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Research report

An experimental field study of weight salience and food choice ☆

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ABSTRACT

Laboratory research has found that individuals will consume more calories and make unhealthy food choices when in the presence of an overweight individual, sometimes even regardless of what that individual is eating. This study expanded these laboratory paradigms to the field to examine how weight salience influences eating in the real world. More specifically, we tested the threshold of the effect of weight salience of food choice to see if a more subtle weight cue (e.g., images) would be sufficient to affect food choice. Attendees ($N = 262$) at Obesity Week 2013, a weight-salient environment, viewed slideshows containing an image of an overweight individual, an image of a thin individual, or no image (text only), and then selected from complimentary snacks. Results of ordinal logistic regression analysis showed that participants who viewed the image of the overweight individual had higher odds of selecting the higher calorie snack compared to those who viewed the image of the thin individual (OR = 1.77, 95% CI = [1.04, 3.04]), or no image (OR = 2.42, 95% CI = [1.29, 4.54]). Perceiver BMI category did not moderate the influence of image on food choice, as these results occurred regardless of participant BMI. These findings suggest that in the context of societal weight salience, weight-related cues alone may promote unhealthy eating in the general public.

Introduction

Two-thirds of the United States population is now overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014), leading to the coining of the now popular term the "obesity epidemic." Not surprisingly, weight is therefore a salient societal dialogue – for example, over 100 million people in the United States are dieting (Marketdata Enterprises Inc, 2013) – but successfully maintained weight loss is elusive (Tomiyama, Ahlstrom, & Mann, 2013). Could such high societal concern surrounding weight have real-world consequences for eating behavior and food choices?

Several laboratory studies offer evidence of how weight salience may influence eating behaviors. One study, for example, found that diners consumed more calories when their "server" was overweight (McFerran, Dahl, Fitzsimons, & Morales, 2010b). Another laboratory study found evidence of a tendency to calibrate food selection and consumption based on the consumption of those around us, especially when in the presence of heavier individuals (McFerran, Dahl, Fitzsimons, & Morales, 2010a). A similar study found that the mere presence of an overweight fellow diner was sufficient to promote increased consumption and unhealthy food choices among study participants regardless of what the overweight diner actually consumed (Shimizu, Johnson, & Wansink, 2014). Finally, Campbell and Mohr (2011) conducted a series of studies suggesting lower thresholds for such effects, finding that images alone were sufficient to induce an effect.

Our investigation extends these prior laboratory findings to a real-world context. This is an important next step considering that individuals tend to consume fewer calories when they know they are being observed (Robinson, Kersbergen, Brunstrom, & Field, 2014), as is the case in artificial laboratory settings. To create similar weight salience as in laboratory paradigms, we chose the setting of Obesity Week 2013, a joint annual meeting of The Obesity Society and the American Society for Metabolic and Bariatric Surgery. At Obesity Week 2013, doctors, clinicians, researchers, and other obesity experts presented work on obesity research, treatment, and interventions.

In the present study, we examined whether people would make different food choices after viewing an image of an overweight individual versus a thin individual, or after viewing no weight cue at all. We hypothesized that participants would be most likely to choose more food when viewing an image of an overweight individual.

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Considering previous evidence that weight salience affects high Body Mass Index (BMI) individuals more than low BMI individuals (Major, Eliezer, & Rieck, 2012), we hypothesized that any observed effects would be strongest in overweight and obese participants.

Materials and methods

Stimuli

At The Obesity Society's main membership and information booth in the lobby of the conference center, we displayed a laptop computer running a looping slideshow. In this slideshow, a fictitious "tour guide" named Sarah Brown offered attendees "tips for making the most out of your conference experience." This served as a cover story so that participants would not know they were engaging in a study. There were three different tour guide conditions: *Control*, showing a textbox labeled, "Sarah Brown, Meeting Guide;" *Thin*, showing an image of a thin woman; and *Overweight*, showing an image of an overweight woman. To control for confounds from attractiveness and other non-weight related characteristics, we chose images of the same woman before and after a~150-pound weight loss. Prior independent ratings of these images from research assistants uninvolved in this study revealed that the images were rated as significantly different in body size ($F(1, 13) = 120.69$, $p < .001$) but not in facial expression ($F(1, 13) = 1.42$, $p = .25$).

We placed bowls with 1.69-ounce M&Ms (230 calories/bag) or eight-ounce apple slices (90 calories/bag) in clear bowls on either sides of the laptop. We chose M&Ms as they are very commonly used as a high-calorie, sweet option in eating and food selection studies (for examples, see McFerran et al., 2010b; Wansink, 2004). We chose apples as the low-calorie snack to match the sweetness, portion, and packaging of the M&Ms. A sign between the bowls instructed participants to take only one, but we did not intervene if participants took more than one snack.

Participants

Participants were Obesity Week 2013 attendees who approached the booth and viewed the slideshow for at least 3 seconds before choosing foods (or choosing no foods). We decided upon this interval to maximize the likelihood that participants did in fact see the image on the screen. Those who viewed the slideshow for less than 3 seconds or not at all were excluded from data collection. Individuals who noticed that their behavior was being observed or who were overheard by study staff verbally expressing suspicions that a study was taking place ($n = 4$) were excluded after data collection but prior to analyses.

Procedure

The research team's Institutional Review Board approved all procedures, and The Obesity Society granted permission and provided space for this study. As participants viewed the slideshow, a trained study staff member seated 12 feet away recorded each participant's food choice, BMI, gender, ethnicity, and age-range. A second member of the research team, seated in a waiting area approximately 30 feet away, changed the slideshow image condition every 30 minutes according to a previously-determined counterbalanced schedule and switched the position of the M&M and apple bowls every 90 minutes. This staff person also periodically refilled the food bowls so they were at the same level of fullness at all times. Data were collected between the hours of 0900 and 1800.

Measures

Food choice

Participants' food choices were coded as none, apples, M&Ms, or both. The calorie content of each choice was as follows: none = 0 kcal; apples = 90 kcal; M&Ms = 230 kcal; both = 320 kcal. No participant took more than one package of apples or M&Ms, but 22 participants did take one of each.

Estimated BMI

Trained study staff estimated participant BMI using the BMI-based Silhouette Matching Test (BMI-SMT; Peterson, Ellenberg, & Crossan, 2003), a reliable measure for estimating BMI. This scale consists of four body silhouettes corresponding to each of the four BMI categories (underweight <18.5, normal weight 18.5–24.9, overweight 25.0–29.9, obese 30+) for each gender, which allowed us to simultaneously code for gender. Because very few participants (4.6%) were categorized as obese, we collapsed the overweight and obese categories into one group for analyses.

Ethnicity

Ethnicity was coded as one of the following: White, Black, Asian, Latino/a, or Other.

Age

Age was estimated as one of the following age ranges: 20–29, 30–39, 40–49, 50–59, 60–69, 70+.

Analytic plan

To examine effects of condition, BMI, and the condition × BMI interaction on food choice, we used ordinal logistic regression models. Ordinal logistic regression analysis provides a single odds ratio for the association between a predictor and each combination of lower versus higher calorie food choice (none vs. apple or M&Ms or both, none or apple vs. M&Ms or both, etc.). The reference group was selecting no calories. In other words, the resulting odds ratio represented the likelihood that a participant would select a higher-calorie option over a lower-calorie option. Brant tests did not reveal evidence of violation of the proportional odds assumption (all p-values >.10), indicating that ordinal models were suitable. As snacking varies throughout the day (Cross, Babicz, & Cushman, 1994), and data were collected across mealtimes, we included time of day intervals as a covariate (morning, early afternoon, and late afternoon). Because the image was a young, White female, and age, ethnicity, and gender stereotyping were potential confounds (Burke, Heiland, & Nadler, 2010; Fallon & Rozin, 1985; Gordon, Castro, Sitnikov, & Holm-Denoma, 2010) that might influence image perceptions, we also tested whether these variables related significantly to the outcome. In the event that any did, we included them as covariates; the final covariates included in the model were time of day and gender. Model 1 included BMI, condition, and covariates. Model 2 added the condition × BMI interaction. We used Stata 12 to conduct all analyses.

Results

The final analysis sample included 262 participants (excluding the 4 who expressed suspicion). Food choice occurred at the following frequencies: 85 took nothing, 95 chose apples, 60 chose M&Ms, and 22 chose both (see Table 1).

Gender and time of day were significantly associated with food choice (see Table 1), and we therefore included these covariates in the ordinal logistic regression models (Table 2). Model 1 demonstrated a significant overall effect of condition ($\chi^2(2) = 8.11$, $p = .02$). There was no significant effect of participant BMI ($\chi^2(2) = 1.94$,