



Improving novel food choices in preschool children using acceptance and commitment therapy



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ABSTRACT

The present study examined the effects of a novel treatment package consisting of Acceptance and Commitment Therapy (ACT)-based activities with and without contingent rewards on children's consumption of low-preferred healthy foods. Participants were 6 children, age 3–5, who attended a local day care center. The effects of the two treatment packages on children's tasting and approach of foods were assessed using a multiple baseline design across food categories. During the ACT-based mindfulness condition, the experimenter led a set of four ACT activities prior to the presentation of food. This condition produced a mean increase in foods tasted of 7.4% for fruits but 0% for vegetables, and mean increases in foods approached of 18.6% for fruits and 8.7% for vegetables. A second condition consisting of the same ACT condition with an added emphasis on values and committed action. Through the use of rewards delivered contingent upon tasting the foods produced mean increases in foods tasted of 69.2% for vegetables, 25.3% fruits, and 43.2% for beans, and increases for foods approached of 54.7% for vegetables, 16.2% for fruits, and 44.6% for beans. The results suggest that the values and committed action components of ACT are critical for behavior change at young ages.

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1. Introduction

Over 60% of American children do not eat enough fruits, vegetables, beans, and whole grains to satisfy nutritional guidelines, putting them at risk for nutritional deficiencies (U.S.D.A & U.S.D.H.H.S., 2010). A variety of factors impact what children eat at any given opportunity. They include (a) genetic predispositions to eat sweet and energy dense foods (Desor, Maller, & Andrews, 1975; Birch & Ventura, 2009), (b) avoidance of novel food items (Rozin, 1976), (c) selective eating (Levin & Carr, 2001), picky eating (Carruth, Ziegler, Gordon, & Barr, 2003; Dubois, Farmer, Girard, & Peterson, 2007), and (d) food refusal (Bandini et al., 2010). Neophobia, or selective/picky eating, has been reported to affect between 16% and 20% of all children 3–5-years-old (Carruth et al., 2003). Considering children's predisposition to avoid novel foods and their tendency to eat sweet and fatty foods, it is possible to see how these predispositions interact to develop unhealthy eating patterns that can cause lifetime health concerns.

Despite children's frequent avoidance of novel foods, research has shown that children can learn to eat new and non-preferred foods. Techniques have included peer modeling (Birch, 1980) and peer-modeling coupled with social reinforcers (Hendy, 2002). However

caution needs to be taken to reduce the risk of negative peer-models (Greenhalgh et al., 2009). Other interventions have included visual and taste exposures (Birch, McPhee, Shoba, & Steinberg, 1987) and contingent rewards (Horne, Lowe, Fleming, & Dowe, 1995; Horne, Lowe, Bowdery, & Egerton, 1998; Horne et al., 2004, 2009, 2011; Lowe, Horne, Tapper, Bowdery, & Egerton, 2004). The Food Dudes program of Lowe and colleagues has received a fair amount of popular media attention but several limitations may apply, including not employing a systematic method to determine relative food preferences, and the need for trained models and video production for incorporation into a typical classroom (Hendy, Williams, & Camise, 2005). Albeit the limitations, Horne et al. (1995, 1998, 2004, 2011) present an interesting conceptualization of how the social influence of language plays a part in controlling behavior in the Food Dudes program. In particular, the authors described how children's own verbalizations and categorization of stimuli into classes influenced their behavior. Horne et al. (1998) argue the following:

“Once [they] are verbally adept, children no longer react to foods merely as particular objects with inherent qualities of taste, smell, appearance, etc., but respond to them as named classes of items and respond to the verbalizations that they themselves and others make about those named classes” (p.133).

Horne et al. (1998) argued that by inserting positive verbalizations from peer models into the children's eating context, negative conceptualizations occurring in children's eating contexts were

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circumvented. Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) describes how language enables humans to use derived learning to relate, evaluate, and compare events without directly experiencing the contingencies of those events (Hayes & Wilson, 2003). At times, this relational behavior is an enormously adaptive trait, as it allows humans to quickly identify possible outcomes of certain events and to behave to produce the preferred outcome. At others times, rigid patterns of avoidance can result from over-reliance on verbal rules based on derived learning instead of learning based on direct-acting contingencies (Hayes & Plumb, 2007). Procedures based in Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) may offer a novel method for creating a context that undermines verbal rules and negative conceptualizations that occur in the presence of healthy foods.

ACT is a form of psychotherapy developed from the concepts of behavior analysis and RFT whose goal is to create behavior change in accordance with individual values. In ACT, mindfulness is described as a collection of four inter-related processes: acceptance, defusion, contact with the present moment, and self as context (Fletcher & Hayes, 2005). These processes function clinically to produce non-evaluative contact with stimuli and to help to bring about responses under appropriate contextual control of the present environment rather than verbal rules (Hayes & Wilson, 2003). Further, committed action and values, the other two processes within ACT, are relevant to treatment contexts that involve motivating individuals to engage in valued, but previously avoided, behavior. Within ACT treatment, committed action consists of engaging in deliberate acts towards goals that are consistent with values (Fletcher & Hayes, 2005). ACT interventions may be particularly relevant to young populations with food selectivity behaviors for several reasons. First, children often make verbalizations that attach verbal, rather than formal functions, to food (Horne et al., 1995, 1998, 2004, 2011). In the context of ACT, children may be more likely to attend to the formal features of the food, rather than any verbal rules or negative conceptualizations about food, which in turn may result more acceptance of previously avoided food. Second, rather than extrinsic contingent reinforcement for eating less preferred foods, an ACT intervention with a focus on values and present moment contact may better link current eating behavior to temporally distant valued consequences such as greater health. For instance, if eating spinach is maintained only by access to other edibles or attention, when those contingencies are no longer in effect, spinach may again be avoided, but if committed action is directed by health-related values, eating spinach may be more likely maintained.

Overall, ACT interventions in regard to food selectivity in a younger population may be of value to proactively promote a lifetime of healthy behavior before problems develop. However, research with ACT and preschool populations has been sparse. For example, three to five year old children have demonstrated increased attention, delay to gratification, and inhibitory control following the introduction of a mindfulness yoga activity (Razza, Bergen-Cico, & Raymond, 2013), but research and implementation of ACT protocols featuring values and committed action are rare with younger children, but have yielded positive results with older school children and adolescents (see Coyne, McHugh, & Martinez, 2011). Despite this gap in the literature, ACT was derived from RFT and behavioral principles, and, theoretically, such systems should apply so long as children respond verbally to the environment. In other words, once children develop a verbal repertoire and begin to relate stimuli, which has been observed in children less than two years old (Luciano, Becerra, & Valverde, 2007), they should respond to interventions that target these relations similar to older populations. As young children may experience negative effects of

verbal relations (e.g., “Peas are sick!”), ACT interventions should be extended to young, verbally capable populations.

The purpose of the present study was to examine the effect of mindfulness as conceptualized within ACT as an alternative to modeling within a treatment package on children’s consumption of previously avoided healthy foods. To test this question, this study examined a set of four ACT-based mindfulness activities based on the processes identified by Fletcher and Hayes (2005) with and without rewards on the percent of foods tasted and approached.

2. Method

2.1. Participants and setting

Six typically-developing 3–5-year-old children who attended a full-day pre-kindergarten classroom at a local day care participated in this study. One participant (Lizzie) stopped attending the center after session 20; her data remained in the presented data, as she had been present for the majority of the sessions. Participants included four girls and two boys: Monroe was a 3-year-old boy; Lizzie, Petra, and Eva were 4-year-old girls; Ariel was a 5-year-old girl, and Joey was a 5-year-old boy. Consent was obtained from the parent or guardian of each participant prior to the start of the study, as well as assent from each participant. Sessions took place two to four afternoons each week between 3:00–3:30 p.m., which was 15–45 min after students’ afternoon snack. During sessions participants sat at one long table in an assigned order that stayed constant throughout the study. Sessions were conducted as a small group exercise that included all participants who were present that day in the classroom. The number of participants present each session varied from three to six ($M=5$). Nineteen students were regularly scheduled to be in the class. The pre-kindergarten room was filled with two long tables for seat work, a corner with carpet and pillows for group time, with children’s toys throughout the room. Students in the class who were not participants in the study engaged in teacher-led small group or station-based activities at the time of the sessions.

2.2. Materials

Food stimuli in this study were fruits, vegetables, and beans supplied and prepared on site by the experimenter. Foods selected for the study had to be available in area stores at the time of the study and reported by parents to be novel or refused 50% or more of the time by each participant. A parent questionnaire was developed by the author and filled out by parents at the same time as the consent form. This survey identified an initial pool of 13 fruits, 11 vegetables, and 10 beans that met the above criteria. Of these foods, seven in each category were selected for the preference assessments based on their novelty or history of refusal.

During preference assessments and experimental sessions, food servings were a mean of 25 g. Fruits and vegetables were cut into small pieces approximately 2.5 cm × 2.5 cm. Foods were presented to participants in 4 oz transparent, single-portion containers. To help students discriminate among their foods, containers were labeled with a small colored sticker: the sticker for the vegetable container was yellow, the fruit container was pink, and the bean container was orange. All fruits, as well as red pepper and water chestnuts, were prepared raw and then frozen and defrosted prior to sessions. Rutabaga, beets, zucchini, turnip, and yellow squash were heated in a microwave oven until al dente, and were also frozen and defrosted prior to presentation. All beans were

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