

*COMBINING STIMULUS FADING, REINFORCEMENT,
AND EXTINCTION TO TREAT FOOD REFUSAL*

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The food refusal of a 6-year-old girl with destructive behavior was treated using stimulus fading, reinforcement, and escape extinction. Intake increased and compliance with prompting procedures remained relatively stable despite the increased consumption requirement.

DESCRIPTORS: food refusal, destructive behavior, escape extinction, reinforcement

Environmental factors have been hypothesized to play a role in the development and maintenance of food refusal. For example, food refusal may result in positive reinforcement in the form of parental attention such as coaxing or verbal reprimands. Negative reinforcement in the form of early termination of the meal may also maintain food refusal. Several methods have been described to treat food refusal based at least in part on the principles of positive and negative reinforcement. For example, Riordan, Iwata, Wohl, and Finney (1980) increased food consumption of 2 girls with food selectivity by providing reinforcement for the consumption of gradually increasing amounts of food (stimulus fading plus reinforcement). Hoch, Babbitt, Coe, Krell, and Hackebert (1994) combined reinforcement and escape extinction to increase the food consumption of 2 participants. In the current investigation, we treated the food refusal of a young girl with autism and a severe behavior disorder. We combined the procedures of fading, reinforcement, and escape extinction using guid-

ed compliance to increase food consumption while maintaining low rates of destructive behavior at mealtimes.

METHOD

Rene, a 6-year-old girl who had been diagnosed with cerebellar atrophy, mild right hemiplegia, autism, and moderate mental retardation, was hospitalized for the treatment of severe food refusal. At the time of admission, she had a 4-year history of food refusal, often resulting in severe weight loss and dehydration requiring emergency medical attention. According to parental report, Rene occasionally consumed food that had been left out (e.g., on countertops, in garbage receptacles) if others were not present. Thus, she demonstrated adequate self-feeding; however, she would not reliably eat. She also exhibited aggression (hitting, scratching, biting, throwing objects at a person), self-injurious behavior (SIB; head banging, self-biting), and disruptive behavior (throwing objects) when required to eat.

All food, towels, plates, and an overshirt worn by Rene were weighed prior to and following meal presentation. Trained observers recorded data on number of grams consumed (the difference between the pre- and postmeal weights of the above items) and compliance (consumption of a bite following a verbal or partial physical prompt) for each

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meal. A second observer collected data during 40% of the meals. Interobserver agreement was calculated by comparing the two observers' recordings. For grams consumed, an agreement occurred when both observers indicated the same pre- and postmeal weights. For compliance, an agreement occurred when both observers indicated that Rene consumed the bite following the same prompt. Percentage agreement was then calculated by determining the number of agreements divided by the number of agreements plus disagreements multiplied by 100%. Mean agreement for grams consumed and compliance was 100% and 95.5%, respectively. Although data were collected on destructive behaviors, they are not presented because rates remained low during both experimental conditions.

A treatment package consisting of stimulus (food) fading, reinforcement (termination of the meal), and escape extinction using guided compliance was evaluated using a multielement design. All meals were fed with other children and staff present at the table. During each baseline meal, Rene was presented with a plate of food with age-appropriate portions of fruit, protein, starch, and vegetables. In the absence of self-initiated food consumption, a verbal prompt ("Rene, take a bite") was provided every 30 s. Meals were terminated if she consumed 100% of the food presented or after 30 min, whichever came first. At least one baseline meal was presented per day. Treatment meals began with a verbal prompt (i.e., "Rene, take a bite"). If Rene did not comply within 5 s, a partial physical prompt (verbal prompt plus guiding Rene's hand to the spoon) was given. If compliance still did not occur, a physical prompt (a verbal prompt plus guiding Rene to bring a spoonful of food to her lips) was given. Verbal praise was provided for successful consumption of a bite at any prompting level. Meals were terminated if 100% of the presented food was consumed

or after 45 min. Two to four treatment meals were presented daily. Destructive behavior resulted in no differential consequences during baseline and treatment meals.

One spoonful of fruit was initially presented during treatment to increase the likelihood of compliance. Fruit was selected because parental report suggested that consumption was most likely with items from this food group. The amount of presented food was increased in 5% increments of the age-appropriate portions provided by the hospital (with the exception of an increase from 20% to 30% of fruit presented) when Rene was 80% compliant for three consecutive meals (i.e., fading). The criterion changed to two consecutive meals at Treatment Meal 114 (Week 4) to fade more rapidly. If compliance dropped below 80% for three consecutive meals (two meals after the change in the treatment plan), the amount of food was decreased to the previous level. This procedure was implemented until she was consuming 50% of an age-appropriate portion of fruit, at which time a small portion of protein was introduced. The amount of protein was increased similarly. Subsequently, starch and vegetables were added sequentially until Rene was consuming 50% of an age-appropriate meal.

RESULTS AND DISCUSSION

The top panel of Figure 1 shows the mean percentage of compliance with verbal and partial physical prompts per meal per week during baseline and treatment meals. Compliance with verbal prompts remained at or near zero during both baseline and treatment meals. By contrast, Rene's rate of compliance with the partial physical prompt remained relatively stable throughout treatment meals, despite the increased consumption requirement. In addition, as can be seen in the top panel, the mean number of meals per week

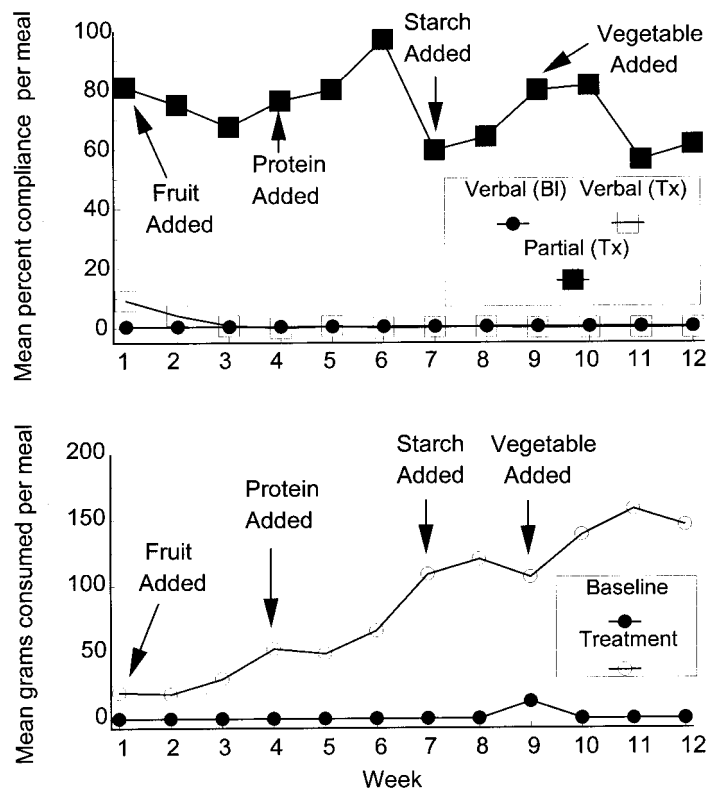


Figure 1. Mean compliance with prompts per meal per week (top panel), and mean number of grams consumed per meal per week (bottom panel).

required to reach the fading criterion remained fairly constant over the course of intervention. Finally, the bottom panel of Figure 1 shows the mean number of grams consumed per meal per week during baseline and treatment. Grams consumed remained near zero during baseline. By contrast, grams consumed increased steadily during treatment. At the end of treatment, Rene was consistently consuming 50% age-appropriate portions of all four food groups.

These results extend the literature on the treatment of feeding problems in several ways. First, we added support to the findings of Riordan et al. (1980) by showing that fading may be a useful treatment for increasing food intake. Second, we increased not only the amount but also the variety of foods that Rene was eating. By the end of treatment, Rene was consuming multiple foods

from all four food groups. Third, we used a multielement design to demonstrate the necessity of the treatment package over time. That is, Rene never ate during daily baseline meals when the treatment procedure was not in effect, but she did eat during treatment meals.

One advantage of the fading procedure is that it may have increased the probability that Rene contacted reinforcement (termination of the meal) more quickly. That is, because Rene was initially required to consume only a small portion of food, she frequently contacted reinforcement shortly after treatment meals were initiated. Reinforcement also was available in baseline. However, because she never consumed all of the food in baseline, termination of the meal did not occur for 30 min. The shorter delay between initiation of the meal and reinforce-

ment may have contributed to the maintenance of relatively stable rates of compliance with the partial physical prompt, which affected how quickly the amount of food presented was increased. Thus, although the prompting procedure appeared to be an integral component to the treatment, the fading procedure may have increased its effectiveness.

A limitation of these findings is that the treatment was implemented as a package, which included stimulus fading, reinforcement, and escape extinction. It is not clear which of these treatment components was responsible for treatment effectiveness. Further, differences in the length of baseline and treatment meals potentially may have confounded results across experimental conditions. Specifically, Rene's food consumption may have increased because she had a longer amount of time to eat during treatment relative to baseline. This seems unlikely, however, because Rene ate immediately and steadily during treatment (i.e., consumption was not limited to the last 15 min of the meal). In baseline, she rarely initiated or maintained eating at any point during the meal. Another limitation is that the effects of treatment occurred over a relatively long period (12 weeks). It is possible that more rapid treatment effects would have occurred without the fading procedure. A further concern has to do with the external validity of the intervention. That is, the effectiveness of

the intervention was assessed on an inpatient unit with trained staff; thus, the extent to which treatment gains generalized to Rene's home setting was not determined (although data were gathered to evaluate this). This is an important limitation that needs to be addressed in the future. Unfortunately, there is a dearth of research evaluating treatment protocols implemented in home and community settings, a notable exception being a study conducted by Werle, Murphy, and Budd (1993) in which the authors evaluated a home-based treatment for feeding problems. Despite their successes, more work needs to be done to assess the factors that result in successful treatment in typical settings.

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