

*THE USE OF AN ESCAPE CONTINGENCY AND
A TOKEN ECONOMY TO INCREASE
FOOD ACCEPTANCE*

SUNGWOO KAHNG

KENNEDY KRIEGER INSTITUTE AND
JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE

AND

JAMES H. BOSCOE AND SHANNON BYRNE

KENNEDY KRIEGER INSTITUTE

Escape (termination of a meal) and token-based differential reinforcement of alternative behavior were used as reinforcement to increase acceptance of food. Using a changing criterion design, the number of bites accepted and consumed was gradually increased to 15 bites per meal. These data suggest that, in some cases, escape may be a potent reinforcer for food acceptance.

DESCRIPTORS: food acceptance, food refusal, escape, negative reinforcement

Reinforcement-based interventions such as differential reinforcement of alternative behavior (DRA) are common approaches to the treatment of pediatric feeding disorders (Patel, Piazza, Martinez, Volkert, & Santana, 2002). In most cases, the reinforcer used is irrelevant to behavioral function (e.g., Coe et al., 1997). Although these interventions have been demonstrated to be effective, research on the treatment of severe behavior disorders suggests that interventions based on the function of the problem behavior may be more successful (Iwata et al., 1994). Therefore, it is conceivable that a treatment based on negative reinforcement (i.e., escape) may prove to be a viable alternative treatment to increase food acceptance given that food refusal may (in many cases) be maintained by escape from the presentation of food (Munk & Repp, 1994).

Kitfield and Masalsky (2000) evaluated a

negative-reinforcement-based intervention with 1 individual who exhibited food refusal. They provided 2-min escape contingent on acceptance of one or two bites of food. Although the intervention was effective in increasing food intake, it was unclear what effect DRA had on the participant's food acceptance because the only dependent measure was weight gain, a permanent-product measure. In addition, experimental control was not demonstrated because an AB single-case experimental design was used. Therefore, the purpose of this study was to examine the use of a token economy in conjunction with a DRA intervention in which the reinforcer was escape from food presentation (i.e., negative reinforcement).

METHOD

Clara was a 4-year-old girl who had been admitted to an inpatient unit for the treatment of food refusal. Clara's impairments included speech delay and possible pervasive developmental disorder. Prior to treatment, Clara received 100% of her nutritional intake from a bottle. Meals were conducted in

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Reprints may be obtained from SungWoo Kahng, Department of Behavioral Psychology, Kennedy Krieger Institute, 707 N. Broadway, Baltimore, Maryland 21205 (e-mail: Kahng@kennedykrieger.org).

a treatment room equipped with an observation window, three chairs, a table, and a Rifton® chair (a child-sized wooden chair with a seat belt, adjustable angle back, adjustable foot rests, and a clip-on tray). Additional supplies included a spoon, Nuk®, timer, and token board.

Frequency data were collected on laptop computers, and the dependent variables consisted of the following behaviors: (a) acceptance (the entire bite was deposited in the mouth within 5 s of the initial presentation and the food was swallowed, as demonstrated by opening the mouth, within 30 s) and (b) food refusal consisting of head turns (turning the head or body 45° past midline during bite presentation), disruptions (any part of the body comes into contact with the spoon, plate, cup, food, or the experimenter's hand or arm during bite presentation), and mouth covers (placing the bib or one or both hands or arms on or within 2 in. of the mouth during bite presentation). A second observer collected data during 43% of the meals. Interobserver (exact) agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Interobserver agreement averaged 99% and 96% for acceptance and food refusal, respectively.

Differential Positive Reinforcement of Alternative Behavior

Two baselines consisting of differential positive reinforcement of alternative behaviors (DPRA) were compared to examine the individual effects of procedural variations. During both baselines, Clara was prompted to take a bite of food and a level spoonful of food was presented to her mouth (midline), approximately 2 to 3 in. from her lips. If she accepted the bite within 5 s, the therapist delivered praise (e.g., "good job taking your bite"). During one baseline (praise plus escape), she received 15 s of escape from the

food presentation contingent on food refusal. A new bite was presented every 30 s or immediately following the escape interval. During the other baseline (praise plus escape extinction), the spoon remained in front of her lips until a new bite of food was presented (or she accepted the bite). The meal was terminated once 10 bites of food were presented or after 20 min had elapsed. A variety of pureed foods such as applesauce, ravioli, pudding, and carrots were presented.

DPRA plus Physical Guidance

Two DPRA plus physical guidance (PG) conditions, which were similar to the previous DPRA conditions, were compared to examine differential effects that may have been a function of procedural differences. In one condition (PG for refusal), Clara was physically guided to accept the food contingent on food refusal. In the other condition (PG for nonacceptance), she was physically guided to eat if she did not accept the bite within 5 s. Physical guidance consisted of the application of gentle pressure to the mandibular junction of the jaw and depositing the bite of food in the mouth. The meal ended once 10 bites of food were presented or after 20 min had elapsed. The foods presented were identical to those in baseline.

Differential Negative Reinforcement of Alternative Behavior

The food bites continued to be presented as in the DPRA and DPRA plus PG conditions. However, if Clara accepted the bite of food, she received a Blues Clues® token. She was not permitted to play with the tokens or token board. Meals were terminated once she traded in the prespecified number of tokens (i.e., differential negative reinforcement of alternative behavior or DNRA) or 30 min had elapsed. (Although this did not occur during this study, bites of food would have continued to be presented if she did

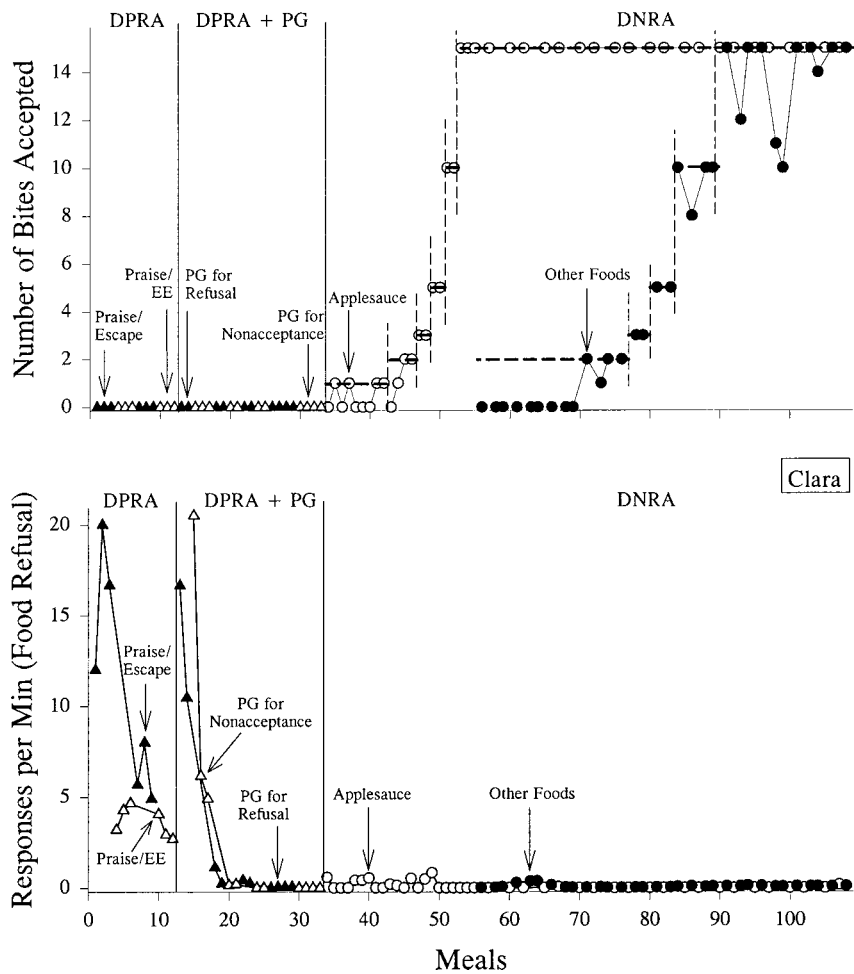


Figure 1. The top panel presents the number of bites accepted (accepted within 5 s of the initial presentation and swallowed within 30 s). The horizontal dashed lines represent the number of acceptances required to terminate the meal. The bottom panel presents responses per minute of food refusal.

not trade in the tokens.) If she did not accept the bite within 5 s, she was physically guided to accept the bite. Initially, bite presentation was limited to applesauce. A similar evaluation with a variety of other foods (excluding applesauce) was later conducted. Clara was initially required to earn one (applesauce) or two (other foods) tokens before meals were terminated. The number of tokens required to terminate the meal was gradually increased after two meals in a row in which she met criterion to terminate the session, and the terminal goal was 15 tokens.

A changing criterion design was used to demonstrate experimental control.

RESULTS AND DISCUSSION

Clara did not accept any bites of food during the DPRA or DPRA plus PG conditions (Figure 1, top panel). A Nuk® was eventually introduced into the DPRA plus PG condition (Meal 21) in place of the spoon and was used throughout the remainder of this study. The Nuk® permitted the therapist to deposit the bite of food more

easily into the participant's mouth when implementing physical guidance.

Once Clara met the 15-bite criterion with applesauce (in Meal 42), meals with other foods were interspersed with the applesauce meals until she accepted 15 bites during both the applesauce meals and meals with other foods.

During DPRA, food refusal was higher when escape was contingent on food refusal during the praise plus escape condition (Figure 1, bottom panel). Both DPRA plus PG conditions resulted in an initial increase in food refusal, which eventually decreased to near-zero levels. Food refusal continued to remain low throughout the DNRA phase.

Finally, the average numbers of bite presentation per meal were 10 bites and 2 bites during the DPRA and DPRA plus PG conditions, respectively. Average meal lengths during the DPRA, DPRA plus PG, and DNRA conditions were 5.4 min, 20 min, and 15.3 min, respectively. The average length of the meals at the 15-bite criterion (applesauce and other foods) was approximately 16 min. A maintenance meal was conducted 6 months after discharge, during which time she accepted 46 of 50 bite presentations within 10 min.

These data suggest that a treatment package consisting of an escape contingency and a token economy may be a viable treatment for food refusal. This treatment was implemented after attempts to use physical guidance, a common treatment for food refusal, failed. It is likely that in this case escape from food presentations may have been a more potent reinforcer for acceptance than praise or avoidance of physical guidance.

It is interesting to note that Clara accepted applesauce much more quickly than the other foods, which may indicate a preference for applesauce. However, this is improbable because she was presented applesauce during

the previous phases, and she did not accept it. Alternatively, it may have been the case that the repeated presentation of the same food resulted in quicker acceptance than the presentation of other foods.

It is unclear which component of our treatment package (i.e., escape or tokens) was responsible for the increase in food acceptance given that a component analysis was not conducted. Although it is conceivable that the tokens functioned as reinforcement for acceptance, this is somewhat doubtful given that she always immediately traded in these tokens for the back-up reinforcer (i.e., escape). Therefore, it is more probable that the escape contingency was responsible for the success of this treatment.

One limitation to our intervention is that it may be more time consuming than other interventions such as DPRA plus PG because of the number of steps necessary to increase the termination criterion. Therefore, it may be that this negative-reinforcement-based intervention should be used only if other interventions fail.

Finally, future studies should examine the role of instructional control on food acceptance. That is, Clara was given instructions prior to each meal. Therefore, it may have been the case that these instructions played a vital part in increasing food acceptance (and decreasing food refusal).

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