

Effects of visual food cues on eating behavior and possible weight gain in college students¹

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This study examined the influence of exposure to food cues on weight gain. Campus dormitories were randomly selected to receive one of three visual food cues weekly for a period of 7 weeks. One dorm received healthy visual food cues, another received non-healthy visual food cues, and a third dorm received neutral visual food cues. Cues were printed on small slips of paper and were placed on participants' doors each week. At the end of the 7 week period, all participants were asked to report on various aspects of their health during the past seven weeks (e.g., weight gain, food choices, etc.). Of interest was to determine the extent to which self-reported behaviors were influenced by the food cues received over the seven week period.

Introduction

Obesity is becoming a prominent problem in the United States. In order to effectively solve this problem, we must first understand the underlying causes. America's obsession with food becomes obvious when the advertising world is examined. We are constantly surrounded by advertisements to elicit us to eat food. From widely circulated magazines to television commercials, we are exposed to cues designed to bring forth thoughts about food. The advertisers in the food industry have a transparent goal, but the effect is less clear.

A great deal has been learned about the effects of food advertisement on calorie intake. In the arena of explaining food behaviors, past research has typically focused on children. While child obesity is an important issue, adult obesity is just as outstanding. It is not known if external visual cues share responsibility for adult's excessive energy intake in a similar manner as it does for children (Mazar et al., 2008)

Cornier, Von Kaenal, Bessesen, and Tregellas (2007) found that external food cues play an important role in the regulation of energy intake. In the previous study, communication appears to exist between external visual cues and the homeostatic regulation of food intake demonstrated by hypothalamic activation in response to visual food stimuli (Cornier et al., 2007). During this

communication, basic food-related visual cues were shown to instigate brain activity (Cornier et al., 2007). Participants were presented with three different types of stimuli; neutral nonfood objects, foods of high hedonic value, and foods of neutral hedonic value. Results showed that images of neutral hedonic value compared with neutral nonfood objects resulted in modest activation of the brain (Cornier et al 2007). When comparing the participant's responses after being exposed to high hedonic valued cues versus neutral nonfood objects, substantial differences in neuronal activation were seen (Cornier et al, 2007). In conclusion to this study of the ties between food cues and food intake, participants were found to have a strong response in brain activity to food-related visual cues. (Cornier et al, 2007). This supports the idea that communication exists between external visual cues and the homeostatic regulation of food intake (Cornier et al., 2007).

The findings of Cornier et al., (2007) illustrate the positive correlation between visual food cues and calorie intake. Mazar et al. (2008) confirmed this conclusion by demonstrating that the display or advertisement of a specific food was strongly associated with the purchase of that food. This suggests not only an importance in visual food cues initiating hunger, but potentially what type of food cue is used. In the impact of food advertisement and purchasing of food research,

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members of the research team visited a primary school and noted the types of food advertisement the students were exposed to. These advertisements were separated into two categories; healthy and high calorie snacks. The cafeteria owners were then asked to fill out a questionnaire describing food purchases by the students at the end of that same week (Mazar et al., 2008). There was a positive correlation found between food offered in the store and the food bought by the students. It was also found that advertising influences purchasing towards high calorie foods (Mazar et al., 2008). There were no significant results found supporting the purchase of low-calorie foods. This suggests that not only do students make food decisions based upon external cues but are more heavily influenced by unhealthy food cues.

Food cues do not need to be directly present to affect behavior. Exposure to food cues through television advertisement was also found to affect calorie intake in overweight children (Halford et al., 2007). These researchers found that obese children are more receptive to visual cues, which promotes the consumption of high calorie foods (Halford et al., 2007). In his design to investigate the relationship between food advertisement and food intake, a sample of children was shown food advertisements and then a cartoon directly after (Halford et al., 2007). Two weeks later, another sample of children was shown nonfood advertisements followed by the same cartoon (Halford et al., 2007). After the television viewing, the participants were each given five plates of different types of food and were told to eat as much or as little as they would like. The children were also allowed to request supplementary food in addition to what was provided (Halford et al., 2007). It was found that energy intake was notably higher after exposure to the food advertisements than the control group which was exposed to a nonfood advertisement (Halford et al., 2007). This demonstrates the significant role food cues play in influencing energy intake in an applicable setting.

Although Halford et al. (2007) found a relationship between visual cues and calorie intake, they only focused on children. Given that college-aged students have more life experience than children, they may not be as susceptible to food cues.

From the combined research of Cornier, Von et al. (2007) as well as Mazar et al (2008) and Halford et al (2007), it appears that external food cues and weight gain are correlated. What is unknown is whether this correlation exists in the college setting. Therefore, the current study evaluates the correlation between external food cues and weight gain among college students.

Based on Cornier et al. (2007) as well as Mazar et al (2008) and Halford et al (2007), it is predicted that exposure to high-calorie visual food cues will result in increased calorie intake and therefore more weight gain than college students exposed to low-calorie visual food cues.

Method

Participants

There were 90 participants in the present study (45 males and 45 females). All participants were enrolled at Robert Morris University in their first year of college. All participants lived in the campus dormitories.

Design

The independent variable for the study was food cues (healthy food cue, unhealthy food cue, and neutral food cue). One dependent variable was the amount of weight gain in the semester. The second dependent variable was concerned with the food choices (healthy or unhealthy) made during the semester.

Materials

The necessary materials per week included 30 flyers displaying healthy food cues, 30 flyers displaying non healthy food cues, and 30 neutral food cue flyers. The healthy food cue consisted of an advertisement to the school's salad bar. The non healthy food cue advertised the pasta bar at the university's cafeteria. The neutral food cue was a grocery cart advertising grocery shopping at the University's market.

The survey included two critical items. The first asked participants to rate their weight gain on a 9-point Likert scale ranging from -4 (weight loss) to +4 (weight gain). The second item asked participants to rate their food choices on a similar 9-point Likert scale ranging from -4 (unhealthy) to +4 (healthy). See the appendix for the complete survey.

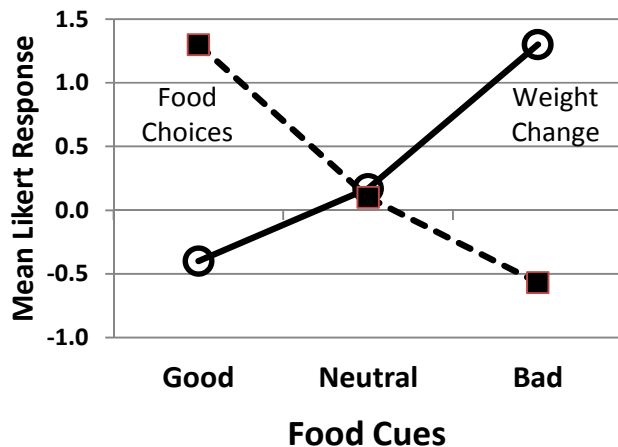
Procedure

The three dormitories involved in this experiment were chosen at random. All non apartment style living spaces were written separately on sheets of paper and three were drawn. The participants were unaware of the study. The food cues variable was manipulated by presenting a related visual cue weekly for a period of 7 weeks. The visual cues were placed on the participants' door. For each week in the seven-week period, every Sunday night each dorm was visited and within each living space visual cues were placed on the participants doors. If the external cue was still present from the previous week, additional cues were not added to the door. At the end of the 7 week period, all participants were presented with a questionnaire that included two Likert Scale items asking them to rate how their weight had been affected over the course of the semester as well as how healthy their food choices had been.

Results

A one-way analysis of variance (ANOVA) was performed on participants' average ratings to the weight-change question. The analysis revealed a significant main effect, $F(2, 87) = 6.32, p < .01$. Another one-way ANOVA was performed on average ratings to the food-choice question. This analysis also revealed a significant main effect, $F(2, 87) = 8.58, p < .01$. The outcomes are depicted in Figure one and show that food cues affected participants' responses as predicted.

Figure 1. Average Likert scores for all conditions for both survey items.



Discussion

External visual cues have an influence on self-reported eating behavior and food choice. Cornier et al. (2007) found that external food cues play an important role in the regulation of energy intake (Cornier et al., 2007). It could be that obese people are more susceptible to food cues. Mazar et al. (2008) examined not only the presence of food cues in affecting weight gain, but also the type of advertising influencing purchases towards high calorie foods.

In understanding the appropriate effect of external food cues, communities and schools may be able to better influence healthy eating habits throughout by choosing to increase the production of healthy food cues. In doing so, intake of high calorie foods should decline, which may lead to weight loss. This is vital because excess weight gain may lead to heart disease, diabetes, cancer, and stroke (Finkelstein, Brown, & Evans, 2008). If a community was able to reduce such problems, it would function at a much more efficient pace.

The findings also imply that in order to decrease the number of obese adults, the number of non-healthy food advertisements must be decreased drastically. Although the present study examined the effect of food cues on weight gain and food choice in the college setting, it would be beneficial to extend the study to reach an adult age group. In doing so, extraneous variables may be deducted, such as living in a college setting with an inadequate kitchen which would permit one to prepare home-cooked, healthier meals.

Until a more diverse age group is tested that integrates greater differences in cognitive development, it will not be possible to generalize the present findings beyond the college level.

References

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