

*USING SIMULTANEOUS PRESENTATION TO  
INCREASE VEGETABLE CONSUMPTION IN  
A MILDLY SELECTIVE CHILD WITH AUTISM*

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A multiple baseline design was used to evaluate the effects of adding condiments on the consumption of previously rejected foods (vegetables). Adding condiments produced increased food acceptance across three food items. Data are discussed in relation to conditioned food preferences and establishing operations.

DESCRIPTORS: antecedent manipulation, conditioned food preferences, establishing operations, food selectivity, preference assessment

The majority of the behavioral literature on feeding disorders has focused on consequence manipulations (e.g., Ahearn, Kerwin, Eicher, Shantz, & Swearingin, 1996), and there is a need to develop more antecedent-based strategies for treating feeding problems, particularly for children with food selectivity. Children who are selective eaters consume some foods but not others, and certain variations in food-presentation methods might facilitate acceptance of previously rejected or novel foods. Kern and Marder (1996) demonstrated that simultaneous presentation of two foods (one preferred, the other nonpreferred) in combination with escape prevention may, at least initially, have been more effective than following acceptance of the nonpreferred food with access to preferred food. Piazza et al. (2002) replicated and extended this finding by showing that simultaneous presentation of foods increased food acceptance for 2 of 3 participants without escape prevention; however, positive reinforcement was also delivered contingent upon food acceptance (e.g., ver-

bal praise, tokens). Piazza et al. posited that increases in acceptance in the simultaneous presentation condition may be a result of flavor–flavor conditioning (i.e., properties of the preferred flavor or food may produce conditional preference for the nonpreferred flavor or food).

The purpose of the current study was to extend the work of Piazza et al. (2002) by using simultaneous presentation of nonpreferred foods and condiments in the absence of consequence manipulations (i.e., no escape prevention for refusal or positive reinforcement for food acceptance was used) to increase the vegetable consumption for a child, diagnosed with autism, who displayed mildly selective eating in a feeding assessment (Ahearn, Castine, Nault, & Green, 2001). In addition, a preference assessment was used to empirically demonstrate preference for specific condiments used in the simultaneous presentation method. Finally, flavor–flavor conditioning was further evaluated by using a withdrawal design.

## METHOD

At the time of this study, Fred was a 14-year-old boy who had been diagnosed with autism and who functioned in the profound range of mental retardation. A feeding assessment was conducted with him as part of

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Portions of this article were presented at the 20th annual meeting of the California Association for Behavior Analysis, San Francisco, February 2002.

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a survey of the eating habits of children with autism (see Ahearn et al., 2001). It was found that Fred did not eat vegetables during the assessment but accepted at least one food item from the fruit, protein, and starch categories. His clinical team reported that Fred consistently requested additional foods after completing his meals but that he rarely ate his vegetables even when access to additional food was made contingent on eating them. Fred was also reported to request condiments and would sometimes consume them alone without other food.

All sessions were conducted in a room that contained a table and two chairs. The three vegetables used during Fred's feeding assessment—carrots, broccoli, and corn—were each presented five times consecutively during each session. A single bite (items were presented in 0.25 in. by 0.25 in. bites) was presented on a spoon that was placed on a plate every 30 s. Carrots were presented during the first five trials, broccoli during the sixth through 10th trials, and corn during the 11th through 15th trials of the session. The dependent variable was percentage of bites accepted (placement of food item past the lips within 5 to 10 s of the simultaneous delivery of the food item and a verbal prompt "take a bite"), which was calculated by dividing item acceptance by the number of times the item was presented. Fred never expelled food and was not disruptive during sessions, although he occasionally requested other food items. These requests were redirected in a neutral tone (e.g., "Maybe we can have that later"). Sessions were videotaped and scored later. Interobserver agreement was calculated for approximately 40% of sessions and averaged 99.4% (range, 93.3% to 100%).

During baseline sessions, there were no differential consequences for eating behaviors. Food items were neutrally removed after 5 s if Fred did not initiate acceptance within 5 s of the presentation of the food

item. If he initiated acceptance at 5 s from food delivery, he was given an additional 5 s to consume the bite. Fred always consumed a food item within 10 s once he picked up the spoon or the food item. Simultaneous presentation sessions were identical to baseline with the exception that 5 cc of condiment was placed on top of the food item. Part of the top of the food item was always left unobscured because the condiments could potentially facilitate acceptance by changing the visual appearance of the food. It was assumed that this might produce different results for salad dressing, which would only partly obscure the foods.

Prior to baseline, a paired-stimulus preference assessment (Fisher et al., 1992) was conducted with eight condiments (ketchup, mustard, spicy mustard, honey mustard, barbecue sauce, ranch dressing, creamy Italian dressing, and Italian dressing) to determine Fred's relative preferences among them. The top three items were ketchup, barbecue sauce, and Italian dressing. These were the items used during the simultaneous presentation sessions. One condiment was used during each of the three simultaneous presentation phases.

A multiple baseline across food items was used to evaluate acceptance under baseline and simultaneous presentation conditions. In addition, three separate condiment conditions were evaluated. The effect of each condiment was evaluated across the three vegetables in the multiple baseline design. Also, a withdrawal to baseline was inserted between the different condiment conditions (ketchup, barbecue sauce, and salad dressing) to enhance the strength of the design.

## RESULTS AND DISCUSSION

Figure 1 presents percentage occurrence of acceptance. In the initial baseline condition for each food item, no food was consumed, with the exception of Session 2. Fred con-

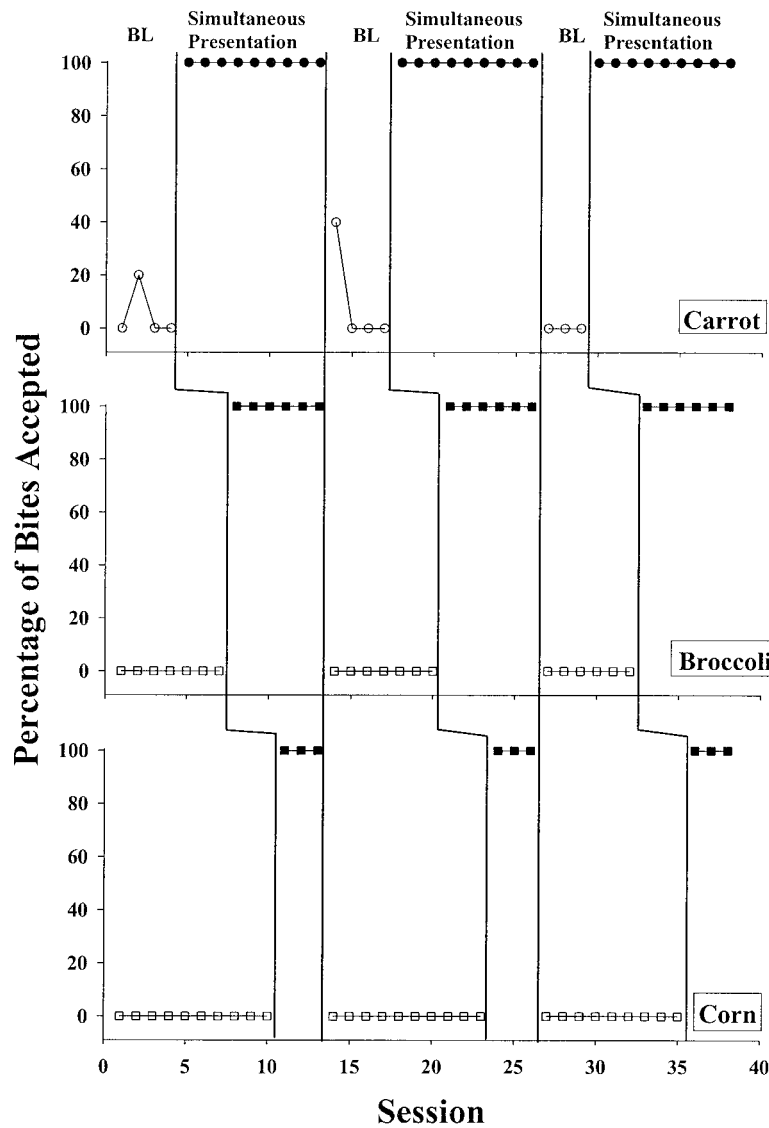


Figure 1. Percentage occurrence of acceptance for Fred across carrots (top panel), broccoli (middle panel), and corn (bottom panel).

sumed the first bite of carrot presented in this session. When ketchup was added, consumption increased immediately to 100% for each food item. Fred accepted the first two bites of carrot in the second baseline condition but then refused all subsequent food presentations during this and the subsequent baseline condition. From this point forward, Fred accepted 100% of the bites of each presented food item during the subse-

quent simultaneous presentation sessions (i.e., barbecue sauce and salad dressing).

Following the study, Fred was taught to match pictures of condiments to each respective condiment. Prior to meals, he was given a choice board with pictures representing three condiments and was asked to choose one. The item chosen was placed on top of his vegetables. He was reported anecdotally by his teachers to consume all of

his vegetables and to frequently request condiments outside meal times using his augmentative communication system. In a 2-week diet history collected 1 year following the study, it was found that Fred continued to consume vegetables with condiments.

The results of this study replicate and extend the previous research by Kern and Marder (1996) and Piazza et al. (2002). Kern and Marder demonstrated that simultaneous food presentation enhanced food acceptance when used in combination with escape prevention. Piazza et al. showed that simultaneous presentation of preferred and nonpreferred foods was superior to sequential pairing of preferred and nonpreferred foods. Positive reinforcement was delivered as a component of the treatment package across the two conditions in the Piazza et al. study, indicating that differential responding may not solely be due to the simultaneous presentation of the foods. The current study systematically replicates this finding by showing that positive reinforcement for acceptance may not be necessary for the effects observed with the simultaneous presentation procedure. The procedure was also conducted across multiple condiments, with each condiment being equally effective.

Fred's refusal of vegetables may have been due to aversive flavor, smell, texture, or to the relatively dense access to other highly preferred foods. Regardless of the cause, the addition of a preferred condiment altered the probability of acceptance. Piazza et al. (2002) suggested that increases in acceptance in the simultaneous presentation condition may be a result of flavor-flavor conditioning. It is possible that the pairing of the two flavors could result in the nonpreferred flavor becoming associated with and acquiring the appetitive properties of the preferred flavor. However, this hypothesis was not directly tested in the Piazza et al. study. In the current study, the withdrawal

phase shows that flavor-flavor conditioning is not a likely explanation for increases in acceptance. On the other hand, there may have been too few pairings of the flavors for conditioning to have occurred. Another possible explanation for these results may be that the condiments acted as an establishing operation that effectively reduced the aversiveness of the nonpreferred food (Piazza et al.). That is, the simultaneous presentation of the condiment and nonpreferred food altered a property (flavor, smell, texture) of the vegetables.

The generality of the outcome of this study is somewhat limited in that it was conducted with only 1 participant. Furthermore, Fred's eating habits were only mildly selective, and similar results may not be obtained with overly selective eaters unless they had a strong preference for condiments. It is also unlikely that such a procedure would be effective with children who refuse all solid food. Future studies should evaluate these procedures with children with more severe feeding disorders and try to evaluate the mechanism responsible for increases in acceptance when using the simultaneous presentation method.

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- Received December 18, 2002*  
*Final acceptance April 30, 2003*  
*Action Editor, Meeta Patel*