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Research Report

Do not eat the red food!: Prohibition of snacks leads to their relatively higher consumption in children

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Abstract

Overweight is becoming more prevalent in children. Parents' behaviours play an important role in children's eating behaviour and weight status. In addition to modelling and providing meals, parents also have an influence by using control techniques. One frequently used technique is restriction of intake. In this study, it was tested whether a prohibition of food in the first phase would lead to an increase in desire for the target food and overeating in the second phase. Sure enough, desire increased significantly in the prohibition group, whereas it remained constant in the no-prohibition group. Though no significant differences between groups were found in the absolute consumption of the target food, the proportion of consumed target food (target food intake/total food intake) was significantly higher in the prohibition group. Finally, children whose parents imposed either very little or a lot of restriction at home consumed more kilocalories during the whole experiment, as opposed to children who were exposed to a moderate level of restriction at home. These data indicate that restriction can have adverse effects on children's food preference and caloric intake.

Keywords: Parental control; Child feeding practices; Restriction; Eating behaviour

Introduction

Obesity is considered one of the most serious health issues of the century. In the Netherlands, 46% of all adults are overweight (body mass index (BMI) $>25\,kg/m^2$; Centraal Bureau voor de Statistiek, 2006). Also among children, overweight is increasingly prevalent (Visscher, Kromhout, & Seidell, 2002). At present, one out of seven Dutch children is overweight (TNO; van den Hurk et al., 2006). As childhood overweight often persists into adulthood (Clarke & Lauer, 1993; Serdula et al., 1993), it seems of great importance to challenge this issue at a young age.

Parental behaviours are believed to play an important role in the development of children's weight status (see, e.g., Birch & Fisher, 1995). Besides being role models and being responsible for purchases and cooking, parents also influence their children's food intake by using control techniques. According to Birch et al. (2001) parental control in the domain of eating can be subdivided into pressuring the child to eat healthy kinds of food (e.g., fruit and vegetables) and restricting intake of unhealthy, palatable (fatty or sweet) kinds of food. Nevertheless, overcontrolling children's food intake might have adverse effects on food preference and intake. It has been hypothesized that parents who overcontrol their children's food intake may interfere with their children's ability to self-regulate their intake. As a result, children would be more responsive to external cues (e.g., the smell and presence of food, rewards) as opposed to internal cues (e.g., hunger and satiety) (Faith, Scanlon, Birch, Francis, & Sherry, 2004). In turn, this could result in disturbed eating behaviours like eating in the absence of hunger, restrained eating and eventually excess weight gain (Birch & Fisher, 2000; Birch, Fisher, & Krahnstoever Davison, 2003; Robinson, Kiernan, Matheson, & Haydel, 2001). With regard to pressuring children to eat healthy kinds of food, researchers found it to be associated with lower fruit and vegetable consumption and picky eating in children (Galloway, Fiorito, Lee, & Birch, 2001). In a more

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experimental design, Galloway, Fiorito, Francis, and Birch (2006) found that normal weight children consumed more soup and made fewer negative comments when they were not pressured to eat.

With regard to the effects of restriction, research in rats showed that, even without depriving energy, restricting access to alcohol can lead to significant increases in the consumption of alcohol when it is subsequently made available (Wayner et al., 1972). These results were replicated using an optional high-fat food as the restricted substance (Corwin et al., 1998).

So far, evidence for an adverse effect of restriction in humans is largely correlational. Several researchers have found parents' restraint over their children's food intake to be positively associated with children's weight status (Birch et al., 2003; Constanzo & Woody, 1984). Although it may seem plausible that restriction behaviour by parents could lead to disturbed eating behaviour and subsequent overweight, the alternative could be that parents start restricting intake of palatable kinds of food when they observe their children becoming heavier. This problem of causality can be solved by manipulating restriction behaviour in a laboratory setting in normal weight participants.

A laboratory study by Mann and Ward (2001) examined the effect of food restriction in normal weight adults. Participants were assigned to either a forbid-choice condition or a forbid-reactance condition. All participants took part in three taste sessions of 5 min each. The first session was identical for both conditions: they were allowed to eat from all three kinds of candy, including a novel kind of candy. In the second taste session, the manipulation took place. Participants in the forbid-reactance condition were not allowed to eat from the novel kind of candy, whereas participants in the forbid-choice condition were asked not to eat much of the novel kind of candy, because it was scarce, but also told that they were free to do so anyway. Finally, the third taste session was identical to the first one. The results showed that desire for the forbidden food remained high in the forbid-reactance participants, whereas desire decreased in the forbid-choice participants. However, this constant level of desire did not lead to subsequent rebound eating in the forbid-reactance participants. Although palatable kinds of candy were used in the laboratory study, the forbidden food was a kind of candy that was novel to the participants. Therefore, one could argue that participants might not have had difficulties denying oneself this candy. It seems rational, thus, that rebound eating and increased desire do occur when participants are prohibited from well-known palatable kinds of food that they are used to eat on a regular base.

Fisher and Birch (1999) studied the influence of restriction of palatable foods in children. In the experiment, 3–6-year-old children participated in eight group snack sessions: four unrestricted sessions, followed by four restricted sessions. The target food was a palatable snack food. The alternative was a food of lower preference. During the unrestricted sessions, both types of food were freely accessible during 15 min. During the restricted sessions, children had only one 5 min period of free access to the restricted food. The results showed that children's behavioural response (requests for the food, attempts to obtain it or comments about liking it) to the palatable snack food was greater during restricted sessions than during unrestricted sessions (Fisher & Birch, 1999).

Summarized, research in adults shows an increased desire, but no rebound eating following restriction. Research in children shows that pressure to eat leads to a lower intake, thus an adverse effect. In addition, children show more behavioural responses when food is restricted. However, the effects of restriction in children have not been extensively tested yet. Considering the clinical relevance of mapping the effects of restriction, more experimental research in this area is highly desirable. In their study, Fisher and Birch (1999) presented a less attractive food as the alternative for the restricted food. Although this design probably corresponds more to a real life situation, the current study aims to examine the pure effect of restriction by providing an alternative food that is equal in taste.

The current study focuses on the possible adverse effects of external restriction of food intake in children. In this study we tested whether prohibiting snacks would result in an increased desire for forbidden food followed by overeating. We expected desire for the forbidden snacks to increase after the prohibition phase in the prohibition group, whereas we hypothesized that it would remain constant or even decrease during that same period in the no-prohibition condition. Secondly, it was expected that participants in the prohibition condition would eat relatively more forbidden snacks (in comparison with control snacks) in the second phase of the experiment, whereas we expected no differences between the two phases in the no-prohibition condition. The third and final hypothesis was that the degree of restriction in the home situation influenced overall food intake during the experiment: the more a participant was restricted at home, the more he would consume during the taste sessions.

Method

Participants

Seventy four participants were recruited from six different primary schools in the Netherlands, Germany and Belgium. Parents with children in primary school were approached and invited to let their children participate in the current study. Participants were told that the experimenter represented a sweets factory. As this factory was developing a new kind of sweet for children, the developers were very interested in how children evaluated existing snacks and sweets. The children were 5 and 6 year olds. The attraction of snacks is fairly strong in children, and we expected minimal social desirable behaviour concerning the