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Rejecting Responsibility: Low Physical Involvement in Obtaining Food Promotes Unhealthy Eating

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LINDA HAGEN, ARADHNA KRISHNA, and BRENT McFERRAN\*

Five experiments show that less physical involvement in obtaining food leads to less healthy food choices. The authors find that when participants are given the choice of whether to consume snacks that they perceive as relatively unhealthy, they have a greater inclination to consume them when less (vs. more) physical involvement is required to help themselves to the food; this is not the case for snacks that they perceive as relatively healthy. Further, when participants are given the opportunity to choose their portion size, they select larger portions of unhealthy foods when less (vs. more) physical involvement is required to help themselves to the food; again, this is not the case for healthy foods. The authors suggest that this behavior occurs because being less physically involved in serving one's food allows participants to reject responsibility for unhealthy eating and thus to feel better about themselves after indulgent consumption. These findings add to the research on consumers' self-serving attributions and to the growing literature on factors that nudge consumers toward healthier eating decisions.

*Keywords:* food consumption, motivated reasoning, attribution, agency, serving

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## Rejecting Responsibility: Low Physical Involvement in Obtaining Food Promotes Unhealthy Eating

Eating away from home has become pervasive, extending to all categories of dining establishments, including fast-food outlets, cafeterias, and gourmet restaurants (Harris Interactive 2012), with two-thirds of Americans dining out at least every other day (Stewart, Blisard, and Jolliffe 2006). Dining out brings benefits, saving the consumer time and effort. However,

research indicates that eating away from home may be costly for people's health: consumers tend to eat much more unhealthily—that is, consume more calories—when they eat out versus at home (Gregory, Smith, and Wendt 2011). This is likely due at least in part to the generally higher fat content of restaurant food (Guthrie, Lin, and Frazão 2002). However, this finding raises the question of whether other variables that are relatively more common when eating away from home may also be involved. One such variable is a difference in consumer physical involvement in obtaining food.

When eating away from home, consumers typically have some responsibility for their eating decisions, as they make an active choice from a menu of options. However, their sense of responsibility may be increased or decreased through their physical involvement in the act of helping themselves to the food. The difference in physical involvement in out-of-home eating contexts could affect perceived responsibility in two ways. First, consumers could discharge responsibility over the assortment or range of portion sizes that are offered in the first place. Being less physically involved in helping oneself to food

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often means that a consumer's choice is limited to a pre-determined portion size (e.g., a default chosen by the restaurant or party host) or a limited range of sizes (e.g., only "small" or "large"), rather than being able to determine a portion for oneself from an infinite number of possible sizes (e.g., by scooping exactly as much or as little as one wants of each item). Such a constrained choice is also present when food comes prepackaged (e.g., snack packs of candy or nuts) or is otherwise preportioned (e.g., precut pastries or pizza) rather than being offered from larger containers or units (e.g., at bulk stations).

Second, consumers also discharge responsibility over the physical act of serving portions of food onto their plates. Being less physically involved in serving one's own food means carrying out less motor activity to help oneself to it. This is the case when another person plates the food (e.g., in restaurants, the kitchen plates a diner's food; at dinner parties, sometimes a host serves the guest's meal) instead of consumers serving themselves. Consumers are likewise less physically involved than they would typically be at home when foods come preportioned or prepackaged (e.g., in cafés, meals are boxed for the grab-and-go display; snacks come in single-serve packs). In such situations, discharging responsibility over physically handling the food may spill over to a reduced sense of responsibility for one's eating decision in general. Here, we ask the question whether less (vs. more) physical involvement in helping oneself to food facilitates the selection of relatively unhealthy foods or larger portions of unhealthy foods, all else being equal, by way of reducing people's sense of responsibility. We show evidence for affirmative answers to all aspects of this question, as discussed in the remainder of this article.

We suggest that consumers are motivated to make self-serving attributions of responsibility for their eating, that is, to reject responsibility for unhealthy eating, in order to feel good about themselves. However, the latitude for relegating responsibility to others is affected by how physically involved they are in helping themselves to the food they eat—that is, by the degree of physical agency. Critically, we predict that how healthy or unhealthy the food is interacts with physical involvement (less vs. more) to affect a consumer's ascription of responsibility. As an extension of prior work on self-serving attributions, we show that the healthiness of food determines the necessity, or motivation, for self-serving attributions, as only unhealthy eating motivates consumers to reattribute responsibility. As a novel contribution to research on motivated reasoning and consumer self-deception, we demonstrate that how physically involved consumers are in helping themselves to their food determines the opportunity for such attribution: being uninvolved in serving the food offers a chance to deny responsibility. Our findings also contribute to research on vice consumption and consumption guilt.

Our findings offer a suggestion for how marketers, policy makers, and consumers themselves may reduce the incidence and volume of unhealthy eating. While we know that the size of portions served in restaurants (Zlatevska, Dubelaar, and Holden 2014), the dimensions of glassware (Chandon and Ordabayeva 2009), and the body shapes of food servers (McFerran et al. 2010a) can all affect food consumption, the important distinction of being less (vs. more) physically involved in helping oneself to a given food has not been studied.

First, we draw on theories of agency and self-serving attributions to derive our prediction that consumers being less (vs. more) physically involved in helping themselves to food

increases both the incidence and the quantity of unhealthy eating by enabling the consumers to avoid responsibility. Then, five studies provide evidence that when less (vs. more) physical involvement is required to help oneself to food, people are more likely to consume unhealthy foods and to select larger portions of unhealthy foods. We show that this behavior occurs because being less physically involved in helping oneself to food allows people to deflect responsibility for unhealthy eating and protect their positive self-evaluation. Finally, we discuss some implications of our findings and suggestions for future research.

## THEORETICAL BACKGROUND

### Agency

People tend to assume intent and agency rather than randomness as the cause of events (Rosset 2008), and beliefs about whether an action was driven by agency strongly influence judgments about actors and outcomes. Abundant research demonstrates that when individuals have a sense of self-agency, or responsibility for their own actions, their emotional responses to a given event they are involved in are amplified, because they associate more strongly with the event's consequences (Landman 1987). For example, consumers evaluate self-selected (Brehm 1956) and self-assembled (Norton, Mochon, and Ariely 2012) products more positively than products they do not select or assemble.

At the same time, personal responsibility is also associated with negative emotions. For example, personal agency is a necessary condition for guilt (Smith and Ellsworth 1985). Accordingly, individuals who regard their active (vs. passive) behavior as the cause of negative consequences (e.g., opting into a vaccination that causes complications vs. forgoing it and falling ill) judge their decisions more negatively (Baron and Ritov 1994) and experience stronger immediate regret (Gilovich and Medvec 1995; Kahneman and Tversky 1982). In summary, research suggests that a sense of personal agency and responsibility for actions and outcomes strongly affects people's thoughts and feelings.

### Self-Serving Attributions of Agency

People's thoughts are also heavily shaped by "what one would like to be" (Heider 1958, p. 121); consequently, reasoning and inferences are distorted as a function of individual goals. A major instantiation of motivated reasoning is self-serving attribution, which occurs to preserve one's self-concept—an important goal for all humans (Campbell and Sedikides 1999; Greenberg, Pyszczynski, and Solomon 1982; for a review, see Shepperd, Malone, and Sweeny 2008). As such, attributions of responsibility are biased to position the individual in a favorable light to make him or her feel good (or avoid feeling bad). For instance, a large body of research demonstrates that individuals take credit for success but overwhelmingly deny accountability for failures (for a review, see Fletcher and Ward 1988). Faced with favorable outcomes, people assume responsibility even for purely chance-based events (Langer and Roth 1975; Wohl and Enzle 2002). Conversely, faced with unfavorable outcomes, they reassign responsibility whenever their own agency is ambiguous (Bandura 1990; Hinrichs et al. 2012).

Overall, the motivation to explain away negative outcomes tends to be stronger than that to claim positive outcomes

(Bohner et al. 1988). Reactions to negative outcomes are typically more intense than reactions to positive ones: negative information weighs more heavily in impression formation (Anderson 1965), negative events affect people longer (Sheldon, Ryan, and Reis 1996), and negative emotions receive more attention and inspire more regulatory efforts (Baumeister, Heatherton, and Tice 1994; for a review, see Baumeister et al. 2001).

Furthermore, motivated reasoning, such as self-serving attribution, occurs only under motivational pressures (Kunda 1987). One domain in which motivational pressures are high is eating (Chernev 2011). Food and eating behaviors are focal in today's society. A majority of Americans aim to lose weight (International Food Information Council Foundation 2014) and try to restrict their consumption of unhealthy foods (Vohs and Heatherton 2000; for a review, see Bublitz, Peracchio, and Block 2010), and many view diet control as a desirable character quality (Chaiken and Pliner 1987; Stein and Nemeroff 1995). Against this backdrop, it is not surprising that eating is closely linked with self-evaluative feelings; many people feel guilty about unhealthy consumption (Ramanathan and Williams 2007). As in other domains of vice and emotion-laden consumption, consumers may employ strategies to make themselves feel better about their consumption choices (Khan and Dhar 2006; Mukhopadhyay and Johar 2009; Okada 2005). As detailed in the previous paragraph, the tendency to make self-serving attributions tends to be stronger for negative than for positive outcomes. Thus, self-protecting attributions (e.g., for unhealthy consumption) may be more powerful than self-enhancing attributions (e.g., for healthy consumption). In other words, to protect their positive self-evaluation, consumers may seek to reject responsibility for unhealthy eating or to claim responsibility for healthy eating, but the latter effect may be weaker.

#### *Physical Involvement in Helping Oneself to Food and Self-Serving Attributions of Agency*

Research suggests that consumers cannot make themselves believe *anything* they want. People attribute responsibility in self-serving ways, but only if they can muster some credible evidence to support those claims (Kunda 1990; Schlenker, Weigold, and Hallam 1990; Weary et al. 1982). We suggest that physical involvement in procuring food functions as a potential driver of motivated reasoning. Specifically, we propose that more physical involvement presents "irrefutable" evidence of one's agency, forestalling alternative ascriptions of responsibility. In contrast, less physical involvement allows the consumer leeway for self-serving attributions and may even facilitate them.

Physical involvement can be defined as active participation in a process through bodily activity. There are numerous ways in which consumers can be less (vs. more) physically involved in helping themselves to food; we examine several. For instance, reaching for a snack pack of candy requires less physical involvement than actively scooping candy into a personal bowl; taking a prefilled snack container from a shelf requires less physical involvement than taking an empty container and filling it oneself; having a server serve food onto one's plate and "saying 'when'" requires less physical involvement than serving the same amount of food to oneself. Each of these first alternatives requires less physical involvement by the consumer than would be typical at home, where consumers frequently serve themselves by scooping their own portion of food onto their plate.

Consumer research has found that, all else being equal, physically interacting with an object influences people's perceived relationship with the object. For example, merely touching a product, such as a mug or a pencil, increases consumers' sense of ownership (Brasel and Gips 2014; Peck, Barger, and Webb 2013; Peck and Shu 2009). Similarly, the more physical activity an actor exerts to acquire an object, the more ownership is credited to him or her. This effect is driven by greater ascribed responsibility for the possession (Palamar, Le, and Friedman 2012). Indeed, greater effort in any activity enhances an individual's sense of self-agency (Demantet et al. 2013).

We suggest that being more or less physically involved in serving food strongly affects consumers' capacity to make self-serving attributions of responsibility. The diner who seizes a serving bowl, takes hold of a serving spoon, and scoops a helping of food onto a plate self-incriminates more in helping him- or herself to the food than one who is merely handed a full plate by a server or who takes a prepackaged portion of a meal from a display shelf. Actively scooping, ladling, pouring, or otherwise serving one's own food may enforce attributions of responsibility to oneself, whereas being served by another person or merely picking up a prepackaged portion of food may open the opportunity for making the most preferable attribution of responsibility, to self or other, depending on how virtuous the food itself seems.

This is not to suggest that *choosing* one's food has no impact; we do not test the relative impact of choosing versus being physically involved in helping oneself to food on a consumer's ability to make favorable attributions of responsibility. Rather, we propose that in the typical circumstance in which consumers choose their own food, being more or less physically involved in helping themselves to the food will obstruct or enhance, respectively, their ability to reject responsibility for unhealthy eating. Given the importance of the sense of agency, and the influence that physical activity appears to have on it, we predict that more actively exercising one's choice (i.e., actively serving one's own food) will affect a consumer's attribution of responsibility more strongly than merely indicating the choice by vocalizing it to a server or taking a prepared plate (i.e., passively taking food). Further, the finding that verbally stating one's choice favors impulsive decisions (Klesse, Levav, and Goukens 2015) suggests that verbal choice is not necessarily associated with greater deliberation and the responsibility it entails.

We expect that such attributions of personal responsibility drive actual consumption behavior. Specifically, when relieved of responsibility, consumers may find it more acceptable to indulge in unhealthy foods and may make their eating decisions accordingly. We propose the following:

H<sub>1</sub>: People are more likely to make unhealthy eating decisions (e.g., choosing to eat foods perceived as unhealthy vs. not; choosing larger portions of food perceived as unhealthy<sup>1</sup>) when less (vs. more) physical involvement is required to help oneself to the food.

<sup>1</sup>Note that evaluations of healthiness are subjective and relative by nature. Much work has shown that it is the *perception* that a food is (un)healthy that drives behavior (e.g., Raghunathan, Naylor, and Hoyer 2006) and, moreover, that food-related information is often interpreted in self-serving ways (Chernev 2011). Thus, this article focuses on consumers' reactions to foods they *perceive* as healthy or unhealthy. For ease of reading, throughout the manuscript we use "healthy" and "unhealthy" to mean "perceived to be healthy" and "perceived to be unhealthy" as established by pretests of the stimuli.

To explain these unhealthy food choices, we propose an attributional account, in which the level of physical involvement affects attribution of responsibility for food consumption, in turn driving how consumers feel about themselves. As detailed earlier, people's sense of responsibility, and their self-appraisal after food consumption, should be a function of two factors: how healthy the food is (determining the necessity for deflecting responsibility) and how physically involved one is in helping oneself to the food (determining the opportunity for deflecting responsibility). We hypothesize that when consumers are less physically involved, they can accept or reject responsibility depending on what suits them better. When they are more physically involved, however, the margin for re-assigning responsibility and alleviating negative feelings is much smaller. This motivated reasoning should drive consumers' feelings about their food decisions, so that their feelings about themselves are influenced interactively by the food's healthiness and the physical involvement required to help themselves to it. Specifically:

H<sub>2</sub>: Less (vs. more) physical involvement in helping oneself to food allows people greater latitude to reject responsibility for eating (the same) foods perceived as unhealthy, and thus to feel better about themselves (e.g., more positive, less guilty) for their food consumption.

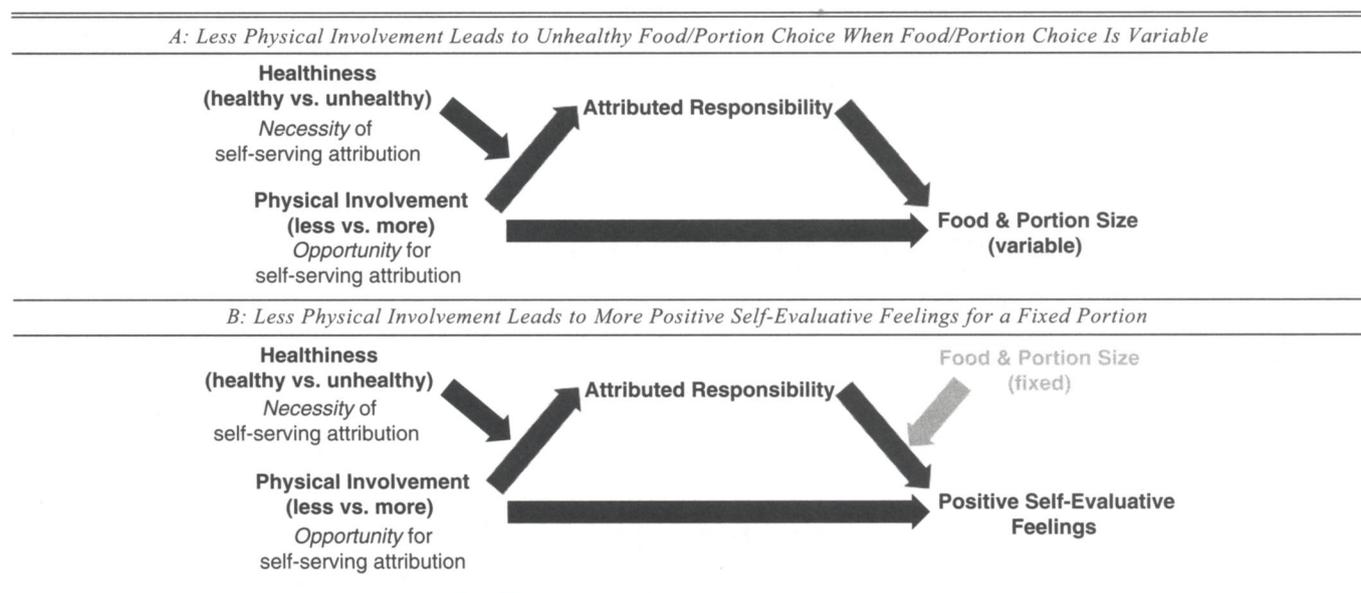
H<sub>3</sub>: Less (vs. more) physical involvement in helping oneself to food has stronger effects on eating decisions when the food is perceived as unhealthy rather than healthy, because people are less likely to feel good about themselves (e.g., less positive, more guilty) after eating foods perceived as unhealthy.

H<sub>1</sub>–H<sub>3</sub> suggest a moderated mediation model (Figure 1). The model includes two subfigures (as in Valsesia, Nunes, and Ordanini 2016) for two different types of eating situation: when consumers choose their portion size (Panel A) and when portion size is held constant (Panel B). The two figures are

separated because we examine each process element in a separate study before testing the full model. The reason for this is as follows. For any particular portion size (i.e., people receive and consume a fixed portion of food), the level of physical involvement in helping oneself to the food and the healthiness of the food jointly determine people's sense of responsibility, which in turn affects their self-evaluative feelings postconsumption, given that portion size. In other words, the lowered sense of responsibility ameliorates people's guilt from eating unhealthy food and thus elevates their positive self-evaluative feelings postconsumption (Panel B). However, when people can choose their portion size, feeling less (more) responsible for their selections when they are less (vs. more) physically involved in helping themselves to their food leads them to choose a larger (smaller) portion size of unhealthy food (Panel A). This occurs because they can "get away with" choosing larger portions without compromising their positive self-evaluative feelings. Thus, when people choose portion sizes, their self-evaluative feelings may be no different in the conditions where they are less versus more physically involved in helping themselves to their food. This model (combining Panels A and B) can be tested by statistically controlling for portion size choice.

This reasoning also implies unique mediation patterns for each panel. When consumers choose portion sizes, being less (vs. more) physically involved in helping themselves to unhealthy food will result in lower perceived responsibility, and responsibility will mediate the effect of physical involvement required on portion size (Panel A). When portion size is fixed, being less (vs. more) physically involved in helping oneself to unhealthy food will result in lower perceived responsibility and higher self-evaluative feelings, and perceived responsibility will mediate the effect of physical involvement required on self-evaluative feelings (Panel B). Combining these steps suggests that when consumers choose their portion size, they

Figure 1  
CONCEPTUAL MODELS



will do so in a way that maintains self-evaluative feelings (i.e., smaller portions of unhealthy food when more physical involvement is required), and, thus, responsibility will mediate the effect of physical involvement in helping oneself to food on self-evaluative feelings, when we control for portion size chosen.

In the following, we first demonstrate the basic phenomenon that requiring less (vs. more) physical involvement to help oneself to food increases consumers' likelihood of choosing unhealthy foods in a natural setting (Study 1, using pre-portioned food) and also leads to choice of larger portions of unhealthy foods (Study 2, using prepackaged food). Then we show that being less (vs. more) physically involved enables rejection of responsibility, which leads to more positive self-evaluative feelings when eating a given portion of unhealthy food (Study 3, using an in-person server). Consolidating our previous findings, we provide evidence that requiring less (vs. more) physical involvement in serving unhealthy food leads consumers to choose larger portions because feeling less responsible permits them to do so without causing them to feel worse (Study 4, using an in-person server). Finally, we provide evidence that being less (vs. more) physically involved in serving food leads people to consume greater amounts of unhealthy food when servers serve industry-standard sizes (Study 5, using an in-person server).

The Web Appendix details four additional experiments that we conducted during the review process of this article but subsequently dropped. For brevity, we do not report the results of (nonsignificant) demographics or nonfocal measures on which data were collected, such as questions that were asked to maintain a cover story (e.g., "How well did you like the consistency of the [food]?" for the taste test cover story in Study 5).

#### *STUDY 1: PROPENSITY TO CHOOSE (VS. FORGO) HEALTHY AND UNHEALTHY FOOD AS A FUNCTION OF PHYSICAL INVOLVEMENT REQUIRED*

In a field study, we first examine the basic idea that people may be more inclined to consume unhealthy food when less (vs. more) physical involvement is required to help themselves to the food ( $H_1$ ). We also examine whether this effect is attenuated for healthy food ( $H_3$ ).

#### *Method and Procedure*

The setting for this study was a small lobby in the business school of a large public university in the Midwest, where students typically wait for experimental sessions. The study ran over the course of two days, during which eight groups of 21–25 business undergraduates ( $N = 189$ , 46% female) waited in the lobby before entering the laboratory for an unrelated management study. This setting ensured that each condition included unique individuals.

We installed an innocuous small table with a letter-sized poster reading "Mmh, Fall Snack Bar—Have yourself a little snack." On this table, we placed a fall-themed snack that was either healthy (mixed dried fruits) or unhealthy (Reese's Pieces). Helping oneself to the available snack required either more physical involvement (scooping the snack into a sampling cup) or less physical involvement (merely picking up a prefilled sampling cup), making this a 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more)

between-subjects design. Each of the four conditions was run once earlier and once later in the day.

Note that the snacks were selected on the basis of a pretest in which 34 students from the same university had rated various snacks for their healthiness and liking on a 1–7 scale. Results indicated that students viewed mixed dried fruits as healthier ( $M = 5.62$ ,  $SD = 1.39$ ) than Reese's Pieces ( $M = 1.44$ ,  $SD = .61$ ;  $t(33) = 16.85$ ,  $p < .01$ ) but liked dried fruits ( $M = 4.53$ ,  $SD = 1.88$ ) just as well as Reese's Pieces ( $M = 4.85$ ,  $SD = 1.76$ ;  $t(33) = -.68$ ,  $p > .5$ ). Further, the Reese's rating was significantly below the midpoint of the healthiness scale ( $t(33) = -19.60$ ,  $p < .01$ ), whereas the dried fruit rating was significantly above it ( $t(33) = 9.17$ ,  $p < .01$ ).

In conditions that required less physical involvement, thirty 4 oz. sampling cups were set on the table, each filled with 45 grams of the respective snack, and participants just had to take a filled sampling cup. In conditions that required more physical involvement, approximately 1.7 kilograms of the snack were set out in a large bowl with a serving spoon, several stacks of ten 4 oz. sampling cups were placed next to it, and the participants had to scoop the snack into a sampling cup. Importantly, the prefilled cups were only half full, so people in the more-physical-involvement conditions could serve more (or less) into their cups than the amount in the prefilled cups available in the less-physical-involvement conditions. That is, upward and downward deviations were equally possible, albeit with a somewhat restricted range.

Students entered the waiting room at their leisure, typically five to ten minutes before the scheduled start time. They remained uninstructed and unobserved until the experimenter who conducted the management study opened the door to the laboratory room. While waiting, the students had the opportunity to take a cup of the snack food. The critical dependent measure was the total number of cups taken across all students in a given waiting period. Note that we did not observe any individual's specific choice, but we observed the total number taken in each wait period and the number of people in the waiting room.

#### *Results and Discussion*

A chi-square test indicated a significant relationship between condition and choice;  $\chi^2(3, N = 189) = 22.83$ ,  $p < .01$ . For the unhealthy Reese's, 0% (0 out of 46) of the waiting students took a cup when they had to scoop the snack from the bowl themselves, but 31.9% (15 out of 47) took one when the snack was already filled into cups. Thus, as predicted, people were significantly more likely to take the unhealthy snack when less versus more physical involvement was required to get the snack;  $\chi^2(1, N = 93) = 17.51$ ,  $p < .01$ . For the healthy dried fruit, however, 6.4% (3 out of 47) took the snack when they had to scoop it themselves, and 16.3% (8 out of 48) took a cup when the snack was already filled into cups. This difference was not significant; people were similarly likely to have the healthy snack regardless of how much physical involvement was required;  $\chi^2(1, N = 96) = 2.34$ ,  $p > .12$ . Time of day did not affect this interaction pattern.

These results support the hypothesis that requiring less physical involvement to help oneself to unhealthy food encourages people to take it, versus when more physical involvement is required. The fact that this effect operated selectively on unhealthy food suggests that it did not occur because the lower physical involvement might take less

effort. Scooping the snack into a sampling cup involved equal effort in the healthy and unhealthy food conditions, but it only shifted people's propensity to have the unhealthy snack.

These results suggest that how much physical involvement is required to help oneself to food (less vs. more) may have quite a powerful effect. On the one hand, only a minority of people opted to have any snack. On the other hand, a waiting room is not a meal context; people did not enter the situation expecting to eat anything. Thus, the measurable impact in this type of situation is notable and important.

Study 1 provides initial evidence that requiring lower physical involvement in helping oneself to a given food may drive consumers toward unhealthy choices. While our design ensures that the effect does not in some way require an experimenter's social presence, one limitation of this naturalistic setting is the use of aggregate data. Further, this study examined only the choice between taking food and forgoing it as the focal outcome, but portion size may be more crucial in contributing to the obesity epidemic than specific food choice (Chandon and Wansink 2012). We now turn to a more controlled laboratory experiment in which we collect responses at the individual level and measure portion choice.

#### *STUDY 2: ORDINAL PORTION SIZE DECISIONS FOR HEALTHY AND UNHEALTHY FOOD AS A FUNCTION OF PHYSICAL INVOLVEMENT REQUIRED*

Study 1 demonstrated that requiring less (vs. more) physical involvement in helping oneself to food increases people's likelihood of partaking of an unhealthy food ( $H_1$ ,  $H_3$ ). Study 2 tests whether requiring less (vs. more) physical involvement in helping oneself to food leads consumers to select larger portions ( $H_1$ ) and whether this effect is reduced for healthy food ( $H_3$ ). Furthermore, participants in all conditions choose from the same set of discrete portion sizes.

#### *Method and Procedure*

Seventy-five undergraduates at a large public university in the Midwest (40% female) participated in the study in exchange for partial course credit. The average age in the sample was 20.77 years, with ages ranging from 19 to 47 years.

Participants were randomly assigned to a 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) between-subjects design. Participants first imagined a situation in which they were about to buy a snack perceived as healthy or unhealthy from a snack bar with a specific serving setup: either pre-filled containers or a bulk station where people serve themselves, the former of which requires less physical involvement than the latter. Both types are common options on campus. The snacks, almonds and M&Ms, were selected on the basis of a pretest in which 35 student volunteers had rated various snacks for their healthiness and liking on a 1–7 scale. They viewed almonds as healthier ( $M = 6.29$ ,  $SD = .99$ ) than M&Ms ( $M = 1.43$ ,  $SD = .56$ ;  $t(34) = 24.11$ ,  $p < .01$ ) but liked almonds ( $M = 4.34$ ,  $SD = 1.73$ ) just as well as M&Ms ( $M = 4.97$ ,  $SD = 1.89$ ;  $t(34) = -1.34$ ,  $p > .15$ ). Further, the M&Ms rating was significantly below the midpoint of the healthiness scale ( $t(34) = -22.00$ ,  $p < .01$ ), while the almonds rating was significantly above it ( $t(34) = 16.69$ ,  $p < .01$ ). Participants read:

Imagine you are getting a snack at a snack bar (e.g., in a cafeteria). You are really looking forward to a snack right now and you decide to go for almonds [M&Ms]. As this is the type of place where you serve yourself the snack into a container [the snack comes filled into containers] of a specified size (paid by weight), you will need to select which one of the available serving sizes you would like to take [get].

Next, participants chose a portion size from seven ordinal response options ranging from 4 oz. to 16 oz. (increasing in 2 oz. increments) and a no-choice option, 0 = "none at all" (adapted from McFerran et al. 2010b). To ensure that students across conditions understood these size options in the same manner, we informed them:

These are the available sizes of snack cups for the almonds [M&Ms].

For each size, the chart tells you the exact amount of almonds [M&Ms] that you will get if you select it. That is, you will have no less and no more almonds [M&Ms] than the amount specified! Please select the serving size that you would like to serve yourself of the [get of the pre-filled] almonds [M&Ms]:

Finally, participants reported demographics, food allergies, and dietary restrictions.

#### *Results and Discussion*

We conducted a 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) analysis of variance (ANOVA) on our dependent variable, portion size choice. Seven participants indicated restrictions relevant to the food in their condition (e.g., nut allergy in the almond condition, lactose intolerance in the M&M condition) and were excluded from the data set, leaving 68 data points for the analysis.

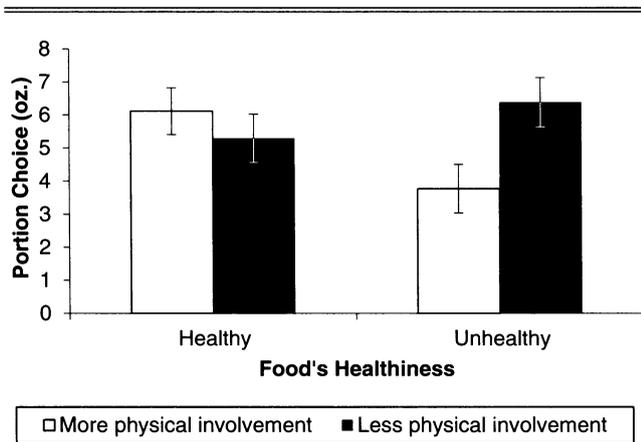
Neither the main effect for physical involvement ( $F(1, 64) = 1.69$ ,  $p > .15$ ) nor that for snack healthiness ( $F(1, 64) = .84$ ,  $p > .3$ ) were significant. However, the predicted interaction between healthiness and physical involvement was significant ( $F(1, 64) = 6.18$ ,  $p < .05$ ).

Following up on the interaction, planned contrasts showed that when people thought about getting healthy almonds, they selected similar portions whether they had to serve themselves ( $M = 6.11$  oz.,  $SD = 2.87$ ) or the snack was already served for them ( $M = 5.29$  oz.,  $SD = 2.22$ ;  $F(1, 64) = .72$ ;  $p > .4$ ). By contrast, when people thought about having unhealthy M&Ms, they selected significantly smaller portions when they had to serve themselves ( $M = 3.77$  oz.,  $SD = 2.64$ ) than when the snack was already served for them ( $M = 6.38$  oz.,  $SD = 3.52$ ;  $F(1, 64) = 6.96$ ,  $p = .01$ ; see Figure 2). This result supports  $H_1$  and  $H_3$ .

These results align with and complement those from Study 1. Less physical involvement in helping oneself to a snack nudged people toward unhealthy choices by encouraging them to select larger portions of an unhealthy snack. The detailed description across conditions about portion size in ounces ensured unambiguous expectations of the exact amount of food associated with every size option. Again, the effect emerged selectively for the unhealthy snack; thus, the larger portion choice for participants with low physical involvement is not attributable to lower required effort or fear of being served too little.

Figure 2

STUDY 2: PORTION CHOICE AS A FUNCTION OF BOTH PHYSICAL INVOLVEMENT REQUIRED TO HELP ONESELF TO THE FOOD AND FOOD'S HEALTHINESS



Notes: For the healthy almonds, physical involvement had no impact on portion choice, but for the unhealthy M&Ms, less (vs. more) physical involvement led people to choose larger portions.

The finding that less physical involvement in helping oneself to a snack food encouraged people to choose larger portions of candy (but not nuts) is suggestive of the idea that being less physically involved in helping oneself to food may attenuate guilt for unhealthy eating, since feeling guilty is a common response to eating unhealthy foods and is one factor that restrains consumers from overeating (Vohs and Heatherton 2000). In the next two studies, we test the hypothesized process: rejection of responsibility to maintain positive self-evaluative feelings. In Study 3, we use fixed portion sizes to examine how responsibility and self-evaluative feelings vary by physical involvement in helping oneself to food (less vs. more) and by the food's healthiness. In Study 4, we allow people to make their own portion decision, to examine how the choices observed in Study 2 will eventually influence their eating-related self-evaluative feelings.

**STUDY 3: SENSE OF RESPONSIBILITY AS AN UNDERLYING PROCESS USING FIXED PORTIONS**

Study 3 investigates the proposed process and tests our hypotheses that people feel more positive about themselves when they are less (vs. more) physically involved in helping themselves to unhealthy food and that this is because they attribute to themselves less responsibility for their consumption (H<sub>2</sub>). In other words, we test a moderated mediation model in which less (vs. more) physical involvement leads people to reject responsibility for unhealthy (but not healthy) eating, which in turn allows them to feel more positive about themselves (see Figure 1, Panel B). Unlike the first two studies, in which we measured people's choice of consuming versus not consuming (Study 1) or choice of portion size (Study 2), here we use a fixed, equal portion of food in both conditions, to isolate the effect on self-evaluative feelings. We use the context of being served by a friend (vs. by oneself) as our operationalization of less (vs. more) physical involvement.

**Method and Procedure**

One hundred and sixty U.S.-based participants were recruited through Amazon's Mechanical Turk platform (31.9% female) for nominal payment. The average age in the sample was 28.03 years, with ages ranging from 18 to 74 years. Participants completed the study on their personal computer and were randomly assigned to a 2 (healthiness: healthy vs. unhealthy) × 2 (physical involvement: less vs. more) between-subjects design. First, they were instructed to imagine that friends had invited them for a meal cooked from scratch and that they were ready to eat. Next, participants in the more [less] physical involvement conditions read:

Once you have sat down at the dinner table, you serve yourself [your friend serves you] the food onto your plate. Imagine that you fill [your friend fills] your plate with a portion of the food that they cooked. After you have helped yourself [your friend has helped you] to the food, you start eating from your plate. This is what you served yourself [what your friend served you]:

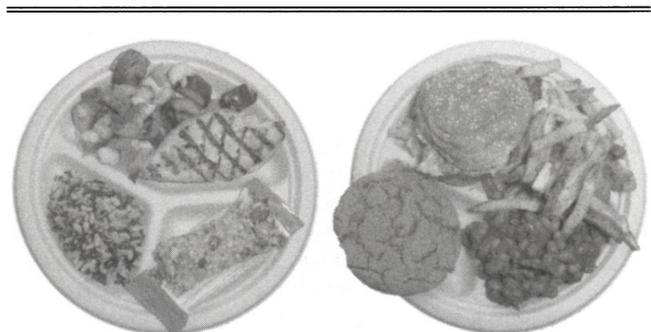
Participants were then shown a photograph of either a plate of healthy foods (grilled chicken, vegetables, wild rice, and a granola bar) or a plate of unhealthy foods (cheeseburger, French fries, baked beans, and a cookie). Portion size was held constant whether one served the food oneself or was served (see Figure 3). To effectively hold portion size constant, we chose a hypothetical study for two reasons. First, it is unrealistic (and ethically problematic) to force people to consume a sizable portion of food. Second, forcing a portion size on participants without any choice in the matter risks influencing their sense of control in additional ways, but having them imagine choosing and eating any particular portion avoids these issues.

**Measures**

**Healthiness.** Subsequently, participants rated on a 0–100 scale how healthy, nutritious, and wholesome they thought the food was, yielding a "healthiness index" ( $\alpha = .95$ ). They also estimated how many calories this meal had.

**Responsibility.** Next, respondents rated on a 0–100 scale how much responsibility they felt for their consumption.

Figure 3  
FOOD IMAGES USED IN STUDY 3



Notes: Plates of healthy food (chicken, vegetables, wild rice) and unhealthy food (cheeseburger, fries, cookie).

**Positive self-evaluative feelings.** Respondents then rated on a 0–100 scale how good as well as how justified, guilty, and shameful they would feel about themselves after eating this meal, which yielded a composite index for “positive self-evaluative feelings” ( $\alpha = .91$ ).

Finally, as an attention check, participants were asked to recall who had served the food in the scenario and what kind of food it had been. They then reported demographic information.

### Results

We conducted 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) ANOVAs on healthiness index, calorie estimate, positive self-evaluative feelings index, and responsibility.

**Manipulation checks.** For the healthiness index, the analyses yielded the predicted main effect for healthiness of the food ( $F(1, 156) = 779.57, p < .01$ ). As anticipated, the food was perceived as significantly healthier in the healthy condition ( $M = 85.61, SD = 10.02$ ) than in the unhealthy condition ( $M = 28.45, SD = 15.41$ ). Neither the main effect of physical involvement ( $F(1, 156) = .26, p > .6$ ) nor the interaction between healthiness and physical involvement ( $F(1, 156) = .63, p > .4$ ) were significant. There was a similar significant main effect for healthiness on calorie estimation ( $F(1, 154) = 78.96, p < .01$ ), such that people expected more calories for the unhealthy meal ( $M = 1,115.12, SD = 417.23$ ) than the healthy meal ( $M = 627.35, SD = 286.64$ ). Moreover, the cheeseburger rating was significantly below the midpoint of the healthiness scale ( $t(76) = -12.27, p < .01$ ), while the grilled chicken rating was significantly above it ( $t(82) = 32.39, p < .01$ ). Thus, the healthiness manipulation was successful.

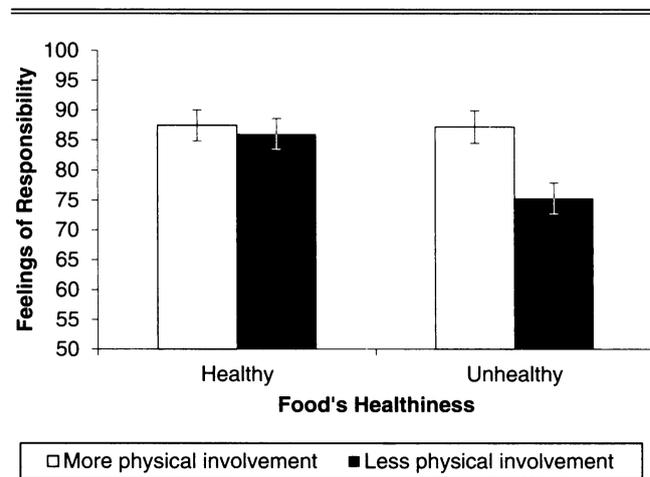
**Responsibility.** For responsibility, the analysis revealed a significant main effect for physical involvement ( $F(1, 156) = 6.45, p < .05$ ), such that people who imagined serving themselves assumed greater responsibility ( $M = 87.32, SD = 14.77$ ) than those who imagined being served ( $M = 80.80, SD = 18.62$ ). There was also a main effect of healthiness ( $F(1, 156) = 4.39, p < .05$ ), such that people assumed greater responsibility for eating healthy chicken ( $M = 86.72, SD = 14.70$ ) than unhealthy cheeseburgers ( $M = 81.02, SD = 19.03$ ). More important, these two main effects were qualified by a significant interaction ( $F(1, 156) = 4.07, p < .05$ ).

Following up on this interaction, planned contrast tests showed that for healthy chicken, those who imagined being served by someone else assumed virtually as much responsibility ( $M = 86.02, SD = 12.73$ ) as those who imagined serving themselves ( $M = 87.44, SD = 16.62; F(1, 156) = .15, p > .6$ ). Conversely, for unhealthy cheeseburgers, those who imagined being served by another person accepted much less responsibility ( $M = 75.33, SD = 22.12$ ) than those who imagined serving themselves ( $M = 87.19, SD = 12.64; F(1, 156) = 9.96, p < .01$ ; see Figure 4), signaling a self-serving attribution. These results are consistent with  $H_2$  and  $H_3$ .

**Positive self-evaluative feelings.** For positive self-evaluative feelings, the analysis yielded a main effect for healthiness of the food ( $F(1, 155) = 176.36, p < .01$ ), such that those who imagined eating healthy chicken felt better about themselves ( $M = 86.28, SD = 17.77$ ) than those who imagined eating unhealthy burgers ( $M = 48.99, SD = 17.73$ ). This effect was qualified by a significant interaction between healthiness and physical involvement ( $F(1, 155) = 3.88, p = .05$ ). The main effect for physical involvement was not significant ( $p > .2$ ).

Figure 4

STUDY 3: PERCEIVED RESPONSIBILITY AFTER EATING AS A FUNCTION OF BOTH PHYSICAL INVOLVEMENT IN HELPING ONESELF TO THE FOOD AND FOOD'S HEALTHINESS



Notes: For the healthy chicken, physical involvement had no impact on feelings of responsibility, but for the unhealthy cheeseburger, less (vs. more) physical involvement led people to accept less responsibility.

Following up on the significant interaction, planned contrasts showed that for healthy chicken, people expressed similarly high positive self-evaluative feelings regardless of whether they imagined serving themselves ( $M = 87.36, SD = 17.86$ ) or being served by someone else ( $M = 85.20, SD = 17.82; F(1, 155) = .30, p > .5$ ). In contrast, for unhealthy cheeseburgers, they had more positive (or, rather, less negative) self-evaluative feelings when they imagined being served by someone else ( $M = 53.51, SD = 17.71$ ) versus serving themselves ( $M = 44.47, SD = 17.76; F(1, 155) = 4.97, p < .05$ ; see Figure 5). These results support  $H_2$  and  $H_3$ .

**Test for mediation.** We tested a moderated mediation model in which feelings of responsibility for one's consumption mediate the effects of physical involvement in helping oneself to the food (less vs. more) on positive self-evaluative feelings, and healthiness moderates the effect of physical involvement on feelings of responsibility (Figure 1, Panel B). Accordingly, we submitted our data to a moderated mediation analysis employing Hayes's (2013) process macro, specifically, testing a model in which path a, from independent variable to mediator, is moderated (Model 7).

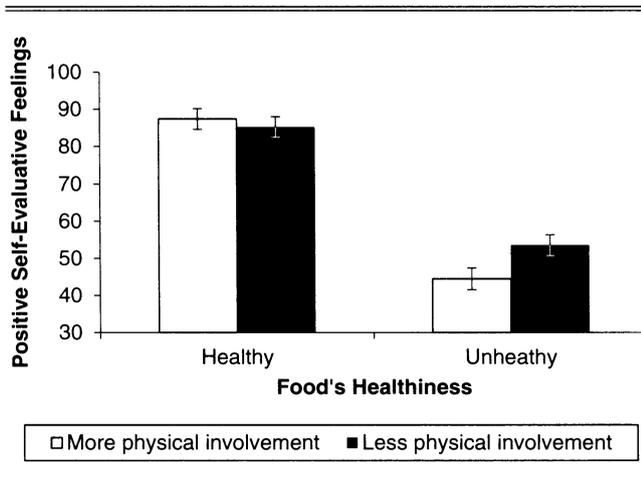
In line with our theory, a bootstrap analysis testing the indirect effect of physical involvement on positive self-evaluative feelings through attributions of responsibility, conditional on healthiness of the food, showed that for unhealthy food, responsibility mediated the observed effect ( $b = 17.76, SE = 9.26; 95\% \text{ confidence interval [CI]} = 4.03 \text{ to } 40.50$ ). In contrast, for healthy food, responsibility did not mediate the effect ( $b = 1.84, SE = 5.08; 95\% \text{ CI} = -6.49 \text{ to } 13.88$ ).

### Discussion

Study 3 shows that to feel better about their eating decisions, people make self-attributions of responsibility, rejecting responsibility selectively for unhealthy eating when they are less physically involved in helping themselves to the food,

Figure 5

STUDY 3: POSITIVE SELF-EVALUATIVE FEELINGS AFTER EATING AS A FUNCTION OF BOTH PHYSICAL INVOLVEMENT IN HELPING ONESELF TO THE FOOD AND FOOD'S HEALTHINESS



Notes: For the healthy chicken, physical involvement had no impact on self-evaluative feelings, but for the unhealthy cheeseburger, less (vs. more) physical involvement led people to feel better about themselves.

operationalized as being served by a friend or serving oneself.<sup>2</sup> In Study 3, we held portion size constant to extract the impact of less (vs. more) physical involvement on self-evaluative feelings for a given portion of food. Having established that less physical involvement in helping oneself to a given amount of unhealthy food allows people to reject responsibility and thus feel better, in the next study we test the full model comprehensively. That is, we examine whether less physical involvement leads people to choose larger portions of unhealthy food because they feel less responsible and thus “can get away with it” without feeling bad about themselves. Accordingly, in Study 4, we let people choose their own portion size to test whether a lowered sense of responsibility, due to less (vs. more) physical involvement in helping themselves to unhealthy food, allows them to choose larger portions without feeling worse.

#### STUDY 4: FULL TEST OF SENSE OF RESPONSIBILITY AS PROCESS USING PORTION CHOICE AS A COVARIATE

Study 1 showed that requiring less physical involvement to help oneself to food encourages consumers to partake of unhealthy food, and Study 2 showed that it leads them to choose larger portion sizes of unhealthy foods. Study 3 showed that, for a fixed portion of food, being less physically involved in helping oneself to the food allows consumers to reject responsibility for unhealthy eating and thus to feel more positive about themselves. In line with these results, we hypothesized that the choice effects in Study 2 occur because when consumers are less physically involved in helping themselves to a food, they can essentially “get away with” a

<sup>2</sup>One concern with the scenario used here is that participants may have had the perception that they had little choice in whether or not to take the food. It is customary not to refuse food at someone else's home. In another study, we used a catered event scenario, and the results were conceptually replicated. Details of this study are available in the Web Appendix.

larger portion without feeling any worse. Study 4 formally tests this overarching idea, unifying  $H_1$ ,  $H_2$ , and  $H_3$  in one model, in the context of being served by a server.

#### Method and Procedure

One hundred seventy-nine undergraduates at a large public university in the Midwest (61.5% female) participated in the study in exchange for partial course credit. The average age in the sample was 20.60 years, with ages ranging from 19 to 30 years.

Participants were randomly assigned to a 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) between-subjects design. They were instructed:

Imagine you are invited to a catered event. It is time to eat, so you walk up to the food station. You check out what is offered, and you decide to have some macaroni and cheese [roasted vegetables]. Then you serve yourself [a server serves you] the macaroni and cheese [roasted vegetables] onto your plate. Imagine taking the serving spoon and [the server] scooping macaroni and cheese [roasted vegetables] onto your plate.

#### Measures

**Portion size choice.** Subsequently, participants indicated which portion size they would choose in this situation by selecting one of ten images, depicting a white plate with one, two, (...), or ten scoops of a particular food (see Figure 6). This visual depiction ensured that people across conditions had the same understanding of the portion sizes, and it helped us eliminate any potential uncertainty regarding portion size, inferences about servers' motivation to over- or underserve, or personal skills with respect to being able to serve oneself a desired portion size.

**Responsibility.** Subsequently, participants rated on a 0–100 scale how responsible they felt for their consumption and to what degree they felt in control over their consumption. These two items were combined into a “responsibility index” ( $r = .41$ ,  $p < .001$ ).

**Positive self-evaluative feelings.** Participants also rated on a 1–9 scale (1 = “not at all,” and 9 = “very much”) how good, how justified, how guilty, and how shameful they would feel about themselves after eating this meal. These items yielded a composite index for “positive self-evaluative feelings” ( $\alpha = .6$ ).<sup>3</sup>

**Healthiness.** Finally, participants indicated on a 0–7 scale how healthy they thought the food in the scenario was, serving as a manipulation check. Finally, they reported demographic information and any dietary restrictions and food allergies.

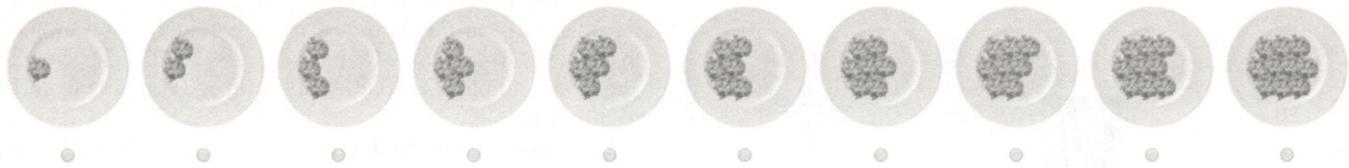
#### Results

We conducted 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) ANOVAs on our dependent variables: healthiness, portion choice, and the responsibility and positive self-evaluative feelings indices. Five participants indicated dietary restrictions pertaining to the food in their condition (e.g., gluten- or dairy-free diet

<sup>3</sup>While these items are the same as those used with high internal consistency in Study 3, here, “justified” appears to fit less well with the other items. Without “justified,” Cronbach's alpha is .66, and the results remain robust with a three-item “positive feelings” index.

Figure 6  
FOOD IMAGES USED IN STUDY 4

How much macaroni and cheese would you have the server scoop?



Notes: Unhealthy condition: macaroni and cheese.

in the macaroni and cheese condition) and were excluded from the data set, leaving 174 data points for the analysis.

**Manipulation check.** For the healthiness rating, the analyses yielded the predicted main effect for healthiness of the food ( $F(1, 170) = 297.90, p < .05$ ). As anticipated, the food was perceived as significantly healthier in the healthy condition ( $M = 5.90, SD = 1.05$ ) than in the unhealthy condition ( $M = 2.33, SD = 1.02$ ). Neither the effect of physical involvement ( $F(1, 170) = .21, p > .7$ ) nor the interaction between healthiness and physical involvement ( $F(1, 170) = 1.72, p > .15$ ) were significant. Further, the macaroni and cheese rating was significantly below the midpoint of the healthiness scale ( $t(83) = -10.46, p < .01$ ), while the vegetable rating was significantly above it ( $t(89) = 21.69, p < .01$ ). Thus, the healthiness manipulation was successful.

**Portion choice.** For portion choice, the analyses revealed a main effect for healthiness ( $F(1, 170) = 10.44, p = .001$ ), such that people selected larger portions of the unhealthy macaroni and cheese ( $M = 4.58, SD = 2.25$ ) than the healthy roasted vegetables ( $M = 3.71, SD = 1.38$ ). The main effect of physical involvement was also significant ( $F(1, 170) = 5.50, p < .05$ ), such that people chose larger portions when they were served by a server ( $M = 4.44, SD = 2.11$ ) than when they were serving themselves ( $M = 3.83, SD = 1.61$ ). More importantly, the interaction between healthiness and physical involvement was also significant ( $F(1, 170) = 4.76, p < .05$ ).

Following up on the interaction, planned contrasts showed that for healthy vegetables, people selected similar portions regardless of whether they served themselves ( $M = 3.69, SD = 1.49$ ) or the food was served for them ( $M = 3.73, SD = 1.29$ ;  $F(1, 170) = .01, p > .9$ ). By contrast, for unhealthy macaroni and cheese, people selected a significantly larger portion when they were served by a server ( $M = 5.22, SD = 2.55$ ) than when they served themselves ( $M = 3.98, SD = 1.74$ ;  $F(1, 170) = 9.90, p < .01$ ; see Figure 7). These results are consistent with Study 2 and with  $H_1$  and  $H_3$ .

**Responsibility.** For responsibility, the analysis revealed a main effect of physical involvement ( $F(1, 170) = 8.28, p < .01$ ), such that people felt less responsible when served by a server ( $M = 76.63, SD = 23.91$ ) than when serving themselves ( $M = 85.34, SD = 15.70$ ). The effect of healthiness was not significant ( $F(1, 170) = 2.37, p > .1$ ), but critically, the interaction between physical involvement and healthiness was significant ( $F(1, 170) = 5.51, p < .05$ ).

Following up on the interaction, planned contrasts showed that for healthy vegetables, people felt similarly responsible for their consumption regardless of whether they served

themselves the food ( $M = 83.81, SD = 15.63$ ) or the food was served to them ( $M = 82.21, SD = 20.05$ ;  $F(1, 170) = .15, p > .7$ ). By contrast, for unhealthy macaroni and cheese, they accepted significantly less responsibility when they were served by a server ( $M = 70.51, SD = 26.44$ ) than when they served themselves ( $M = 86.24, SD = 15.85$ ;  $F(1, 170) = 13.19, p < .001$ ; see Figure 8). These results replicate Study 3 and support  $H_2$  and  $H_3$ .

**Positive self-evaluative feelings.** For positive self-evaluative feelings, there was a main effect of healthiness ( $F(1, 170) = 7.72, p < .01$ ), such that people felt less positive about themselves when having unhealthy macaroni and cheese ( $M = 6.45, SD = 1.50$ ) than when having healthy roasted vegetables ( $M = 7.01, SD = 1.14$ ). However, there was no significant main effect for physical involvement ( $F(1, 170) = .24, p > .6$ ) and no interaction between physical involvement and healthiness ( $F(1, 170) = 1.4, p > .2$ ). This result is consistent with our theory: when people feel responsible for their consumption (as they do when they serve themselves), they should choose smaller portion sizes so that they can maintain positive self-evaluative feelings. This proposed process (as depicted in Figure 1, Panel B) is tested next.

**Tests for mediation.** We tested the two moderated mediation models, corresponding to Panels A and B, respectively,

Figure 7

STUDY 4: PORTION CHOICE AS A FUNCTION OF BOTH PHYSICAL INVOLVEMENT REQUIRED TO HELP ONESELF TO THE FOOD AND FOOD'S HEALTHINESS

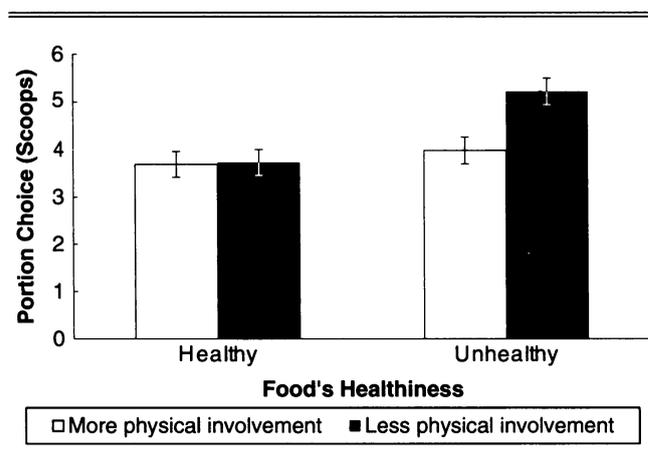
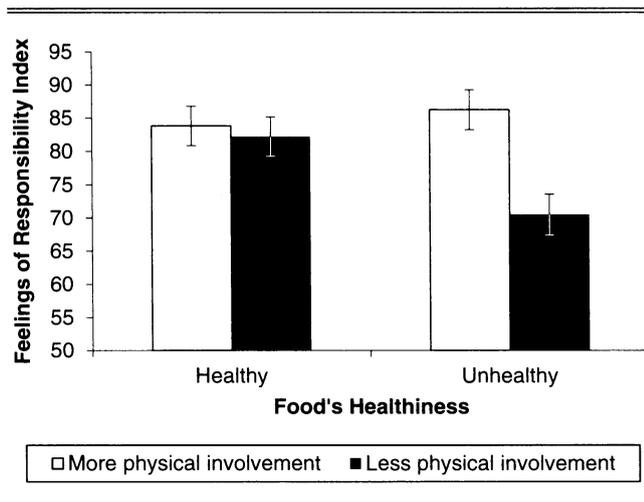


Figure 8

STUDY 4: PERCEIVED RESPONSIBILITY AFTER EATING AS A FUNCTION OF BOTH PHYSICAL INVOLVEMENT REQUIRED TO OBTAIN THE FOOD AND FOOD'S HEALTHINESS



in Figure 1. First, we tested the basic model depicted in Figure 1, Panel A, in which portion choice is variable and up to the consumer. We tested whether feelings of responsibility mediate the effect of physical involvement on portion choice and whether healthiness moderates the effect of physical involvement on sense of responsibility. We submitted our data to a moderated mediation analysis employing Hayes's (2013) process macro, testing a model in which path a, from independent variable to mediator, is moderated (Model 7).

In line with our theory, a bootstrap analysis with 10,000 iterations testing the indirect effect of physical involvement through feelings of responsibility on portion choice, conditional on healthiness, showed that for unhealthy food, responsibility mediated the observed effect ( $b = -.29$ ,  $SE = .14$ ; 95% CI =  $-.66$  to  $-.08$ ). In contrast, for healthy food, responsibility did not mediate the effect ( $b = -.03$ ,  $SE = .08$ ; 95% CI =  $-.22$  to  $.10$ ). These results align with  $H_1$ ,  $H_2$ , and  $H_3$ .

Next, we tested the model depicted in Figure 1, Panel B, in which portion choice must be either held constant or taken into account, because according to our theory it covaries with physical involvement and the food's healthiness. That is, we tested whether feelings of responsibility mediate the effect of physical involvement in helping oneself to the food (less vs. more) on positive self-evaluative feelings, contingent on the change in portion choice induced by physical involvement.<sup>4</sup> We conducted a moderated mediation analysis as detailed previously (Model 7) but took into account portion choice by using it as a covariate on path b.

<sup>4</sup>Note that there is no direct effect of physical involvement on portion choice, just as predicted by our model, in which the (in)ability to reject responsibility for unhealthy eating causes people to adjust their portion choices in order to maintain and keep constant their positive evaluation. As such, we are testing an indirect-only effect (Zhao, Lynch, and Chen 2010). For an overview of mediation without a direct effect, or "indirect-only" effects, refer to Hayes (2009), Zhao et al. (2010), or examples such as Lee et al. (2015), Spiller (2011), and Wilcox, Block, and Eisenstein (2011).

In line with our theory, a bootstrap analysis with 10,000 iterations testing the indirect effect of physical involvement through feelings of responsibility on self-evaluative feelings, conditional on healthiness and using portion choice as a covariate, showed that for unhealthy food, responsibility mediated the observed effect ( $b = .29$ ,  $SE = .10$ ; 95% CI =  $.13$  to  $.52$ ). In contrast, for healthy food, responsibility did not mediate ( $b = .03$ ,  $SE = .07$ ; 95% CI =  $-.12$  to  $.18$ ). Although any mediation test relies on correlation, these results are consistent with  $H_2$  and  $H_3$ .

### Discussion

Study 4 provides comprehensive evidence for the full conceptual process model that we propose. Being less (vs. more) physically involved in helping oneself to unhealthy (vs. healthy) food caused people to reject responsibility, leading them to choose larger portions but enabling them to maintain a more positive self-evaluation. Indeed, the results of a mediation analysis were consistent with the idea that thanks to a lower sense of responsibility, people may allow themselves to choose larger portions of unhealthy foods without compromising their self-evaluation. As such, Study 4 supports the overall model suggested by our theory.

### STUDY 5: CONTINUOUS PORTION SIZE DECISIONS FOR HEALTHY AND UNHEALTHY FOOD AS A FUNCTION OF PHYSICAL INVOLVEMENT REQUIRED

Studies 1 and 2 demonstrate that requiring less (vs. more) physical involvement in helping oneself to food increases people's likelihood of partaking of an unhealthy food and selecting larger portions, respectively. Studies 3 and 4 provide evidence that these effects may be driven by a reduced sense of responsibility for unhealthy decisions, protecting self-evaluative feelings. In contrast, we designed Study 5 to provide insight into how the dynamics studied in the previous experiments play out in a more externally valid setting that assesses real consumption (i.e., beyond choice). We use being served by a server (vs. serving oneself) to operationalize less (vs. more) physical involvement, to test whether less physical involvement in helping oneself to food ultimately causes people to obtain and consume larger amounts of unhealthy food.

### Method and Procedure

One hundred eighty-four undergraduates at a Canadian university (56.8% female) participated in the study for partial course credit. The average age in the sample was 21.28 years, with ages ranging from 19 to 37 years. Participants were randomly assigned to a 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) between-subjects design. Under the guise of a taste test for a cafeteria, they read that they would have the chance to sample one of two food options. People in the healthy [unhealthy] condition could choose between multigrain and flaxseed bread [cranberry-orange and banana-chocolate cake].

Note that the foods were selected on the basis of a pretest in which 30 students from a different university had rated various foods for their healthiness and liking on a 1–7 scale. Students viewed breads as healthier ( $M = 5.20$ ,  $SD = 1.35$ ) than cakes ( $M = 2.03$ ,  $SD = 1.19$ ;  $t(29) = 8.82$ ,  $p < .01$ ) but liked breads ( $M = 4.63$ ,  $SD = 1.71$ ) just as well as cakes ( $M = 4.80$ ,  $SD = 1.47$ ;  $t(29) = -.39$ ,  $p > .7$ ). The cakes rating was significantly below the midpoint of the healthiness scale

( $t(29) = -9.06, p < .01$ ), while the bread rating was significantly above it ( $t(29) = 4.87, p < .01$ ).

Participants read, "When you have decided, please cut and serve yourself [let the researcher serve you] a slice of the bread [cake]." They also read that they would have to leave any uneaten food in the laboratory after the session and could only try one of the two options. Next, those in the more-physical-involvement conditions cut themselves a slice of the cake [bread] they selected. Those in the less-physical-involvement conditions were served a pre-cut slice of their chosen cake [bread] by a research assistant. Finally, participants completed mock taste evaluation questions and demographics.

We calculated the weight of the slice each participant served him-/herself by recording the weight of the loaf of bread [cake] pre- and postsession. We predetermined the weight of the other-served slices by mimicking popular café chains: 100 g cake slices (based on Starbucks' 100–126 g for slices of loaf cakes) and 45 g bread slices (based on Panera Bread's 55 g slices of whole-grain breads). Note that the slightly lower weights for the slices served by a server make for a more conservative test: if people serve themselves an amount of cake that is even smaller than this modest preselected other-served size, we can be more confident about the effect.

In addition, we measured the amount each participant actually consumed, subtracting the weight of each person's leftovers from the amount served. The specific choice between the two healthy [unhealthy] options is irrelevant to the hypothesis and thus was not analyzed.

### Results and Discussion

We conducted 2 (healthiness: healthy vs. unhealthy)  $\times$  2 (physical involvement: less vs. more) ANOVAs on the amount (grams) served and the amount (grams) consumed.

*Amount served.* For amount served, the analysis yielded a main effect for healthiness of the food ( $F(1, 180) = 90.5, p < .01$ ), such that the portions of those tasting unhealthy cake ( $M = 73.19$  g,  $SD = 37.08$ ) were larger than the portions of those tasting healthy bread ( $M = 44.56$  g,  $SD = 16.43$ ). There was also a main effect of physical involvement ( $F(1, 180) = 96.27, p < .01$ ), such that the portions of those serving themselves ( $M = 43.46$  g,  $SD = 30.76$ ) were smaller than the portions of those served by the research assistant ( $M = 67.20$  g,  $SD = 26.72$ ). More importantly, the predicted interaction between healthiness and physical involvement was significant ( $F(1, 180) = 65.13, p < .01$ ).

Following up on the significant interaction, planned contrasts showed that when participants tasted healthy bread, their portion sizes were about equal whether they served themselves ( $M = 41.21$  g,  $SD = 26.34$ ) or were served by someone else ( $M = 46.57$  g,  $SD = 3.40$ ;  $F(1, 180) = 1.68, p = .2$ ). In contrast, when participants tasted unhealthy cake, their portions were significantly larger when they were served by someone else ( $M = 100.72$  g,  $SD = 4.82$ ;  $F(1, 180) = 145.53, p < .01$ ) than when they served themselves ( $M = 45.65$  g,  $SD = 34.72$ ). This result supports  $H_1$  and  $H_3$ .

*Amount consumed.* Not surprisingly, amount served and amount consumed were strongly related ( $r(183) = .69, p < .01$ ). For amount consumed, the analysis yielded a main effect for healthiness of the food ( $F(1, 180) = 62.91, p < .01$ ), such that those tasting unhealthy cake ( $M = 51.39$  g,  $SD = 39.39$ ) ate more than those tasting healthy bread ( $M = 17.08$  g,  $SD = 17.83$ ). There was also a main effect of physical involvement

( $F(1, 180) = 4.72, p < .05$ ), such that those served by the research assistant ate more ( $M = 33.22$  g,  $SD = 36.55$ ) than those serving themselves ( $M = 30.37$  g,  $SD = 29.80$ ). More importantly, the predicted interaction between healthiness and physical involvement was significant ( $F(1, 180) = 19.37, p < .01$ ).

Following up on the significant interaction, planned contrasts showed that when participants tasted healthy bread, they ate marginally more when they served themselves ( $M = 22.90$  g,  $SD = 23.20$ ) than when they were served by someone else ( $M = 13.58$  g,  $SD = 12.62$ ;  $F(1, 180) = 2.78, p = .1$ ), suggesting a slight self-enhancement effect not present in our other studies. In contrast, when tasting unhealthy cake, they ate significantly more when served by someone else ( $M = 65.13$  g,  $SD = 40.18$ ) than when serving themselves ( $M = 37.65$  g,  $SD = 33.79$ ;  $F(1, 180) = 19.67, p < .01$ ). This result supports  $H_1$  and  $H_3$ .

Reinforcing the choice results from Studies 2 and 4, these results show that consumers' portion size and eating decisions depend jointly on whether the food is healthy or unhealthy and on the level of physical involvement required to obtain it. When the food was healthy (vs. unhealthy), consumers' portion and consumption amounts were less affected by who served the food (self vs. other). When the food was unhealthy, both portion sizes and consumption amounts were significantly larger when participants were served by someone else than when they served themselves. This pattern emerged even though participants had chosen the food themselves. Again, the results are in line with the idea that being less physically involved in helping oneself to one's food may enable a self-serving discharge of responsibility, causing consumers to increase the amount of unhealthy food they are served and subsequently eat.

Although it is most ecologically valid to predetermine the amounts served by a server on the basis of common portions in the industry, one may be concerned that our results could depend on the (arbitrary) industry-set amounts being overly large. We fully acknowledge that the effect found here might disappear or be reversed if the predetermined slice sizes were set considerably smaller. However, portion oversizing affects both healthy and unhealthy foods (Smiciklas-Wright et al. 2003), meaning that the focal interaction result might not be affected much. In addition, our results held similarly for portion choice and consumption, the latter of which all participants had full control over, further suggesting that the effect is not purely driven by the predetermined portion sizes in the less-physical-involvement conditions.

### GENERAL DISCUSSION

The findings of various studies show that eating out is associated with more extensive consumption and weight gain (Bezerra, Curioni, and Sichieri 2012; Todd, Mancino, and Lin 2010), and the complex connection between eating out and obesity has been studied from a variety of angles. In this article, we propose that one variable that is often associated with eating away from home but has been neglected thus far can contribute to obesity: the mere circumstance of being less, rather than more, physically involved in obtaining one's food. We argue that two common aspects of eating away from home—being less involved in portion choice and the physical act of being served—are associated with consumers abdicating their personal responsibility for what they eat.

Drawing on the literature on self-serving attributions, we made the novel prediction that lower physical involvement in the process of helping oneself to food enables people to attribute responsibility away from themselves. As a result, less (vs. more) physical involvement in helping oneself to unhealthy food causes consumers to feel better about themselves. We predicted that anticipating these effects should lead consumers to adjust their consumption, including (1) their decision to consume or forgo unhealthy foods and (2) their portion size selection.

Five experimental laboratory studies with college student and Mechanical Turk populations provide support for this model. First, we demonstrate the predicted effects: participants were indeed more likely to partake of unhealthy snacks instead of forgoing them (Study 1), and they also chose larger portions of unhealthy snacks (Study 2), when less (vs. more) physical involvement was required to obtain those snacks. Next, we provide evidence for the hypothesized process: participants rejected responsibility when they were less (vs. more) physically involved in helping themselves to a fixed portion of an unhealthy meal, and as a result they felt more positive self-evaluative feelings (Study 3). Correspondingly, our data were consistent with the theory that larger portion choices of unhealthy foods under less physical involvement occur because feeling less responsible allows consumers to select larger portions without feeling bad afterward, in spite of having chosen a larger portion (Study 4). Although these psychological mechanisms were measured in hypothetical scenario studies, the consistent pattern across studies, including the moderation by healthiness, provides strong process evidence. One limitation may be that in Studies 3 and 4, participants rated their sense of responsibility before rating their self-evaluative feelings, so it is not entirely clear to what degree the impact of physical involvement on self-evaluative feelings is spontaneous. However, the effect on portion choice emerged spontaneously when participants made their portion size choice without (Studies 2 and 5) or before (Study 4) rating their responsibility. This suggests that at least the ascription of responsibility, and likely also the impact on self-evaluative feelings, occurs extemporaneously.

Critically, these effects of lower physical involvement in helping oneself to food on food and portion size choice, attributed responsibility, and self-evaluative feelings arose independently of making a choice, emerging even when people chose food or portion size themselves. This research offers theoretical insight into consumers' eating decisions and suggests a new and actionable tool to nudge consumers toward healthier eating.

The asymmetrical nature of the findings across healthy versus unhealthy food is also consistent with the self-serving attribution. People engage in more extensive causal reasoning for negative events than positive events (see Alicke and Sedikides 2009; Bohner et al. 1988), so any motivated reasoning should be more pronounced for unhealthy than for healthy food. In addition, one might argue that claiming *just as much* responsibility for healthy eating when one is passively served as when one actively serves the food is also a self-serving attribution.

In a recent review by Wansink and Chandon (2014), the authors argue that three major categories of factors influencing food consumption—namely, sensory, emotional, and normative factors—operate chiefly by biasing our consumption

monitoring. Furthermore, it has been suggested that attention to the amount consumed is key to exerting self-control in eating (Redden and Haws 2013). Is less (vs. more) physical involvement in helping oneself to food merely another way to reduce monitoring or attention? While it is possible that being less physically involved reduces people's attention to the precise amounts, there is reason to believe that this is not the primary driver underlying our findings. For instance, in Studies 2 and 4, all participants selected their portion size. They all faced the same decision task in the same fashion and saw a description of the portion in ounces or as an image, respectively. Thus, their level of monitoring at this decision stage was most likely equivalent, yet one group chose larger portions. Furthermore, if reduced monitoring was the primary driver (rather than motivated reasoning), perceived responsibility and portion sizes should have been affected for unhealthy *and* healthy foods. This is not what we find. It is conceivable, however, that being less physically involved in helping themselves to food allows consumers to turn a blind eye and deliberately stop monitoring, ultimately contributing to their ability to reject responsibility. Future research from a cognitive angle could test whether attention to portion size as well as to the amount consumed differs by physical involvement *and* healthiness, using techniques such as eye tracking to quantify the role of visual monitoring.

One limitation of our approach is its focus on foods *perceived* as (un)healthy, a subjective judgment that may itself be subject to motivated reasoning in certain circumstances. While we do not find physical involvement to influence perceptions of healthiness, future research may seek to determine when consumers are more likely to distort their subjective inferences about the food, versus when they are more likely to resort to other types of motivated reasoning (such as reattribution of responsibility or licensing). Furthermore, our laboratory studies used fairly modest portion sizes, and it is possible that the sizes perceived to be "right" vary more outside of the lab. We believe this yields a stronger test of our hypothesis, but larger portions outside the lab may be influenced by additional factors, such as implicit theories linking "unhealthy" with "tasty" (Raghunathan et al. 2006) or "healthy" with "less filling" (Finkelstein and Fishbach 2010).

Our studies show that being more physically involved in helping oneself to unhealthy food leads to more negative self-evaluative feelings than being less physically involved, even if the foods are identical. Further, participants seem to anticipate this effect and adjust their consumption accordingly. What might these results mean for a person's eating experience? How might this effect be implicated in the rise in obesity associated with the increase in eating out? First, if less physical involvement in helping oneself to a given food leads to larger portion size choices, it indirectly contributes to greater consumption, given that portion size is one of the best predictors of intake (Diliberti et al. 2004; Rozin et al. 2003). Second, if being less physically involved in helping oneself to food affords individuals the motivated reasoning necessary to protect a positive self-view, then being served a lavish meal allows them to indulge without feeling bad about it. Avoiding such negative self-evaluative feelings may then afford unhealthy eating on the next occasion. Thus, as people are usually less physically involved in helping themselves to food when eating away from home, doing so may increase, on average, the frequency and size of unhealthy choices and thereby contribute to weight

gain. While our laboratory studies provide evidence for our basic premise and an underlying psychological mechanism, future research might directly measure the relationship between being less physically involved in serving and caloric intake in restaurant settings.

In the long run, consumption of hedonically appealing but less healthy foods may be chronically reinforced through low physical involvement in helping oneself to one's food. High physical involvement in serving oneself, in contrast, may discourage unhealthy eating in the long term, given that retrospective regret can discourage subsequent purchases (Patrick, Lancellotti, and Hagtvedt 2009). Not least, to the extent that eating and health are identity-relevant domains, more positive self-evaluation here may boost one's overall self-esteem (Crocker et al. 2003).

This research suggests contrasting implications for restaurateurs and policy makers. Hospitality providers may benefit from enabling consumers to savor consumption experiences more by serving indulgent vice foods to customers and discouraging self-service in any form. Public entities might combat overindulgence and obesity by implementing self-serve pay-per-weight setups in certain dining environments. Likewise, consumers may leverage these insights to nudge themselves toward healthier decisions. For example, making it a personal rule to formally serve oneself even from a so-called single-serve package may help consumers hold themselves accountable for, and in turn curb their portions of, even small snacks that they consume during the day. Using family-style bowls at shared meals so that everyone can serve their own portion may aid in reducing portions as well.

There are several ways our research can be extended. First, it would be valuable to conduct large-scale field experiments to test the robustness and magnitude of the effect of being served on food type and portion size choice outside of the laboratory, comparing intake in restaurants that have standard table service with those that have family-style self-serve procedures. Intervention data would help generalize and quantify the impact of such serving-style manipulations on the average meal. Second, we focus on only one specific way consumers can be more or less agentic with respect to food consumption, namely, how physically involved consumers are in serving the food. Food preparation is another manifestation of agency in food consumption. Studies investigating the effect of preparing one's own food could span a range from actually cooking a whole dish from raw ingredients to combining elements of a packaged mix. This important aspect of food consumption should certainly be studied in depth. Further, our studies suggest that consumers have an intuition of how certain consumption situations will make them feel. Lay intuitions can strongly influence consumer decisions, regardless of whether they are correct or rational (Raghunathan et al. 2006). If consumers possess a strong lay theory that being less physically involved in helping themselves to their food will reduce their consumption guilt, they may actively seek out being served when they choose unhealthy foods, or pay a premium for it.

Future studies might also consider boundary conditions to the "physical involvement effect" (less vs. more). For instance, when other situational factors enhance or reduce responsibility (e.g., social pressures to eat an offered food), the effect may weaken. Further, our studies were limited to food consumption, but other research has demonstrated that consumers seek justification for vice-type consumption in many domains. For

example, they may feel legitimized to make vice purchases if they expended effort to obtain the vice (Kivetz and Simonson 2002; Mukhopadhyay and Johar 2009) or bought it on sale (Khan and Dhar 2010). Our findings might extend to these and other domains involving vice/virtue conflicts, such as saving versus spending. For instance, consumers may feel equally responsible for automated versus actively authorized deposits into their savings account, but they may feel less responsible for automated versus active credit card payments. Future research might explore whether the physical involvement effect we show in this article extends to other domains. Finally, it may be instructive to examine the interplay of satisfaction with the self and satisfaction with the product in the consumption process. Might dissatisfaction with the self spill over to dissatisfaction with the product? These and other questions await future research.

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