mastered foods each week, and (d) to conduct five taste sessions with one nonmastered food per day. Weekly follow-up appointments were scheduled for 3 weeks. A fourth follow-up session was scheduled with Lance because of a decreasing trend in his follow-up data. During follow-up, the mother conducted 10 taste sessions followed by one probe meal. After completion of the study, mothers were asked to rate the acceptability of the BST procedure, the acceptability of the feeding intervention, and the outcome of treatment on child behavior using a Likert scale from 1 (*poor*) to 5 (*excellent*).

Interobserver Agreement

A second observer collected data for approximately 35% of baseline, posttraining, and follow-up sessions. Agreement for child behavior during taste sessions was scored if both observers indicated that the child did or did not consume a bite within 30 s and that disruption did or did not occur. Agreement for child latency was scored if both observers' latencies to accept were within 3 s of each other. Agreement for acceptance during probe meals was defined as both observers marking child acceptance or rejection of the presented bite. Agreement for parent behavior was scored if both observers indicated that the mother's performance for each step was either correct or incorrect. Mean agreement (agreements divided by agreements

Table 1
Average Percentage of Correct Steps Performed

	Baseline TS	Posttraining TS	Follow-up TS	Baseline PM	Posttraining PM	Follow-up PM
Tommy's mom	40	95	91	85	94	89
Lance's mom	44	98	86	86	92	90
Noah's mom	29	99	94	70	97	94

Note. TS = taste sessions; PM = probe meals.

plus disagreements) during taste sessions and probe meals, respectively, was 96% (range, 67% to 100%) and 98% (range, 95% to 100%) for Tommy; 98% (range, 67% to 100%) and 99% (range, 91% to 100%) for Lance; and 92% (range, 33% to 100%) and 99% (range, 93% to 100%) for Noah. Mean agreement on parent performance during taste sessions and probe meals, respectively, was 94% (range, 67% to 100%) and 95% (range, 92% to 100%) for Tommy's mother; 94% (range, 56% to 100%) and 93% (range, 85% to 100%) for Lance's mother; and 92% (range, 71% to 100%) and 93% (range, 88% to 97%) for Noah's mother.

RESULTS AND DISCUSSION

Table 1 shows the mean percentage of correct steps performed by each mother during taste sessions and probe meals. All mothers' baseline performance for taste sessions averaged less than 50%, whereas their performance for probe meals during baseline averaged at least 70%. It should be noted that they did not have to implement escape extinction during probe meals, which most likely accounted for the higher percentages. Improvements in each mother's performance were observed for both taste sessions and probe meals during posttraining and at follow-up.

Figure 1 shows the proportion of bites accepted within 30 s and the proportion of bites with disruption during taste sessions. Figure 2 shows the mean number of bites accepted during probe meals. During baseline taste sessions, all children consistently refused bites and engaged in disruption. During posttraining, each child showed an increase in bites accepted within 30 s and a decrease in disruption. These improvements also were reflected in the children's acceptance of bites during posttraining and follow-up probe meals.

All mothers anecdotally reported an increase in the number of foods eaten by their children following treatment. Lance's and Noah's mothers reported that their children continued to make gains at 3-month follow-up. By contrast, Tommy's mother reported that her son ate fewer foods than at 1-month follow-up, but that he continued to eat foods rather than only drinking milk prior to treatment. All mothers rated the effectiveness of the BST package as *excellent* and rated the food selectivity intervention as *very good* or *excellent.* They also reported that they found the modeling component of BST to be most helpful. In addition, mothers rated their children's behavior during mealtimes following treatment as either *good* or *excellent*.

These results extend those of Paul et al. (2007) and Pizzo et al. (2009) by demonstrating parental implementation of the taste exposure procedure in the home. Further, this intervention led to gains in child behavior even after modifying the procedure by implementing 20 taste sessions and two probe meals per day instead of conducting sessions throughout the entire day, as was done in previous studies. Another contribution of this study was the use of novel foods during probe meals, unlike the previous studies that used mastered foods. With regards to BST, all mothers maintained high levels of correct performance following initial training, and none of them required any booster training sessions. Thus, BST appears to be an

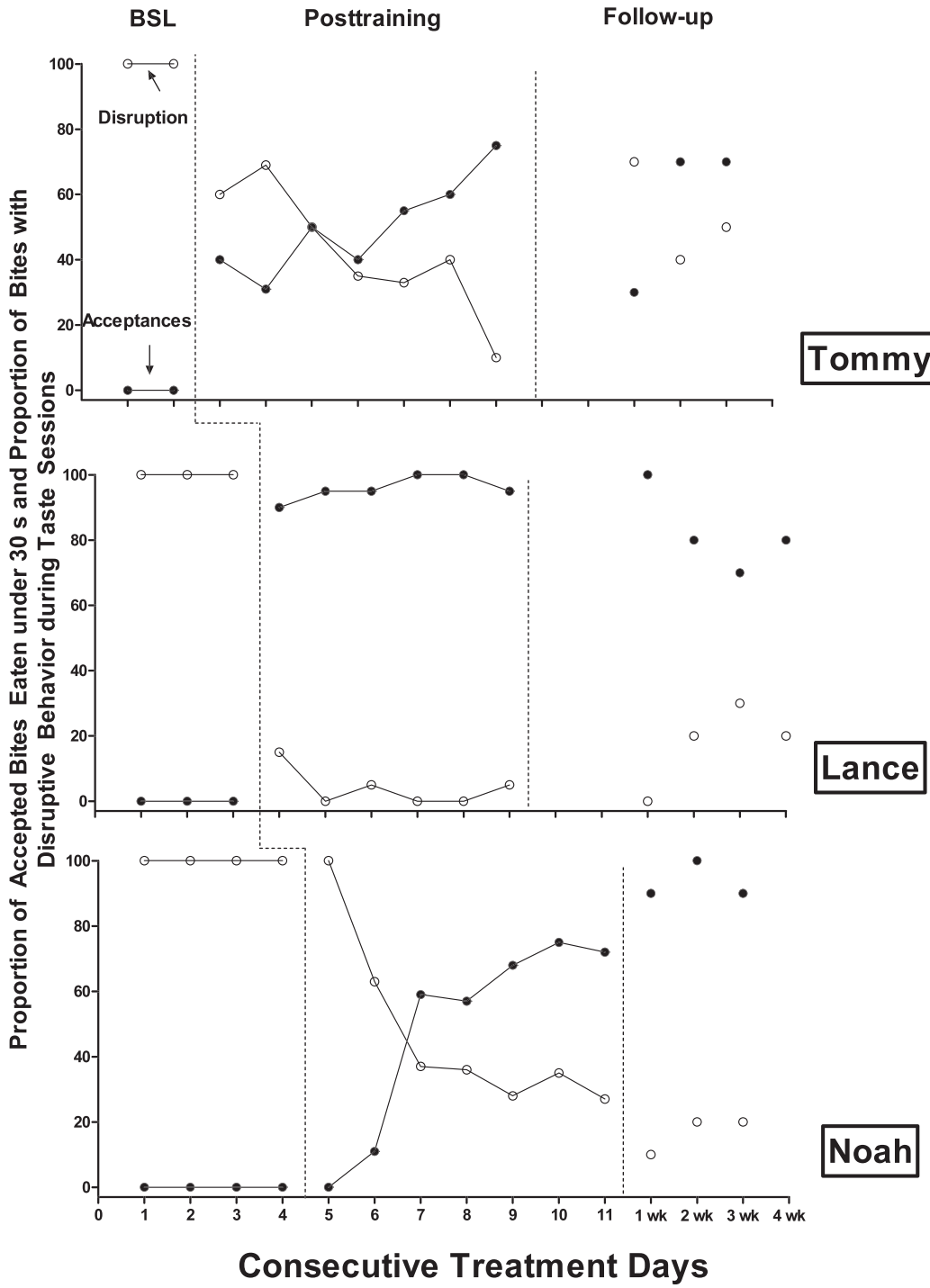

Figure 1. Proportion of accepted bites eaten within 30 s and proportion of bites with disruptive behavior during baseline (BSL), posttraining, and follow-up taste sessions.

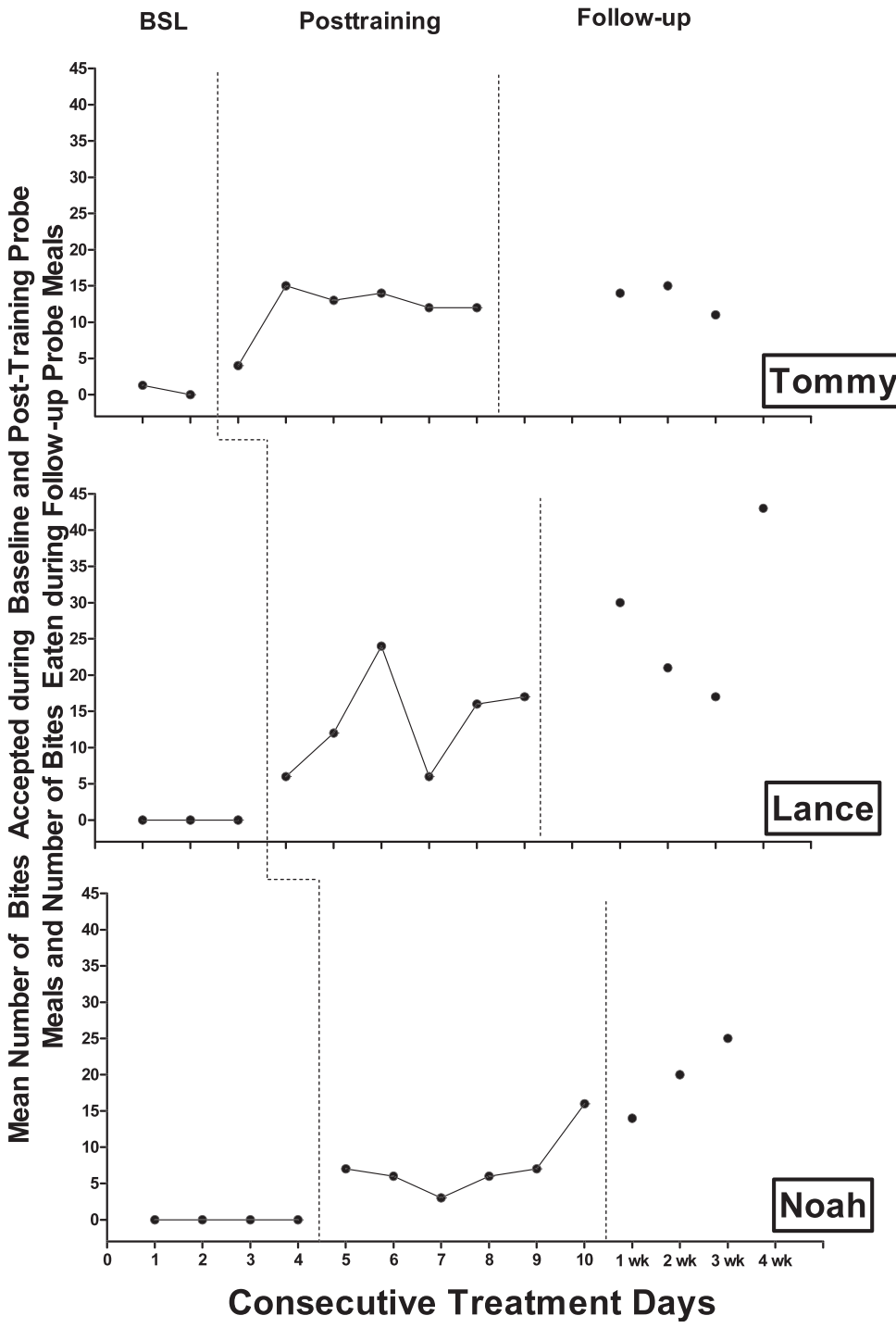

Figure 2. Mean number of bites accepted within 30 s for each probe meal across baseline (BSL) and treatment days and number of bites accepted during follow-up probe meals.

efficient and effective training package for teaching parents how to conduct this intervention for food selectivity in the home.

One limitation of the current study was the use of the same probe meal plates, in that Tommy and Noah often accepted bites of one or two foods but rejected all other foods on the presented plate. An additional limitation of the probe meals was the time-based format. The number of presented bites varied due to factors such as acceptance and how long it took for the child to chew. Future experimenters should conduct component analyses of both parent training and feeding intervention packages. Future research also could evaluate trial-based probe meals as well as the outcomes with mastered versus nonmastered foods.

REFERENCES

Anderson, C. M., & McMillan, K. (2001). Parental use of escape extinction and differential reinforcement to treat food selectivity. *Journal of Applied Behavior Analysis*, *34*, 511–515.

McCartney, E. J., Anderson, C. M., & English, C. L. (2005). Effect of brief clinic-based training on the ability of caregivers to implement escape extinction. *Journal of Positive Behavior Interventions*, *7*, 18–32.

Mueller, M. M., Piazza, C. C., Moore, J. W., Kelley, M. E., Bethke, S. A., Pruett, A. E., et al. (2003). Training parents to implement pediatric feeding protocols. *Journal of Applied Behavior Analysis*, *36*, 545–562.

Najdowski, A. C., Wallace, M. D., Reagon, K., Penrod, B., Higbee, T. S., & Tarbox, J. (2010). Utilizing a home-based parent training approach in the treatment of food selectivity. *Behavioral Interventions*, *25*, 89–107.

Paul, C., Williams, K. E., Riegel, K., & Gibbons, B. (2007). Combining repeated taste exposure and escape extinction. *Appetite*, *49*, 708–711.

Pizzo, B., Williams, K. E., Paul, C., & Riegel, K. (2009). Jump start exit criterion: Exploring a new model of service delivery for the treatment of childhood feeding problems. *Behavioral Interventions*, *24*, 195–203.

Williams, K. E., & Seiverling, L. (2010). Eating problems in children with autism spectrum disorders. *Topics in Clinical Nutrition*, *25*, 27–37.

Received July 9, 2010
Final acceptance June 20, 2011
Action Editor, Michele Wallace