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Research report

Getting a bigger slice of the pie. Effects on eating and emotion in restrained and unrestrained eaters☆

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ABSTRACT

Manipulated perceptions of the portion size of food influence subsequent eating by restrained and unrestrained eaters. In the present study, all participants were served a same-sized slice of pizza. For one-third of participants, their slice appeared larger than the slice being served to another ostensible participant, another third perceived their slice as smaller, and the final third did not see a second slice. All participants then proceeded to "taste and rate" cookies in an *ad lib* eating opportunity. A significant interaction reflected the fact that when the pizza slice was perceived as large, restrained eaters tended to eat more cookies whereas unrestrained eaters tended to eat less cookies. Emotion data suggest that the differential responses of restrained and unrestrained eaters to the belief that they have overeaten relative to another eater influenced their subsequent dissimilar *ad lib* eating behavior.

We often eat one food followed by another (e.g., main course and then dessert). How much we eat of the later food probably depends to a large extent on our intake of the earlier food. In the laboratory, we refer to the earlier food as a "preload." The effects of food preloads on subsequent eating are complex: chronic dieters or restrained eaters generally respond quite differently than nondieters or unrestrained eaters do. Whereas unrestrained eaters typically compensate by eating less after a larger preload than after a smaller one, restrained eaters often "counter-regulate", eating more after a large preload than after a small preload or after no preload at all (e.g., Adams & Leary, 2007; Herman, Polivy, & Esses, 1987; Polivy, Heatherton, & Herman, 1988; Polivy, Herman, Hackett, & Kuleshnyk, 1986). Presumably, the larger preload is more likely to sabotage the restrained eater's diet for that day, undermining motivation for continued restraint and unleashing disinhibited eating (possibly potentiated by chronic perceived deprivation). If the preload is actually large and fattening, it is likely to produce disinhibited eating by restrained eaters (e.g., Herman et al., 1987; McCann, Perri, Nezu, & Lowe, 1992; Polivy et al., 1986, 1988), but disinhibition may be observed even when the restrained eater is merely led to believe that the preload is high in calories or otherwise forbidden (e.g., Polivy, 1976; Spencer & Fremouw, 1979) or when the restrained eater draws that implication from the nature of the food itself (Knight & Boland, 1989).

Previous studies have manipulated the perceived size of the preload (holding actual size or caloric content constant) by either telling participants that the preloads are high in calories (e.g., Polivy, 1976; Spencer & Fremouw, 1979) or by implication. For example, Knight and Boland (1989, Study 2), served iso-caloric preloads of milkshake or a cottage–cheese–fruit mixture. Restrained eaters displayed disinhibition only when served milkshake, because they regard milkshake as inherently more caloric than the salad-like cottage–cheese–fruit mixture. More recently, Pliner and Zec (2007) showed that thinking about a preload as a meal (rather than as a snack) makes people perceive the preload as higher in calories and affects eating accordingly.

The present study was designed to further extend the exploration of the effects of perceived preload/portion size on eating and, moreover, to do this in a more externally valid meal setting. In order to understand the source of these effects, we included measures of affective responses, as it has been shown that affect influences eating differently for restrained and unrestrained eaters (e.g., Polivy & Herman, 1999), and eating, especially eating what is seen as a large amount, affects emotions differently in restrained and unrestrained eaters (e.g., Polivy & Herman, 2005).

We hypothesized that even with the preload/meal held constant, restrained eaters who regard the portion as larger will subsequently eat more than will those who regard it as normal-sized or small, because the "large" portion is more likely to break their diets and lead to disinhibited eating. We also predicted that unrestrained eaters will eat less after a perceived large portion than after what they perceive to be a normal-sized meal, and less after a portion perceived as normal-sized than after one perceived as small. In the present study, all participants received an identical,

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standard light lunch meal, but some were led to perceive the portion they received as large and some were led to perceive the portion as small simply by means of social comparison (or more accurately, perceptual contrast). If someone gets a larger portion than yours, your own portion may appear to be "small," whereas if someone gets a portion that is smaller than yours, your own portion may appear to be "large."

Method

Participants

The participants were 106 female undergraduate students enrolled in an introductory psychology class at a large university. The participants were recruited via an experimental database, where they could sign up for a study entitled "Market Taste Test Study." Each experimental session lasted 1 h and the participants were compensated with one course credit for their participation. Participants who scored 15 or less on the restraint scale were classified as unrestrained eaters, whereas participants who scored above 15 were classified as restrained eaters.

Materials

Food—Extra-large uncut cheese pizza was ordered from a local pizza chain for each day of experimentation. The slices were reheated in a microwave oven before they were served to the participants. Any left-over pizza was stored in a freezer for use on another day.

Frozen cookie dough (from a manufacturer who supplies "fresh baked" cookies to local restaurants) was stored in a freezer and used to bake bite-sized cookies regularly throughout the week. Three different types of cookies were baked as needed: oatmeal raisin, chocolate chip, and double chocolate chip.

Questionnaires—Pre- and post-pizza rating scales were completed by all participants immediately after the manipulation and again after the pizza but before the cookie taste test. The pizza rating scales included a section from the PANAS (Watson, Clark, & Tellegen, 1988) that was designed to measure the participants' negative affect. Participants answered questions on a Likert scale from 1 for "very slightly or not at all" to 5 for "extremely" concerning various affects such as "guilty" and "angry." The rating scale also contained questions (using a 9-point Likert scale) assessing hunger and various aspects of the pizza that they were about to eat or had just eaten. These questions included a manipulation check that asked participants to rate the portion size (rating from 1 for "too small" to 5 for "just right" to 9 for "too big"). The questions were answered before and after eating the pizza (with wording changed appropriately). In addition, participants were asked at the end of the study to what extent they had noticed any difference in the size of the pizza slices ("how did your slice of pizza compare to the slice received by the other person in the study?" Response options were smaller, the same, and larger).

Restraint scale—The 10-item Herman and Polivy Revised Restraint Scale (Herman, Polivy, & Silver, 1979) was used to determine restraint status.

Procedure

Female participants were recruited for this study through a psychology experimental website advertisement that specified that the participants must have no food allergies, must not be lactose intolerant, and should refrain from eating for up to 3 h prior to their experimental session.

Each participant was informed that she would be given a light vegetarian cheese-pizza lunch in order to ensure that each participant had the same taste experience and same level of fullness before completing taste ratings for market research. She was told that she would be sampling various food products that were being proposed for the market by a large food company that targeted the university-student population. The participant was also informed that she would be completing some questionnaires to assess her mood and other variables, to ensure that these factors were not influencing her food ratings. Furthermore, the participant was told that she would be discussing her food ratings with another female participant in a brief discussion at the end of their session. She then signed the consent form.

Participants were randomly assigned to one of three pizza-slice conditions: "smaller slice," "larger slice," and "no information[1]." Regardless of which condition the participant was in, she always received a standard slice of pizza (1/6 of the pizza), but the size of the "other participant's" slice was varied. Each pizza was cut into six pieces consisting of four standard-sized slices (1/6 of the pizza), one larger slice (1/3 larger than a standard-sized slice), and one smaller slice (1/3 smaller than the standard slice). In order to ensure that each slice was consistently cut for all pizzas used in the study, the appropriate sized slices were drawn onto a piece of paper and cut out to be used as templates for all pizzas. Thus, in the "smaller" condition, the participant received a standard-sized slice of pizza, while the "other female participant" was supposedly receiving the slice 1/3 larger than the standard slice. Similarly, participants in the "larger" condition received the standard slice of pizza, while the "other female participant" appeared to be receiving the slice 1/3 smaller than the standard slice. In the "no information" control condition, participants were given a standard-sized slice of pizza, with no indication of the "other female participant's" slice.

When the experimenter presented the participant with the pizza slices, the pizza slices were placed on a tray with a glass of water next to each slice, and brought into the experimental room. Each participant in the "smaller" condition was presented with her standard-sized slice of pizza next to the 1/3 larger slice belonging to the "other female participant," which was identified as such as it was situated further away from her. Each participant in the "larger condition" saw her standard-sized slice along with the "other" female participant's smaller slice. In the "no information" control condition, the participant was presented only with her standard-sized slice, along with a glass of water. The experimenter then left the room, leaving the slices in the room and explaining that she had to retrieve a questionnaire for the participants. The experimenter left the room for exactly 1 min, allowing a sufficient amount of time for the participant to observe the slices and perceive the differences in their sizes. When the experimenter returned, the participant's slice and water were placed on the table in front of her and the pre-pizza rating scale was handed to the participant. She was asked to complete the questionnaire before eating her pizza slice. The experimenter then left the room with the "other participant's" slice.

The participant was given 7 min to complete the pre-eating questionnaire and to eat her entire pizza slice (supposedly to ensure equal fullness in all participants), after which time the experimenter returned to the experimental room and handed the participant another set of questionnaires (to maintain the cover story). These questionnaires included the post-pizza scales. The participant was instructed to ring a bell when she had completed the questionnaires. At that time, the experimenter returned with 3

[1] It was decided on the basis of pilot data that a no information condition wherein participants simply saw their own slice and not the other person's slice was preferable to a condition wherein participants saw 2 equal-sized slices. The pilot data indicated that even when the slices were cut as close to equal as possible, some participants saw them as different sized. When no second slice was presented, participants assumed that the other slice was the same size as theirs. Indeed, this was the case in the present study as well, as the results indicate.