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The effects of simultaneous presentation and fading on consumption of non-preferred foods

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Running Head: THE EFFECTS OF SIMULTANEOUS PRESENTATION

**The Effects of Simultaneous Presentation and Fading on Consumption
of Non-preferred Foods**

A Thesis Presented

by

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The Department of Counseling and Applied Educational Psychology

In partial fulfillment of the requirements

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Non-preferred Foods

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Abstract

This study evaluated the effects that simultaneous presentation of preferred and non-preferred food had on consumption of non-preferred foods. The study simultaneously presented a 5-year-old boy diagnosed with autism, preferred and non-preferred foods in a changing criterion design. The non-preferred food was systematically increased and the preferred food then faded out. The results indicate that simultaneous presentation and fading were effective methods for increasing consumption of two non-preferred foods.

Children with and without disabilities may display challenging behaviors during meal times. This includes, but is not limited to, food selectivity, socially inappropriate behavior during meals, and feeding/swallowing difficulties. The effects of such behaviors can put a child at high risk for nutritional deficiencies, weight loss from low caloric intake, sleep disturbances, and lethargy to name a few (Riordan 1984). Of these behaviors, a commonly reported concern among caregivers and parents is “picky eating.” Food selectivity is common in typically developing toddlers and those with a disability, but treating a “picky eater,” who is at risk for low caloric intake and nutritional deficiencies can be a challenge for both parents and professionals.

Picky eaters can be characterized as eating from limited food groups or eating foods that are same color, texture, or flavor. Piazza (2002) defined food selectivity as a “strong preference for a few foods, rejection of many foods” while Wilder (2005) defined picky eating as occurring when “the food preferences exist with dramatic, emotional responses to the non-preferred foods.” Additional behavioral responses include excessively long meal times, gagging or vomiting during a meal, holding food in the mouth, and eating junk food instead of a “real meal.” Those most at risk for “picky eating” are children with a developmental delay, born prematurely, or facing ongoing medical problems.

Food selectivity becomes problematic when the child’s diet is limited to foods that are nutritionally deficient (e.g., high in fat) (Wilder 2005). Pediatricians and other professionals have previously recommended a “wait and see” approach to food selectivity (Piazza 2002). Removing food, changing foods offered, and coaxing do not typically improve the food selectivity in children with disabilities.

A variety of treatments, however, have been developed and used successfully to treat food selectivity and refusal in children with disabilities (Kern & Marder 1996, Piazza 2002, Muller 2004, Ahearn 2006). Before selecting a treatment option, medical issues involving oral motor activity or respiratory function should be considered first. Some previously used treatments employed the behavior principles of negative reinforcement and escape extinction, with the underlying assumption that food refusal is often maintained by negative reinforcement in form of escaping from eating. Ahearn et al. (2006) used an escape extinction procedure involving non removal of spoon (feeder presents cup or spoon to child's lips until the child allows food to be placed in mouth) and physical guidance (feeder manipulates mandible joint and deposits food or liquid into the child's mouth if child fails to accept bite within pre-determine time) to increase food acceptance.

Food presentation has also been studied as a means for increasing target food acceptance. Kern and Marder (1996) used simultaneous and delayed reinforcement as a method of increasing food consumption in a 7 year-old diagnosed with PDD. During simultaneous reinforcement, the non-preferred and preferred food were presented together (i.e. the fruit was placed on top of the chip.) In the delayed reinforcement condition, the preferred food (chip) was presented after acceptance of the non-preferred food (vegetable). Kern and Marder (1996) found that both interventions resulted in increased food acceptance with simultaneous presentation having higher levels of acceptance initially.

Piazza (2002) extended the study by Kern and Marder (1996) by randomly assigning two arbitrary groups of food to one of the two conditions: simultaneous or sequential

presentation. Each group contained two foods from four food groups (protein, starch, fruit, and vegetable). Of the three participants involved in the study, results showed food consumption increased in the simultaneous condition for two participants. The third participant increased consumption in the simultaneous condition after physical guidance and representation were implemented.

Mueller, Piazza, Patel, and Kelley (2004) extended the use of simultaneous presentation to increase food consumption by adding stimulus fading, a process where the preferred food was faded out gradually in 10% increments. The study was conducted with two participants who had severe food refusal and consumed all calories from feeding tubes or bottles. Prior to the study, the participants had been exposed to non-contingent reinforcement (NCR) and non-removal of the spoon to increase food acceptance, which yielded poor results. The first treatment phase consisted of blending non-preferred foods into preferred foods at low ratios (10% and 90%). If the participant met criteria on three consecutive sessions, the non-preferred food was presented alone to assess acceptance. If the participant did not accept the non-preferred food alone in six consecutive sessions, the blending procedure continued and the ratio of non-preferred to preferred food increased (e.g. 20/80.) The results showed an increase in number and type of foods consumed using blending for both participants. The two participants each began eating four foods from four food groups, 16 in total. In addition, non-preferred foods that had been exposed to blending were consumed in absence of the preferred food, which was the goal of the study.

The purpose of the current investigation used a changing criterion design to assess the effects of a preferred food on non-preferred foods when paired simultaneously. The

preferred food was then faded out after consumption of the non-preferred food met criterion.

Method

Participant and Setting

The participant, Danny, was a 5-year-old boy diagnosed with autism. Danny attended a substantially separate classroom in a public school for 3-5 year olds with autism or Pervasive Developmental Disorder (PDD). At the time of study, Danny accepted only five foods. These foods were strawberry banana yogurt, bananas, maple-flavored pancakes or waffles with ketchup, and chicken nuggets. When Danny was presented with a non-preferred food, he repeatedly drop it on the floor, squished it between his fingers, or made statements about how much he disliked the food item.

Danny performed on grade level in his readiness skills; used simple and complex sentences to communicate wants and needs; and engaged in developmentally appropriate self-help behavior. Danny used the correct utensil to feed himself a meal and drank from both a cup and a straw without spilling. Danny was included in a regular education pre-kindergarten class for several activities in a typical school week. A record review and a parent interview were conducted to rule out factors contributing to picky eating such as medications or oral motor difficulties. At the time of study, Danny did not take any medications and did not present with any food allergies.

Sessions were conducted in a teacher workroom across the hall from the student's classroom. Age appropriate table and chairs were used. Sessions were conducted five days per week at the student's regularly scheduled lunchtime. Only Danny and the

experimenter were usually present; however, a second observer occasionally was in the room to collect interobserver data.

Materials

A small, white dish weighing 4 ounces, a white plastic spoon, and a food scale measuring in ounces were used in the study. Preferred and non-preferred foods were weighed before and after each session on a Salter® diet scale. The experimenter and second observer recorded the data using pencil and data sheets prepared prior to the sessions. Preferred foods included in the study were bananas and Yoplait GoGurt® Strawberry Banana Burst yogurt. Non-preferred foods included were strawberries and peaches. Preferred foods were identified as foods that were repeatedly accepted and consumed on a daily basis.

Data Collection and Interobserver Agreement

Data were collected on the amount (in oz) of strawberry and peaches consumed when paired simultaneously with strawberry banana yogurt. The experimenter and, occasionally, a second observer recorded data at the beginning and end of each session by weighing predetermined food amount on scale and recording it onto data sheets.

A second observer was present during 33% of baseline sessions and 20% of treatment sessions for strawberries. During peaches, a second observer was present for 33% of baseline sessions and 18% of treatment sessions. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. The mean agreement for baseline sessions was 100%. The mean agreement for treatment sessions for strawberries was 75% and the mean agreement for peaches was 75%.

Procedure

Baseline. Danny was denied access to both preferred and non-preferred foods two hours before and after baseline sessions. The sessions occurred at the same time of day, which was Danny's regular lunchtime. During baseline, Danny was presented with pea-sized bites of strawberry or peaches every 30s for 30s. Danny was instructed to "take a bite." All inappropriate behaviors were ignored and no consequence was delivered for acceptance, which was defined as anytime food passed the plane of the lips and was swallowed within 30s. Each session consisted of 10 trials, with the baseline phase for both strawberries and peaches lasting three sessions. Danny was not allowed access to preferred foods for two hours before or after sessions as in the Piazza et al. (2002) study.

Before treatment. Prior to the treatment sessions, Danny was taught to eat the yogurt (preferred food) out of the dish with a spoon instead of sucking the yogurt through the tube as it was intended to be eaten. The experimenter then systematically introduced, in quantity and size, bites of banana (preferred food) until the participant was eating equal two-ounce portions of both pea-sized banana and strawberry banana yogurt simultaneously.

Treatment. As in baseline phase, access to both preferred and non-preferred foods was restricted two hours before and after sessions. During the first intervention phase, Danny was presented with two ounces of strawberry banana yogurt, one ounce of banana in pea size, and one ounce of strawberry also presented in pea size. Criteria to advance to the next phase were 0.50 ounces or less remained in the dish over three consecutive days. A termination criterion was set at two minutes in which no bite was taken.

In the second phase of treatment, Danny was provided with two ounces of strawberry banana yogurt and two ounces of pea size bites of strawberry. As in the first treatment phase, termination criterion was set at two minutes without taking a bite and criteria to advance was three consecutive days of 0.50 ounces or less remaining in the dish.

Phase three of treatment presented Danny with only one ounce of yogurt and two ounces of pea-sized strawberry. Termination criterion and criteria to advance remained the same as in phase one and two of treatment.

These treatment procedures were then repeated with a second non-preferred food: peaches.

Experimental design. The experimental design used was a changing criterion design.

This design was chosen because it allowed the treatment procedure to be implemented in a gradual, stepwise fashion.

Results

Figure 1 displays the results from both the baseline and treatment phases of the study that targeted acceptance of strawberries. During the baseline condition, Danny accepted zero bites of strawberry in three consecutive sessions of 10 trials each. During the first phase of treatment for strawberries, Danny consumed 3.2 ounces of the yogurt, banana, and strawberry meal. In this session, Danny met criteria for termination (2 minutes without a bite being taken). Danny had consumed most of the banana and yogurt and left the strawberry remaining in the dish. For the next phase, the strawberry was cut into smaller pieces. In phase two of treatment, Danny consumed 3.5, 3.6, and 3.5 ounces respectively of yogurt (2 oz), banana (1oz), and strawberry (1oz). He met criteria to advance to phase three. In phase three, Danny consumed 3.7, 3.5, and 3.6 ounces of

yogurt (2 oz) and strawberry (2 oz). He met criteria to advance to phase four where the amount of yogurt was reduced by 50%. Here, Danny consumed 2.8, 2.6, and 2.7 ounces of yogurt (1 oz) and strawberry (2 oz).

Figure 2 displays the results for the sessions targeting the acceptance of the second non-preferred food: peaches. In the baseline condition, Danny consumed zero bites of peaches. During phase one of treatment, Danny consumed 2.5, 2.75 and 2.6 ounces respectively in the first three sessions. Danny met criteria to advance to the next phase. Phase two required an increase in the amount of peaches consumed by one ounce. Danny ate 3.2, 3.5, 3.8, and 3.6 ounces in four sessions and advanced to phase three. In phase three of treatment, which had a reduction in the amount of yogurt by 50%, Danny continued to meet criteria by consuming 2.2, 2.5, 2.6, and 2.6 ounces of peaches and yogurt.

Discussion

The results demonstrated that simultaneous presentation of preferred and non-preferred foods was an effective method for increasing food consumption of two non-preferred foods for Danny. Prior to the study, Danny repeatedly refused both strawberries and peaches when presented alone; he threw them on the floor and made statements about how he disliked them. After the introduction of treatment, however, Danny accepted both strawberries and peaches when they were paired with a preferred food (yogurt). In addition, Danny was observed to eat a strawberry outside of the sessions when it was presented to him during a speech therapy session where strawberry smoothies were being made. This observation suggests that the acceptance of the treated foods generalized to additional settings, which supports the results found by Mueller et

al. (2002). This study demonstrated that two participants would consume non-preferred foods (that had been blended and accepted with preferred foods previously) in the absence of the preferred foods.

Piazza et al. (2002) mentions that the presentation of the preferred food may act as an establishing operation by reducing the aversiveness of the non-preferred food. This may have been a factor in Danny's consumption of the non-preferred food.

Piazza et al. (2002) also expresses the concern that the non-preferred food maybe so aversive that by pairing the preferred and non-preferred food together might result in the preferred food as becoming aversive as well. This possibility should be carefully considered and monitored when designing and implementing a treatment plan. It would be an unfortunate result to eliminate a food from a selective eater's diet.

One limitation of the current study was that there was only a single participant. More participants would have strengthened and further supported the results that simultaneous presentation is an effective technology for increasing food acceptance and consumption in children with a history of food selectivity or refusal.

An additional limitation to the study is the small number of both preferred and non-preferred foods used. Extending the research to include additional non-preferred food from food groups such as starches, proteins, and vegetables would further support use of the simultaneous presentation method. In addition, identifying other preferred foods to pair simultaneously would further supplement the findings.

Another limitation of the present research was the lack of follow-up data. Collecting data to determine how the behavior has been maintained is an important clinical assessment of treatment effectiveness.

Lastly, the lack of procedural integrity and treatment integrity data pose as limitations to the study. In order to further evaluate the effectiveness of the study, treatment integrity data should involve measuring the “pea sized bites” and the ration of preferred and non-preferred food presented in each session. This type of data would ensure future success of replicating and extending the study for other participants or foods.

Possible areas for future research might include the use of a variety of both preferred and non-preferred foods as opposed to the limited number of foods used in this study. In addition, research could expand to the ability to generalize this increase in behavior to other foods in the absence of a preferred food.

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Figure Captions

Figure 1. The amount consumed in ounces of strawberry.

Figure 2. The amount consumed in ounces of peaches.

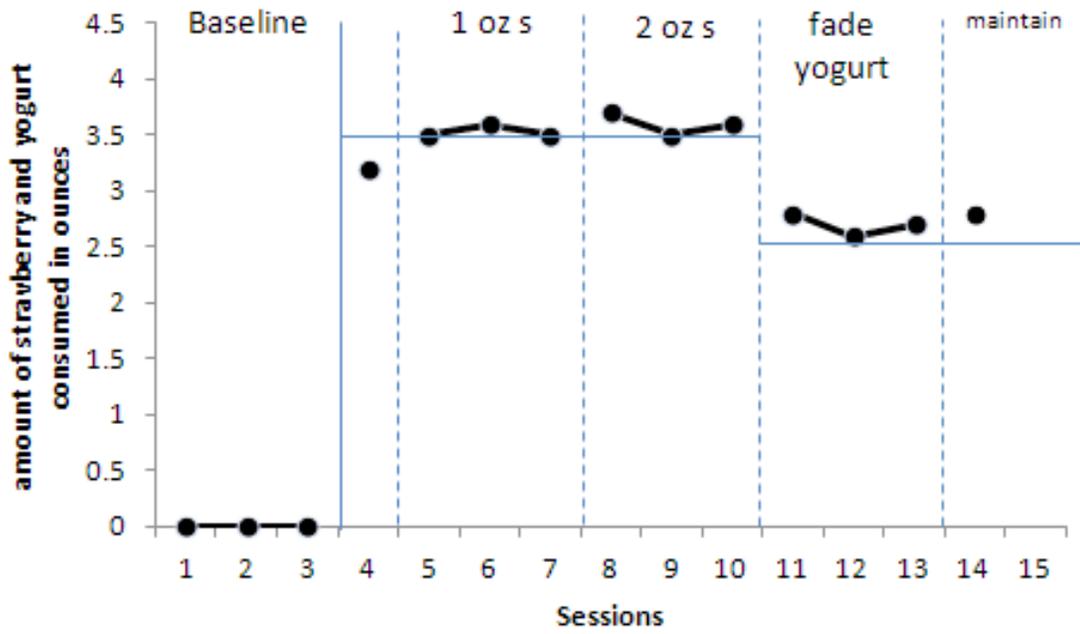


Figure 1.

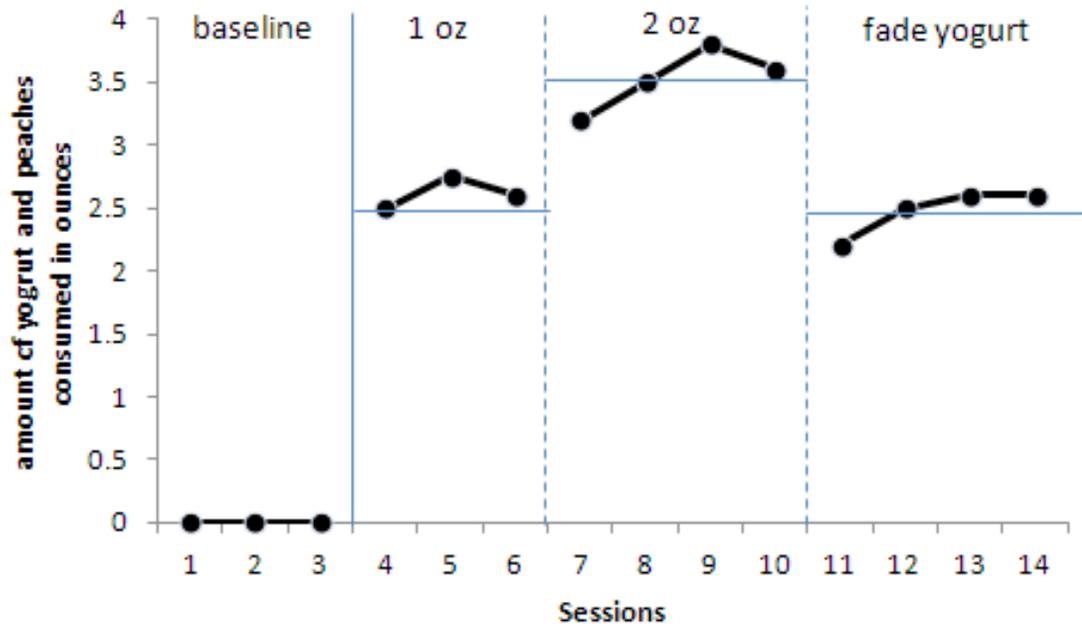


Figure 2.