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‘Finish your soup’: Counterproductive effects of pressuring children to eat on intake and affect

Amy T. Galloway, Laura M. Fiorito, Lori A. Francis, Leann L. Birch

ABSTRACT

The authors examined whether pressuring preschoolers to eat would affect food intake and preferences, using a repeated-measures experimental design. In the experimental condition, children were pressured to eat by a request to finish their food. We collected intake data, heights and weights, child-feeding practices data, and children's comments about the food. Children consumed significantly more food when they were not pressured to eat and they made overwhelmingly fewer negative comments. Children who were pressured to eat at home had lower body mass index percentile scores and were less affected by the pressure in the lab setting than children who were not pressured at home. These data provide experimental evidence supporting previous correlational research indicating that pressure can have negative effects on children's affective responses to and intake of healthy foods.

INTRODUCTION

During early childhood, children are introduced to many foods of their culture's adult diet. This is a time when children are neophobic and often reject new foods initially (Birch, Gunder, & Grimm-Thomas, 1998). However, with repeated exposure, children can either learn to prefer and consume, or dislike and reject foods depending on the social contexts and physiological consequences in which the foods are eaten (Birch, 1998).

Parents shape the development of children's food acceptance pattern by determining what foods are offered to children and by providing the social contexts in which children are eating. Parental child feeding practices are central in shaping children's eating environments and their developing preferences (Birch & Fisher, 1998). These feeding practices are intended to promote patterns of intake that will foster children's healthy development. However, these practices may produce unintended negative consequences.

Despite parents' good intentions, they use many feeding practices that are associated with negative outcomes. For example, restrictive feeding practices can actually promote the liking and increased intake of palatable, energy dense nutrient poor foods, and foster the development of overeating ([Fisher and Birch, 1999] and [Fisher and Birch, 2002]). Pressuring children to eat foods that are ‘good for them’ has been associated with lower fruit and vegetable intake, and picky eating in children (Galloway, Fiorito, Lee, & Birch, 2005); although the directionality of these findings is still in question as most findings are based on observational data (Galloway et al., 2005). These data do not shed light on whether children who do not eat their vegetables elicit more pressure from parents to do so; or whether parental pressure fosters the development of dislikes and food rejections in children. Retrospective reports reveal that many common food dislikes can be traced back to children's experiences of being pressured to eat specific foods (Batsell, Brown, Ansfield, & Paschall, 2002), suggesting that this parenting practice is causally implicated in the development of food dislikes and rejections. However, it is still unclear from this work whether it was the pressure that exacerbated the participants' dislike for the food they were pressured to eat as children, or whether the permanent dislike was simply the result of the participants' original dislike of the food that would have continued regardless of whether pressure was used. The purpose of this experiment was to test the hypothesis that pressuring children to eat would negatively affect children's intake and responses to food they were pressured to eat.

METHODS

Design

A repeated-measures, within-group experimental design was used where children were exposed to a series of conditioning trials. In these trials over an 11-week period, children were presented with two different flavors of soup (Table 1). Pressure (experimental) and no pressure (control) conditions were used to evaluate the effects of mild pressure on eating during a lunchtime appetizer course. To assess the effects of conditioning, we obtained four pairs of

intake data, pre- and post-test data on intake, and comments made during each trial. The study was designed so that children were equally exposed to both types of soups (i.e. corn and squash, which were counterbalanced across conditions). During conditioning trials, children received repeated exposure to both soups, and were randomly assigned to have one soup consistently associated with pressure to eat; the other soup was presented in the no pressure condition. Half of the children were pressured to eat the corn soup and the remaining children were pressured to eat the squash soup. Weighed-food intake data were obtained at each session. Comments about the soup were recorded during the sessions by trained research assistants. Separate sessions were used to obtain children's weight and height measures. The parent primarily responsible for feeding the child completed a questionnaire concerning child feeding practices.

Table 1
Experimental timeline

Week			Pre	Pre	Pre	T1	T2	T3	T4	T5	T6	T7	T8	Pst	Pst	Pst
Room 1[a]	FT1	FT2	NC1	NC2	Ch1	E1	C1	E2	C2	E3	C3	E4	C4	NC3	NC4	Ch2
Room 2[b]	FT1	FT2	NC1	NC2	Ch1	C1	E1	C2	E2	C3	E3	C4	E4	NC3	NC4	Ch2

FT, familiarization trial; Pre, pre-test; T, conditioning trial; Pst, post-test; NC, one-choice session (one soup served each day totaling two soups tested); Ch, two-choice session (two soups served together totaling two soups tested); E, experimental trials (pressure); C, control trials (no pressure).

[a] $n=13$; four boys, nine girls; mean age$=4.0+1$yr.

[b] $n=14$; six boys, eight girls; mean age$=4.0+1$yr.

Participants

Participants in the present study were preschool children attending full-day care programs at The Pennsylvania State University. Thirty-three children in two separate classrooms were screened for inclusion in the study. Six children refused to participate. Data were obtained from 27 children (10 boys and 17 girls; six Asians, 19 non-Hispanic whites, and two Hispanics) ranging in age from 3 to 5 years with a mean age of 4.0±1 year. We divided the children in each classroom into two groups, to counterbalance the presentation of the two types of soups with the pressure and no pressure conditions. The average body mass index (BMI) percentile score for the sample was 57%. Parents tended to be highly educated and currently employed; they provided written consent for their own and their child's participation. All procedures were reviewed and approved by the university Institutional Review Board.

MEASURES AND PROCEDURES

Experimental menu

Several commercially available Imagine® soups were used during various phases of the study. Pureed butternut squash soup and corn soup were used for the pressure and no pressure trials. One additional flavor (tomato) was used during the familiarization trials. The soups differed in taste, smell, and color, but were similar in texture. The macronutrients and sodium content

varied accordingly: 1.5–3 g of fat, 10–23 g of carbohydrates, 2–4 g of protein, and 348–380 mg of sodium per serving.

Children were told before the study began that they would visit the children's eating lab to have an appetizer before having lunch in their classroom. The classroom teachers explained the term ‘appetizer’ during a classroom discussion activity. When children entered the children's eating lab, they were directed to sit at child-size tables with three other children. Two research assistants also sat at each table. One research assistant's responsibility was to record the food-related comments of the children. The second research assistant was primarily responsible for pressuring children to eat during the pressure trials. The second research assistant also recorded comments of the children, but these data were used only in cases where the first research assistant did not hear what a child said. The research assistants did not have soup placed in front of them like the children. They were instructed to engage in conversation with the children and to redirect any questions about the foods.

Pre-weighed paper serving cups containing soup (120 g) were placed on each child's tray. Each child received one or two cups of soup (i.e. corn or squash, depending on the session). Children were given 5 min to drink their soup and were instructed to eat as much or as little of the soup as they wanted. The children's intake was calculated as the difference in the weight of the serving cup before and after the appetizer. Each appetizer session began after the children were given a description of the soup based on color. The children were instructed not to share their soup and to remain seated for the duration of the appetizer period. Spilled soup was collected and added to the post-consumption weight of that food. The soup intake was measured by using weighed-food intake data. Data were not collected on holidays or on any other day that involved scheduled celebrations with food (i.e. Valentine's day).

Familiarization trials

During the two days of familiarization trials children were served one cup of tomato soup that was placed on each child's tray. The children were familiar with tomato soup because it was often served for lunch in their classrooms. These trials were conducted in the laboratory before the study to accustom the children to the procedures used during the experiment.

Pre- and post-test assessment sessions

As shown in Table 1, after the 2 days of familiarization trials, pre- and post-trials were conducted before and after the series of conditioning trials to assess the effects of conditioning. During these assessment trials, a 120 g serving of the two soups were offered to the children prior to lunch, either one at a time (single, no choice trials) or in pairs (two soups presented simultaneously), and weighed intakes were obtained in these sessions. We included both one-soup and two-soup presentations in order to have two different measures of preference. Regardless of whether the two types of soups were presented separately at different sessions or together during one session, the children were given 5 min to drink the soups and were

instructed to eat as much or as little as they desired. The children's intake of the soup was calculated as the difference in the weight of the serving cup before and after it was offered. The order and position of the flavors were counterbalanced across the two types of assessment conditions, as appropriate.

Experimental conditioning trials: pressure and no pressure conditions

Children's soup intake was measured during both the pressure and no pressure trials. In the pressure condition, children were reminded by one research assistant sitting at the table to ‘Finish your soup, please’, four times, once every minute, during the 5 min session. Research assistants who made these comments were trained to use a normal tone in order to simulate the mildest form of pressure a child might experience under normal circumstances. In the no pressure condition, using a different type of soup, children were not pressured to finish their soup. The only difference between the two conditions was the four requests to finish during the pressure condition. Research assistants sometimes needed to interrupt conversation to make these requests.

Behavioral observations of children's comments

The children's comments about soup were also recorded by trained research assistants who sat with each table of four children. Any evaluative comments regarding the soups were tallied as ‘positive’ or ‘negative’. Coders were trained by using written descriptions and examples of comments to be coded in each category. Any questionable comment was recorded and coded at the end of the session. Coders were instructed not to encourage interaction with the children during the sessions and to provide minimal answers to all questions or to redirect questions asked by children. To familiarize the children to the presence of a coder at the table, the staff member sat with each table of children during the familiarization and pre-test sessions.

Child-feeding practices: pressure to eat

Mothers' use of pressure to encourage their children to eat more was measured using the pressure-to-eat subscale from the child feeding questionnaire (CFQ) developed by Birch et al. (2001). The pressure-to-eat subscale (four items) measures the extent to which mothers pressure their children to consume foods. All items were rated using a five-point Likert-type scale; responses ranged from ‘disagree’ to ‘agree.’ Items include: (1) My child should always eat all of the food on her plate and (2) If my child says ‘I'm not hungry,’ I try to get her to eat anyway. The internal consistency of items on this subscale was α=0.73.

Children's weight status

Height and weight measurements were obtained by a trained staff member following procedures described by Lohman, Roche, & Martorell (1988). Height was measured in triplicate to the nearest 10th of a cm using a Shorr Productions stadiometer (Irwin Shorr, Olney MD). Weight was measured in triplicate to the nearest 10th of a kilogram using a Seca Electronic Scale (Seca Corp., Birmingham, UK). Age and gender specific BMI percentiles were calculated using growth charts from the centers for disease control (Kuczmarski et al., 2000).

Statistical analyses

Data are reported for 27 children of the 29 children who participated in the study; the data from two children were excluded from analyses due to absenteeism. One child did not participate in the post-test trials and was not included in analyses using those data. Missing data are reflected in the sample size for each change variable. We used nonparametric tests for many of the analyses because the distributions were not normal and we dichotomized parental use of pressure using a median split of the data. When the data were normally distributed we used parametric statistics including *t*-tests and a repeated measures two-way ANOVA.

RESULTS

Patterns of intake pre- and post-conditioning

Preliminary analyses revealed similar patterns of intake whether the soups were presented one at a time or in pairs, the data from the two types of assessment trials were summed to simplify the presentation of the results. There was no difference in the consumption of the two types of soup (corn versus squash) during the pre-test or post-test trials (Wilcoxon Signed-ranks test: T=−1.65, and −1.19 ns, respectively). Similarly, no age differences were evident in consumption during the pre-tests and post-tests (Mann–Whitney test: U=80.00 and 86.00 ns, respectively). Six children were never willing to eat the test foods. We performed two sets of analyses, with and without these participants, and determined that the data were largely unaffected except that the significance values and effect sizes increased. We present data that include all participants. Fig. 1 presents the results of the two-way ANOVA, which included condition (pressure/no pressure) and trials as repeated factors. Findings revealed that the interaction of time and the effect of pressure was significant, $F(1, 25)=4.51$, $p< 0.05$, $\eta_p^2 = 0.15$. Greater increases in intake were noted in the no pressure condition than in the pressure condition. There was also a main effect for time, $F(1, 25)=8.31$, $p<0.01$, $\eta_p^2 = 0.25$, indicating that children consumed more soup during post-test trials than pre-test trials. There was no main effect of condition, $F(1, 25) <0.05$ ns.

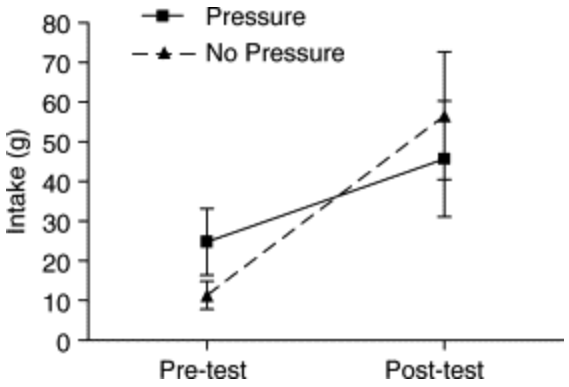

Fig. 1.

Mean soup intake (±SE) during pre- and post-test trials as a function of pressure and time.

Intake during experimental conditioning trials

Preliminary results indicated that there were no differences in intake due to soup flavor, child age, or gender. To assess the effects of pressure or no pressure on intake during the series of conditioning trials, a two-way ANOVA was conducted with pressure and trials over time as a repeated factor. There was no significant interaction of pressure by conditioning trial and no main effects of pressure. As shown in Fig. 2, children did not consume more soup during the pressure condition than in the no pressure, $F(1, 25)=1.34$ ns. The main effect of time was significant across both pressure and no pressure, intake increased significantly over time, $F(3, 23)=2.98$, $p=0.05$, $\eta_p^2 = 0.28$. There was no interaction effect, $F(3, 23)=1.00$ ns.

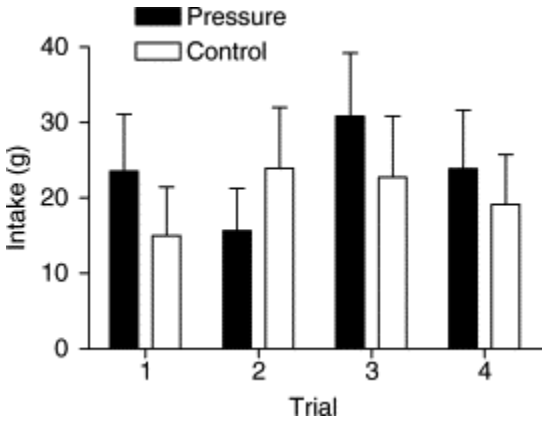

Fig. 2.

Mean soup intake (+SE) during conditioning trials as a function of pressure and time.

Associations of children's intake with weight and child feeding practices

We used the CFQ pressure-to-eat subscale to determine the amount of pressure mothers reported using at home. Mothers in the study reported using low levels of pressure (M=2.24, SD=0.98), but these levels were comparable to scores reported previously in another study with older children (Birch et al., 2001). Mothers who reported regularly pressuring children to eat at home (M=3.16, SD=0.45) had children who showed little difference in their intake in the pressure condition and no pressure condition, using a difference score, compared to children who were reportedly not pressured at home, t=2.45, N=23, p<0.05, d=1.03, see Fig. 3. Children who were pressured minimally at home (M=1.40, SD=0.34), consumed significantly more soup in the pressure condition and less soup in the no pressure condition than their counterparts who were pressured at home. Children whose parents reported higher levels of pressure to eat at home had significantly lower BMI percentile scores (r_{21}=0.48, p<0.05).

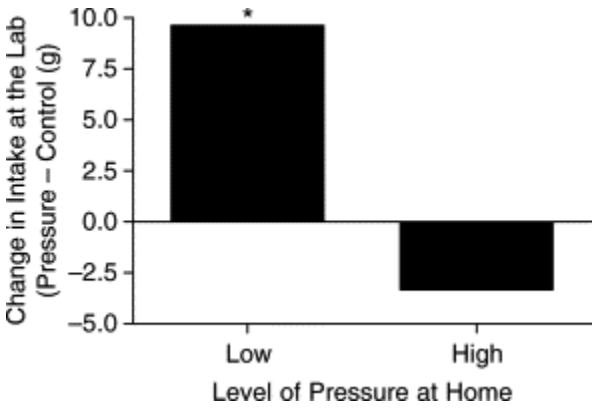

Fig. 3.

Children's soup intake in the laboratory setting as a function of maternal reports of pressuring the child to eat at home.

Children's affective response to pressure

Comments made by children were overwhelmingly negative during the pressure condition when differences between positive and negative comments during the pressure and no pressure trials were analyzed (Cochran's test: Q=34.5, p=0.001, Fig. 4). Altogether, the children made a total of 157 negative comments in the pressure condition compared to 30 negative comments made during the no pressure condition. A total of 10 positive comments were made during the pressure condition and no positive comments were made during the no pressure condition. Examples of negative comments during the pressure condition included: “I don't want to drink it,” “I hate it,” “Yuck. I don't like it. I don't want to eat it,” “I'm not going to eat it,” “Yuck, it's yellow soup again,” “I never will eat my soup,” and “I told you already I don't like it.” In response to the pressure one child said, “You always say that to us and I don't want it. It's so annoying.” Some

of the positive comments during the pressure condition included, “Wow. Yellow soup! I think I can drink yellow soup!,” “I drank all of mine!” and “I like it!” Children would often show experimenters their empty cup as if they were proud to have finished the soup.

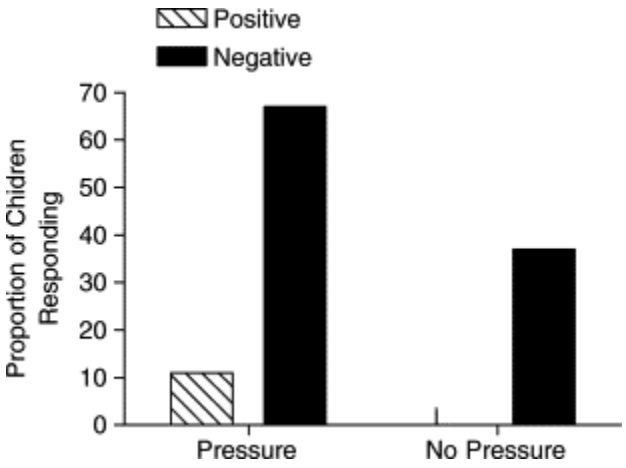

Fig. 4.

Proportion of children who responded with negative or positive comments during the pressure and no pressure trials.

DISCUSSION

The purpose of this study was to test the hypothesis that although pressuring a child to eat might increase intake initially, it would have negative consequences on intake and liking of a food. These findings show that children's intake increased over time both when children were pressured and when they were not pressured to eat. However, the increase in intake was significantly greater when they were not pressured to eat, supporting the hypothesis. Pressuring children to eat was not effective in promoting intake of a food and also resulted in negative affective reactions to the foods they were pressured to eat. These experimental findings provide evidence that the use of pressure contributes to lower intake and can foster negative affective responses to foods. In addition, the findings are consistent with previous retrospective research indicating that pressuring children to eat can have negative effect on liking of individual foods, and also on the developing controls of food intake. In a retrospective study, young adults reported disliking foods they had been pressured to eat as children (Batsell et al., 2002). In previous experimental research, when children were offered rewards for eating it resulted in reduced liking (Birch, Birch, Marlin, & Rotter, 1984).

Previous research has also revealed associations between parental use of pressure in feeding and other negative outcomes, including elevated levels of dietary restraint and disinhibition in young girls (Carper, Fisher, & Birch, 2000), increased picky eating, and reduced fruit and vegetable intake (Galloway et al., 2005). In the current study, children were more likely to

increase their intake of an initially unfamiliar food if they were not pressured to eat it. These results, based on changes from pre- to post-test sessions conducted in the no pressure group, were in contrast to the effects of pressure during conditioning sessions. Measures obtained during the conditioning trials revealed increased intake over time for both conditions. There was no difference in intake in the pressure versus no pressure condition. However, the pre-test and post-test data indicate that over time, pressure elicited more negative comments and reduced their willingness to consume the food they were pressured to eat during the conditioning trials. Although pressure increased intake among some children during the conditioning trials, when the cost of reduced liking for pressured foods is considered along with the negative behavior in the form of comments, this strategy has negative long-term consequences.

When parental reports on the use of pressure at home were related to our laboratory findings, children of parents who reported routine use of pressure to eat at home consumed less food when pressured in the laboratory setting than children who were not reported to be pressured at home. This suggests the possibility that either children learn to oppose or ignore requests to eat over time or that these children have always been difficult to feed and that they are exhibiting a behavior that may have troubled their parents from the beginning, eliciting more pressure to eat from parents. Children who were accustomed to receiving high levels of pressure to eat from their parents at home were more likely to ignore the pressure received in the experimental setting and ate significantly less food during these trials. This result is reminiscent of the reports from clinical studies of failure to thrive children (Chatoor, Egan, Getson, Menvielle, & O'Donnell, 1989), a condition characterized by a lack of weight gain over time that results in a child's weight for age falling below the fifth percentile. Among a sample of failure to thrive children treated in clinical practice, parental pressure was typically met by food refusal in children. The interaction between controlling parents and their infants became circular; when the infants refused to eat the parents would try harder to make them eat, which eventually made the situation worse. The current findings suggest that this type of relationship may exist among parents and normally developing children who do not show failure to thrive. Despite a parent's best intentions, a child may react with the least desired response from the parent's perspective. From the child's perspective, eating or not eating is one of the few ways in which they can exert control over their own environment and over their parents. Therefore, from an early age, a child's reaction to parental desires about eating may have more to do with control than with food. The fact that the children in this study reacted so strongly with negative comments during the experimental condition provides evidence for negative affect elicited by parental pressure.

Findings from the current study indicate that the children who were pressured to eat by their parents at home had significantly lower BMI scores than their counterparts who were not pressured to eat. Based on findings in other studies with girls in middle childhood (Francis, Hofer, & Birch, 2001), it is likely that parents who reported pressuring their children to eat at home did so because of perceived underweight status. This extends a previous finding that seven-year-old girls who were thinner, but not underweight, were more likely to be pressured to eat and to be considered to be picky eaters by their mothers (Galloway et al., 2005). These results imply that thinner children may be an appropriate target group for interventions to foster healthier diets that provide parents with alternatives to the use of pressure.

Many parents report that they regularly pressure their children to eat (Carper et al., 2002; Francis et al., 2001), and retrospective reports from children also suggest that this is a common practice. In a previous study, parents reported that using various types of coercive methods to pressure children to eat is ineffective (Casey & Rozin, 1989). Despite this belief, the authors reported that many parents in the study thought that asking or cajoling their child to eat was a positive strategy to use, suggesting that parents did not consider the specific act of asking them to eat to be coercive.

Past research concerning the acceptance of new foods has revealed a variety of experiences that influence the intake of foods in young children. Repeated exposure to foods is known to increase intake of foods that were initially rejected (Birch & Marlin, 1982). Foods used to reward children, which are usually already preferred, energy-dense foods, become even more desirable after they have been used as a contingency (Birch, Zimmerman, & Hind, 1980). In contrast, when disliked foods are used as a contingency for receiving a reward (e.g. finishing vegetable before being allowed to play), these already disliked foods become even less desirable (Birch, Birch, Marlin, & Kramer, 1982; Birch, Marlin, & Rotter 1984). This is not surprising given that the contingencies are typically used by parents to pressure children to eat more of foods they are not consuming in amounts parents would like. The data from the current research support studies indicating that mere exposure to food increases liking but that attempts to control intake reduces the strength of the exposure effect.

The findings of the current study support previous research in that pressuring children to eat more food ultimately lead to a lower intake of those foods even in situations when they were not being pressured to eat those foods. Results from this study also provide evidence that the use of pressure at home is associated with a lower intake of food when those children were asked to finish eating compared to their classmates who were not reported to be pressured to eat at home. Finally, data from this study show that children are much more likely to respond emotionally, in the form of negative comments, when pressured to eat compared to when they were not pressured to eat. Taken together, these data reveal that pressuring children to eat is not an effective strategy for promoting intake. Anticipatory guidance for parents is needed to point out the counterproductive effects of pressure and to provide parents with alternative feeding practices to promote healthier diets.

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