

*TREATING TOTAL LIQUID REFUSAL WITH  
BACKWARD CHAINING AND FADING*

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In this study, we report on a 12-year-old boy with autism, mental retardation, and a history of severe gastrointestinal problems who presented with total liquid and food refusal. Backward chaining was used to shape drinking from a cup, and a fading procedure was used to increase the quantity of water he was required to drink.

DESCRIPTORS: backward chaining, fading, liquid refusal

Although it is commonly used for the treatment of insufficient food and liquid intake, reinforcement alone may not be effective in cases in which oral consumption is totally absent. In one study, fading was used with reinforcement to treat total refusal of solid foods in a patient who accepted only liquid bottle feeding in baseline (Johnson & Babbitt, 1993). After initially providing reinforcement for a preexisting behavior (acceptance of liquids), food texture and utensil type were faded until the patient was accepting solid foods from a spoon. In the present study, we report on the treatment of total liquid refusal in a boy with life-threatening gastrointestinal (GI) problems.

#### METHOD

Josh was a 12-year-old boy with autism and moderate mental retardation who had been admitted to an inpatient unit for total food and liquid refusal and nasogastric tube dependency. His medical history was significant for life-threatening GI conditions, which included a hiatal hernia, esophagitis

secondary to frequent emesis, and chronic constipation. Following an exacerbation of these problems 6 months prior to admission, Josh completely stopped ingesting anything by mouth. During his admission, frequent emesis (averaging 17.5 per day; range, 1 to 56) that occurred over a 2-month period necessitated the placement of a central line to provide total parenteral nutrition. Prior to treatment, Josh repeatedly requested food and drink, and subsequently would chew but expel all items. Medical and behavioral assessments did not identify any physiological or environmental variables associated with his emesis or food and liquid refusal. Behavior therapy sessions were suspended on multiple occasions due to his frequently unstable and acute GI conditions. Because numerous emergent medical interventions co-occurred with behavioral treatments that targeted food refusal, only treatment for liquid refusal is presented in this paper.

Data were collected on *acceptances*, defined as the targeted amount of liquid entering his mouth; *expulsions*, defined as any amount of liquid emerging past his lips; *swallows*, defined as an observable and palpable movement of the larynx (the therapist gently placed his or her fingers on the child's throat); and *avoidance behavior* (collected beginning with Session 15), defined as turning his face or body away, clamping his mouth

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shut, pushing items away, or repeatedly picking up and putting down the cup. Only the therapist monitored swallows directly using palpation of the larynx; independent observers recorded swallows using visual observation. When amounts of liquid greater than 0.2 cc were targeted, swallows were defined as showing an empty mouth without expelling. A successful trial was defined as accepting (the target amount) and swallowing without expelling. An independent observer collected reliability data for 43% of sessions (and on avoidance behaviors for 37% of sessions). Exact reliability coefficients for successful trials and avoidance behaviors were 100% and 80.3%, respectively. All sessions were conducted in a room (2.5 by 2.5 m) and consisted of five trials. During all sessions, Josh was provided with 90 s of access to an identified reinforcer (cutting paper with scissors) for each successful trial. If he had an expulsion at any time during the reinforcement period, reinforcement was terminated.

During baseline, Josh was presented with 10 cc of water in a cup and was prompted to drink. To demonstrate functional control of the intervention, a reversal design was used, in which 10-cc cup baseline sessions were conducted periodically. Treatment involved backward chaining and fading components. The target response, drinking water from a cup, was conceptualized as a chain of the following responses: (a) bringing cup of water to mouth, (b) accepting water into mouth, and (c) swallowing. The criterion for moving to the next phase was a minimum of two consecutive sessions at 100% success. In the first treatment phase, Josh received reinforcement for simply swallowing after being prompted (water was not presented). Josh was then required to swallow after an empty syringe was depressed into his open mouth. Next, Josh received reinforcement for accepting and swallowing water placed into his mouth from the syringe. In subsequent phases, a fading procedure was used to in-

crease the amount of water Josh had to accept and swallow from the syringe (dipped in water, 0.2 cc, 0.5 cc, 1 cc, and 3 cc). Then, Josh was required to bring a cup containing 3 cc of water to his mouth, accept it, and then swallow the water to obtain reinforcement. Finally, the amount he had to drink from the cup was gradually increased to 30 cc. Baseline probes, in which 10 cc of water was presented in a cup, were conducted after the 0.2-cc syringe phase, the first 3-cc cup phase, and the second 3-cc cup phase. In subsequent sessions and generalization, Josh was presented with up to 90 cc of water in a cup into which juice was gradually added.

## RESULTS AND DISCUSSION

During the initial baseline phase, Josh had 0% successful trials (see Figure 1). In some phases (e.g., syringe dipped in water), gradual increases in success occurred over the course of several sessions and were associated with decreases in avoidance behavior. In the first 10-cc probe session, Josh had 0% success and displayed avoidance behavior during 80% of trials. In the second 10-cc probe phase, a downward trend in percentage of successful trials was observed across the three sessions. Sessions were suspended for a 3-week period after Josh's rate of emesis doubled in the course of 1 week and were reinitiated when medical clearance was given. After successfully completing a second 3-cc phase, Josh was successful at the 10-cc probe phase, and then at 30 cc. During generalization to the living unit, Josh successfully consumed up to 90 cc of water and juice (see Figure 1).

The baseline probes helped to determine the rate at which treatment could progress and also permitted a demonstration of functional control by showing that Josh did not consume 10 cc of water in a cup until after he was successful with smaller quantities. Although we cannot be certain that Josh's improved performance following the 3-week

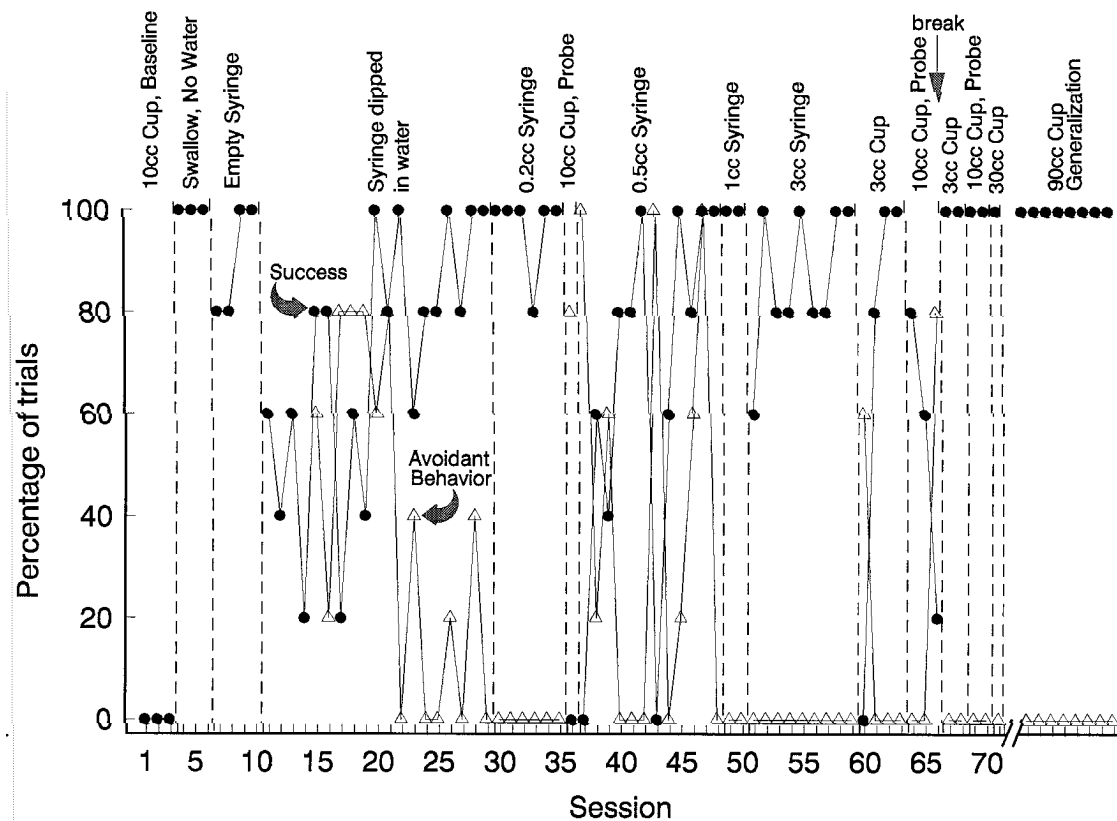


Figure 1. Percentage of successful trials and avoidance behaviors.

break was completely due to the behavioral intervention, it should be noted that there was no apparent resolution of his chronic medical problems during the break. Sessions were suspended when he became acutely ill and were reinitiated when medical clearance was given.

When reinforcement cannot be delivered because a target response is infrequent or absent (as in the case of total liquid or food refusal), it may be necessary to use a backward chaining or fading procedure. The treatment package described in the present study consisted of both components. We began by targeting a preexisting response (swallowing), which was the third and final response in the chain of behaviors that constitute drinking from a cup. Next, reinforcement was delivered for the last two responses in the chain (accepting and swallowing). Fi-

nally, reinforcement was delivered only when all three responses in the chain occurred. Fading larger quantities of water was conducted in conjunction with backward chaining, in that Josh was required to swallow increasingly larger quantities first from the syringe and later from the cup. One contribution of this study is that it provides an illustration of how a chain of responses that is totally absent (drinking) can be shaped by first targeting a simple preexisting response in the chain (swallowing).

## REFERENCE

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