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Preparation (mis)perception: Effects of involvement on food attributes and desirability

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Preparation (mis)perception: Effects of involvement on food attributes and desirability

Abstract

Purpose: The purpose of this paper is to assess the effect of involvement in food preparation on estimated calorie content, perception of portion size, and desirability of the food item.

Design/Methodology/Approach: To test the hypotheses, three between-subjects experiments (one online, two in a laboratory setting) were conducted. Across the three experiments, participants were presented with a food item either ready for consumption (low involvement) or with the individual ingredients in need of assembly prior to consumption (high involvement).

Findings: Results showed that when a consumer is involved in the preparation of their food, they perceive the food to be lower in calories and smaller in portion size than when the same food is presented fully prepared and ready-to-eat. In addition, the effect of food preparation involvement on perception of portion size has negative downstream consequences on food desirability, as a smaller perceived portion resulted in a less desirable food item.

Originality/Value: To the authors knowledge, the results of this research are the first to focus on the impact of preparation involvement on perceptions of the specific product attributes of calorie content and portion size, and the downstream effect on desirability.

Keywords: Food preparation; Involvement; Calories; Portion Size; Serving Size

Paper Type: Research paper

Preparation (mis)perception: Effects of involvement on food attributes and desirability

1. Introduction

As the number of time-crunched consumers in the marketplace rises, so too has the demand for convenient solutions from the food industry. Time-saving solutions such as on-the-go options, single-serving packages, and prepared meals are experiencing growth; notably, 63% of consumers are now purchasing prepared dinner meals from grocery stores (Food Marketing Institute, 2019). In tandem with the growing demand for convenience is the desire for healthier food and beverage options, with 93% of United States (U.S.) consumers wanting to eat healthy at least some of the time and 63% wanting to eat healthy most of the time (Steingoltz *et al.*, 2018). However, the concepts of convenience and healthiness typically conflict, as most convenience foods are stereotyped as high-fat and/or high-calorie and are perceived as generally unhealthy with low nutritional value (Jackson and Viehoff, 2016).

In an effort to meet the desires of consumers, there has been an increase in “healthier” convenience food opportunities for consumers. Convenience foods are no longer limited to take-out food, fast-food, and ready-made meals (Jackson and Viehoff, 2016), but instead have evolved to include time-saving options that vary in the amount of involvement required to prepare the meal. The Instant Pot, for example, is a multicooker which has quickly become Amazon’s top selling product in the home and kitchen category. Marketed as a tool that “simplifies the joys of home cooking, promotes healthy lifestyles, and gives you more time to relish great meals with the people you love” (Instant Pot, 2020), the Instant Pot has developed a cult-like following for its ability to cook time-saving, healthy meals. Another example is the boxed ingredient/meal kit that was originally introduced as a subscription service by companies like Plated, HelloFresh and Blue Apron and designed to deliver meals directly to the consumer’s doorstep. More recently, meal kits

have also become available in grocery retailers such as Walmart, Kroger, and Publix (Martino, 2019). Rather than completely replace meal preparation, meal kits focus on simplifying the process by providing the consumer with step-by-step recipes and coordinated pre-portioned ingredients. By promoting the use of fresh, sustainable, and/or high-quality ingredients, meal kits are expanding the convenience food category by providing what many consumers would perceive as a healthier, yet still convenient, form of an at-home meal option (Hertz and Halkier, 2017). Both of the aforementioned health-convenience options require a higher level of preparation involvement than traditional convenience food options, where full meals (e.g., fast-food, frozen dinners) or meal components (e.g., ready-to-eat mashed potatoes) require little to no involvement from the consumer.

Yet, while these more recent options promote themselves as the healthy alternative to other convenience foods, this is not necessarily the case when comparing calories of products with similar ingredients and portion/serving size. For example, a serving of Sweet and Sour Chicken with Jasmine Rice from HelloFresh is 680 calories (HelloFresh, 2019), while a serving of Pei Wei Asian Sweet and Sour Chicken with White Rice is 650 calories for a small portion or 730 calories for a large portion (Pei Wei Asian Kitchen, 2019). The primary difference between these options is not the calories or the size of the meal but instead the level of involvement in the preparation; while the meal from HelloFresh requires the consumer to be actively involved, the meal from Pei Wei is fully prepared by someone else – the consumer’s role is to order, receive, and consume. This raises the question: do contemporary forms of convenience food, in which consumers are actively involved in the preparation, influence consumer perceptions of product attributes?

Research examining the impact of individuals’ involvement in food preparation on consumer perception and consumption behavior has been relatively sparse and offers inconsistent

results. In examining the effect of food preparation involvement in children, researchers have found a positive effect on overall liking for and consumption of both healthy and unhealthy foods (DeJesus *et al.*, 2019; Radtke *et al.*, 2019). However, with adults, the effect has only been found to replicate for healthy beverages (Dohle *et al.*, 2014; 2016). Research has yet to examine how preparation involvement influences consumer perceptions of food/beverage attributes and the subsequent downstream effects.

Through three studies, the present research investigates how consumer involvement in food preparation influences calorie estimates, perception of portion size, and desirability of the food item. This has practical implications for health, as many individuals choose to be involved in the preparation of their food with the belief that they have greater control over attributes such as calories; however, the consistent *under*-estimation of calorie content and portion size can have negative implications for body composition and overall health. The present research is organized as follows: first, a review of the definition of convenience food, of the influence of food preparation involvement on consumer perceptions and behavior, and of the importance of calorie and portion size perceptions is provided, followed by hypothesis development. Then, three studies are presented (one online and two laboratory) along with the respective results. Lastly, theoretical and practical implications of the research findings, as well as extensions for future research, are discussed.

2. Literature Review

2.1. The evolution of convenience food

A broad definition of convenience goods includes items that require little time and physical and mental effort (Berry *et al.*, 2002; Olsen, 2012) and thus, arguably, convenience food falls under this large umbrella. However, the definition of convenience food has a lengthy history as it has

evolved to encompass multiple formats, and several sub-categories and divisions have been proposed (Brunner *et al.*, 2010; Costa *et al.*, 2001; Fine and Leopold, 1993). Yet, at its core, convenience food creates an element of timesaving somewhere in the process, from meal planning to consumption to clean-up (Scholliers, 2015). Over time, two general categories have emerged relative to food preparation at home: full meals and components used to prepare a meal (Scholliers, 2015). For example, the frozen TV dinners that emerged in the 1950's provided a full meal in a matter of minutes with little to no preparation involvement, while frozen vegetables are served as meal components or side dishes. Thus, convenience foods come in a variety of formats with one common element: decreased time spent reaching the consumable form of the food product.

Notably, convenience food consumption often occurs with a trade-off between the time-saving aspects of convenience and the health-related aspects of meals (Costa *et al.*, 2007). Another commonly agreed upon form of convenience food is fast-food (e.g., McDonald's, Wendy's), where locations are vast, and the time and effort from placing an order to consumption and clean-up is minimal. As discussed previously, by comparison, the more contemporary forms of convenience foods which have entered the marketplace require an increased level of involvement. Involvement in food preparation may take place in a number of ways; however, in the current research, the focus is on the creation of meal items through the combining and cooking of ingredients. This process is a form of co-creation, which has also been referred to as the "IKEA effect".

2.2. Preparation involvement and product attributes

When consumers are involved in the creation of a product, they evaluate it more favorably in order to justify their efforts. Theoretically, this is grounded in the concept of effort justification, which is tied to the link between an individual's level of love for a product and the associated effort or labor (Festinger, 1957; Norton *et al.*, 2012). This concept of "a labor of love" lays the

foundation for the “IKEA effect” – where consumers place an increase on a product’s value when they are involved in its creation (Norton *et al.*, 2012). In the seminal paper on the IKEA effect, Norton *et al.* (2012) found consumers placed a higher value and were willing to pay more for products (e.g., IKEA boxes, origami, Lego sets) when they were self-created than when they were created by someone else.

In the context of food and beverage, the findings from existing studies are inconsistent, particularly when the population shifts from children to adults. In studies focused on children, researchers have found that when children are involved in food preparation they report a greater liking for the food, and in turn consume more (DeJesus *et al.*, 2019; van der Horst *et al.*, 2014). For example, van der Horst *et al.* (2014) found when children assisted a parent with preparing a lunch consisting of pasta, salad, chicken, and cauliflower they consumed 24.4% more calories than children who were not involved in the meal preparation. The researchers also found increased positive valence and feelings of control when children were involved in the preparation. These findings were recently extended by replicating the effect of preparation involvement on consumption of both healthy (salad) and unhealthy (dessert) food items (DeJesus *et al.*, 2019).

When examining preparation involvement with adults, the phenomenon has been coined the “I made it myself” (Troye and Supphellen, 2012) or the “I cooked it myself” effect (Dohle *et al.*, 2014). Similar to the studies of children, researchers found that adult participants evaluated and consumed significantly more when following step-by-step instructions to prepare a food/beverage (i.e., high involvement) than when the item was served already prepared (Dohle *et al.*, 2014; Troye and Supphellen, 2012). For instance, Dohle *et al.* (2014) found participants consumed a larger volume of a raspberry milkshake when they prepared the beverage themselves, and this effect was mediated by liking (Dohle *et al.*, 2014). However, while DeJesus *et al.* (2019)

demonstrated this effects holds across both healthy and unhealthy foods for children, Dohle *et al.* (2016) demonstrated the effect was attenuated for adults when the item was categorized as unhealthy, leading them to suggest higher health salience may countervail the effort justification. Troye and Supphellen (2012) also found mixed results for the direct effect of preparation involvement, or self-production, on overall evaluation of a Tiki Masala dinner. In addition, the authors found the effect was moderated by food quality, where the effect was significant only when the meal quality was “not clearly bad or clearly good”. Beyond the differing results, a limitation to the existing literature is the lack of examination across food categories, as previous studies were limited to milkshakes and an Asian meal kit.

Consumers may use the level of involvement as an informational cue, which in turn leads to formation of knowledge regarding attributes that cannot be directly seen. Research has shown consumers are susceptible to inter-attribute misperceptions, using information provided by product cues to form inferences about other attributes of the product that may not be correct (Peloza *et al.*, 2015). For instance, unhealthy foods are perceived as tastier (Raghunathan *et al.*, 2006), foods that are minimally processed are perceived as healthier (Szocs and Lefebvre, 2016), and food products are estimated to be lower in calories when labeled as organic (Besson *et al.*, 2019) or low-fat (Ebner *et al.*, 2013). These incorrect inferences can lead to biased perceptions (Bowen *et al.*, 2003) and subsequently influence behavior, such as overconsuming foods believed to be healthy (Szocs and Lefebvre, 2016).

2.3. The importance of calorie and portion size perceptions

The terms “serving size” and “portion size” are often used interchangeably. Within this research, we focus specifically on portion size, and define it as the quantity of food that an individual can consume in one eating occasion (Ge *et al.*, 2018; Hieke *et al.*, 2016; Schwartz and

Byrd-Bredbenner, 2006). Comparatively, serving size refers to the information provided on nutrition and food labels (Bucher *et al.*, 2018; Hydock *et al.*, 2016; Lando and Lo, 2013).

Understanding the ability of product cues to influence perceptions of calorie content and portion size remains important to provide guidance for portion control in the management of body composition (Bucher *et al.*, 2018). Extant research has identified the ability of product cues to influence the estimated number of calories and portion size perceptions of food items; for example, Koo and Suk (2016) found that taller packages were perceived to have fewer calories than wider packages. Likewise, Jiang and Lei (2014) found that augmentation of a food product through the addition of toppings (e.g., pizza toppings) altered consumer calorie estimations; however, this result was dependent on the healthiness of the base food. Specifically, the addition of a healthy topping to an unhealthy food base led to calorie underestimation; in contrast, the effect was attenuated when the food base was healthy (Jiang and Lei, 2014). Further, research has found items with a nutrition label that indicates a larger (vs. smaller) serving size resulted in consumers estimating more calories in a self-portioned serving (Hydock *et al.*, 2016), which suggests a positive relationship between calories and portion size.

Thus, based on the aforementioned “I made it myself”/ “I cooked it myself” phenomenon, greater involvement in food preparation should lead to a more positive evaluation of the final product’s attributes as a form of effort justification. We propose this positive evaluation will manifest itself through greater healthfulness perceptions of the food, as characterized by fewer perceived calories and smaller perceived portion size. Specifically, when the level of involvement is high, consumers perceive the meal as lower in calories and smaller in portion size, thus justifying the effort involved in the preparation, as both “low in calories” and “small portion” may be viewed as positive attributes of food products from a healthiness perspective.

Developed from the aforementioned literature, we propose the following hypotheses:

H1: Food preparation involvement will have a negative effect on perception of calorie content.

H2: Food preparation involvement will have a negative effect on perception of portion size.

However, the potential (mis)perception of these attributes is likely to impact the desirability of the food item due to the value placed on larger portions. Portion size is often used as a communication tool by marketers and advertisers who promote the notion that consuming more will bring more pleasure (Harris *et al.*, 2010). Further, larger portion sizes communicate economic value to consumers, as highlighted through consumer experiences with “supersized” pricing in which an “immediately consumable food product is priced nonlinearly such that the price per unit decreases as the overall quantity increases, resulting in a larger quantity for a disproportionately small increase in price” (Haws and Winterich, 2013, p. 48). According to behavioral economics, consumers rely on automatic, quick-response processing when making food-related decisions (Riis, 2014). This is demonstrated by consumers placing more value on the short-term pleasure of overconsumption than on the potential long-term health consequences (Riis, 2014). In line with this reasoning, we posit that consumers place a greater psychological and economical value on larger portions, making them more desirable, and hypothesize the following:

H3: Food preparation involvement will have an indirect effect on the desirability of the food through perception of portion size. Specifically, food preparation involvement will have a negative effect on portion size perceptions, which in turn, will have a positive effect on desirability of the food.

3. Exploratory study

An exploratory study with two experimental conditions (involvement: low vs. high) was conducted as an initial examination of the impact of consumer involvement in food preparation on perception of the calorie content of the final consumable product.

3.1. Stimuli and procedure

One-hundred and eleven participants (43% female, $M_{\text{age}} = 38$ years) completed the study through Amazon Mechanical Turk (MTurk). Participants were required to be located in the U.S., to be over the age of 18, and to complete the study on a computer or laptop. Mobile devices were prevented from opening the study to ensure each participant viewed the stimuli as designed. Participants were randomly assigned to one of the two conditions.

To manipulate preparation involvement, a scenario was provided in which participants were told they had ordered trail mix from an online retailer. In the low-involvement condition, participants were asked to review the trail mix and accompanying information. They were shown an image of a jar of trail mix and a list of the ingredients. Participants were then instructed to pour the trail mix into a bowl. Using the Qualtrics Survey Software drag-and-drop question feature, participants were able to simulate pouring the trail mix into the bowl by dragging the image of the jar of trail mix from the left side of the screen into a box on the right side of the screen. In the high-involvement condition, participants were also asked to review the trail mix image and information that came with it. Participants viewed an image with each of the six trail mix ingredients in individual clear packages, an ingredients list, and instructions to combine the ingredients and mix well. Participants in the high-involvement condition were then presented with each of the individually packaged ingredients on the left side of the screen and were instructed to drag each ingredient one at a time, using the Qualtrics Survey Software drag-and-drop question feature, to

the box at right in order to combine them. Following the manipulation, participants in both conditions were shown the same final bowl of trail mix and asked to review their snack.

After viewing the final bowl of trail mix, participants were asked “How many calories do you think your bowl of trail mix has?” (1 = A Little; 7 = A Lot) and “How involved did you feel in creating the final trail mix?” (1 = Not at all Involved, 7 = Very Involved). The attention check measure (i.e., “To ensure you’re paying attention what is 3+3? [Ignore the question and select A Lot]”) and demographic questions completed the study.

3.2. Analysis and results

3.2.1. Attention and manipulation checks. Fifteen participants failed the embedded attention check measure and were removed from the data set, leaving a final sample size of 96. Results of an independent samples t-test revealed the involvement manipulation worked as designed; participants in the high-involvement condition felt they were more involved in creating the trail mix than those in the low-involvement condition ($M_{\text{High}} = 5.12$ vs. $M_{\text{Low}} = 3.74$; $t(94) = -3.62, p < .001$).

3.2.2. Perceived calories. An independent samples t-test was conducted to assess participants’ perception of calorie content based on their involvement in the trail mix preparation. Results showed that participants in the high-involvement condition perceived there to be significantly fewer calories in the trail mix ($M_{\text{High}} = 4.80$) than those in the low-involvement condition ($M_{\text{Low}} = 5.30, t(94) = 1.96, p = .05$).

3.3. Discussion

These results offer initial support for the proposition that involvement in the preparation of a food item influences an individual’s perception of the final consumable food item; more

specifically, the calorie content. Next, we chose to further explore the impact of involvement in a live lab setting with actual consumable food items.

4. Experiment 1

To examine the effect of involvement on perception of calories in a live setting, a study with two experimental conditions (involvement: high vs. low) was conducted. Both laboratory experiments took place at a mid-size, public university in the U.S. The study was approved by the university's Institutional Review Board.

4.1. Stimuli and procedure

Sixty-nine undergraduate students (55% female, $M_{\text{age}} = 21$ years) completed the experiment in exchange for extra credit. Upon arriving at the lab, participants were randomly assigned to a workstation that was prepared with an unmarked box, a napkin, and the research questionnaire with a set of instructions. After providing participants with the informed consent form and ensuring there were no food allergy concerns, participants completed a measure of baseline hunger ("How hungry are you right now? [1 = Not at all Hungry, 7 = Very Hungry]). Then, participants were directed to begin and to follow the instructions in the questionnaire. Participants were also told not to touch the box until guided to do so in the instructions.

The focal stimulus was a two-bite chocolate brownie purchased from a nationwide retailer. In the low-involvement condition, the brownie was frosted with 14 grams of milk chocolate frosting and carefully placed in the center of a 3-inch x 3-inch (7.62cm x 7.62cm) box. In the high-involvement condition, the box contained an unfrosted brownie, a small (approximately 2-inch spatula), and a 1-oz clear plastic cup with a lid that contained 14 grams of milk chocolate frosting. The box contained a card with an image of the final product and preparation instructions similar to those found inside of meal preparation kits. In the low-involvement condition the card instructed

participants to “Remove the brownie from the box” and “Enjoy!” In the high-involvement condition participants were instructed to “Remove the brownie and frosting from the box, use the provided spatula to ‘frost’ your brownie”, and “Enjoy!”

Following the manipulation, participants were asked “How many calories do you think the food has?” as an open-ended question to assess the dependent variable of perceived calorie content. Then, participants were asked to indicate how much they liked the food item (“How much do you like brownies in general?” [1 = Hate Them, 7 = Love Them]), followed by demographic questions.

4.2. Analysis and results

The responses of two participants were identified as outlying (outliers were defined as being greater than 99% of the normal distribution surrounding the mean [± 2.5 standard deviations]) and replaced with the next most extreme but non-outlying data-point (Woods *et al.*, 2011). Figure 1 presents the mean estimated calories for both the low- and high-involvement conditions. Results of an independent samples t-test revealed a significant effect of preparation involvement on calorie content ($t(67) = -2.11, p = .039$). Specifically, participants in the high-involvement condition estimated the brownie to have significantly less calories ($M_{\text{High}} = 178.03$) than those in the low-involvement condition ($M_{\text{Low}} = 244.21$), thus supporting H1. An ANCOVA was conducted to examine the effect of preparation involvement when controlling for baseline hunger and liking of brownies. The results remained significant ($p = .045$) with neither covariate being significant (p 's $> .41$).

5. Experiment 2

5.1. Stimuli and procedure

Seventy-five undergraduate students (52% female, $M_{\text{age}} = 21$ years) completed the experiment in exchange for extra credit. Following the same procedure as Experiment 1,

participants were randomly assigned to a workstation upon entering the lab that was prepared with an unmarked box, a napkin, and the research questionnaire with a set of instructions. Participants reviewed the informed consent, responded to the proctor's question regarding food allergies, and completed the same measure of baseline hunger used in Experiment 1. Then, participants were directed to begin and to follow the instructions in the questionnaire. As in Experiment 1, participants were told not to touch the box until guided to do so in the instructions.

The focal stimulus was a s'more made with two graham crackers, 8 grams of chocolate spread and 5 grams of marshmallow cream spread. Participants in the low-involvement condition were provided with the s'more already prepared, while those in the high-involvement condition were provided with two graham crackers, two 1-oz plastic cups containing the chocolate and marshmallow spreads, and two small spatulas. The 4-inch x 4-inch (10.16cm x 10.16cm) box contained an instruction card, similar to the one used in Experiment 1, which also included a picture of the final snack (See Appendix). Participants were told to open the box, review the food and information provided and, in the high-involvement condition, to follow the instructions to create the final snack. Specifically, in the high-involvement condition, the card instructed:

- “1. Remove the two graham cracker halves.
2. Using the spatula, cover one graham cracker half with the chocolate spread.
3. On the other graham cracker half, use the remaining spatula to spread the marshmallow fluff.
4. Put the chocolate and marshmallow halves together.
5. Enjoy!”.

Following the manipulation participants were asked “How many calories do you think the food has?” to assess the dependent variable of calorie content. Participants were also asked to rate

the portion size of the food item (“How would you rate the portion size of the food? [1 = “Very Small, 7 = “Very Large”]), followed by a three-item measure of desirability of the food (“The s’more you reviewed was: [Unappealing/Appealing; Unattractive/Attractive; Undesirable/Desirable] $\alpha = .90$). Then, participants were asked to indicate how much they liked the food item (“How much do you like s’mores in general?” [1 = Hate Them, 7 = Love Them]). The study concluded with demographic questions.

5.2. Analysis and results

5.2.1. *Perceived calorie content.* Four responses were identified as outliers as defined in Section 4.2 and corrected through the same method (Woods *et al.*, 2011). Figure 1 presents the mean estimated calories for both the low- and high-involvement conditions and displays the same pattern of results as Experiment 1, thus providing further support for H1. An independent samples t-test revealed those in the high-involvement condition estimated the s’more snack had significantly less calories ($M_{\text{High}} = 150.67$) than participants in the low-involvement condition ($M_{\text{Low}} = 218.08$; $t(73) = 2.78, p = .007$). An ANCOVA was conducted to examine baseline hunger and liking of s’mores as covariates. The effect of preparation involvement on perceived calorie content remained significant ($p = .021$) and neither covariate was significant (p 's > .63).

>>>>> **PLEASE PLACE FIGURE 1 HERE** <<<<<

5.2.2. *Portion size.* As expected, the results of an independent samples t-test on perception of portion size replicate the pattern of results for estimated calorie content, providing support for H2. Figure 2 presents the mean ratings of portion size for both the low- and high-involvement conditions. The s’more was perceived as being smaller in portion size when participants were in the low-involvement condition ($M_{\text{High}} = 3.67$) than the high-involvement condition ($M_{\text{Low}} = 4.64$; $t(73) = -3.17, p = .002$).

>>>> PLEASE PLACE FIGURE 2 HERE <<<<<

To examine the downstream effect of perception of portion size on desirability of the food, PROCESS Model 4 with 5000 bootstrap samples was used (Hayes, 2017). Results support a negative effect of involvement (0 = low, 1 = high) on perception of portion size ($a = -0.97, p = .002$). In turn, portion size was found to significantly influence food desirability ($b = 0.28, p = 0.02$). The indirect effect of involvement on food desirability through portion size was significant (effect = -0.27, 95% CI from -0.56 to -0.03), while the direct effect was non-significant ($p > .99$), providing support for mediation and H3 (See Figure 3).

>>>> PLEASE PLACE FIGURE 3 HERE <<<<<

6. General discussion

Do contemporary forms of convenience food, in which consumers are actively involved in the preparation, influence consumer perceptions of product attributes such as calorie content and portion size? Based on the results of three studies, one online scenario-based experiment and two live experiments conducted in a lab, the answer is yes. Our results consistently demonstrate that when a consumer is involved in the preparation of their food, they perceive the food to be lower in calories and smaller in portion size than when the same food is presented fully prepared and ready-to-eat. The effect of consumer involvement in food preparation found in our studies is consistent with both the proposition that involvement alters consumer perceptions of the food item, as well as with results of prior studies which suggest that consumers develop biased perceptions of food products based on external cues (Besson *et al.*, 2019; Ebner *et al.*, 2013; Lefebvre and Orłowski, 2019; Ordebayeva and Chandon, 2016; Pelozo *et al.*, 2015; Raghunathan *et al.*, 2006; Szocs and Lefebvre, 2016).

Additionally, Experiment 2 revealed that the effect of food preparation involvement on perception of portion size has negative downstream consequences on food desirability; more specifically, the perception of a smaller portion results in a less desirable food item. This finding not only extends consumer involvement literature on overall product evaluation by providing process evidence in the context of food preparation, but also offers an interesting contrast to prior studies which indicate consumers have an increased positive evaluation in terms of liking for foods they have prepared (Dohle *et al.*, 2014; 2016).

Extant literature suggests consumers report liking a product more when they are involved in its creation to justify the increased effort level required, thus linking effort and product value (Norton *et al.*, 2012). One possible explanation for our divergent result is that, in the context of food, the psychological value of a product may not always translate to desirability. For instance, an individual may place greater value on a meal that they have prepared, but it does not necessarily mean this meal is more desirable than a meal prepared by someone else (e.g., a takeaway meal). Another possible explanation is the association between portion size and value (see Zurakait *et al.*, 2019 for a review). Notably, larger portions provide better economic value than smaller portions (Steenhuis and Vermeer, 2009) and are generally more appealing (Burger *et al.*, 2011). Consumers are also typically told that consuming more food will lead to greater pleasure (Harris *et al.*, 2010). As our studies established that a higher level of involvement led to the perception of smaller (rather than larger) portion sizes, it is likely the portion size-value association contributed to the negative downstream effect on food desirability.

In sum, the findings of the current research lend support for further investigation of the effects of consumer involvement in food preparation on perceptions of food attributes and related behaviors. They also offer important implications for food researchers, marketers, health

professionals, and consumers, particularly as health concerns related to food consumption behaviors continue to rise.

6.1. Implications

First, the underestimation of calories and portion size resulting from involvement in food preparation may have detrimental long-term effects on body composition and overall health, since consistent overconsumption of calories is associated with weight gain. The strong link between body composition and health concerns has been well established; thus, understanding the factors that contribute to food consumption decisions is extremely important to overall well-being. Regulatory actions, such as restricting the sale of sugary beverages over 16 ounces in New York City (Diehm and Hall, 2013), have typically been ineffective. This highlights the importance of education, rather than regulation, in order to affect positive change for consumer food consumption behaviors. In other words, consumers must be aware that making a meal themselves does not necessarily make it healthier than a prepared version of a convenience-style meal. Further, our findings provide insight on the importance of providing meaningful nutritional information in a clear format for consumers, even on “healthy” meal kit-style products, to increase the awareness of calorie content and appropriate portion sizes.

Second, and as a corollary to the first implication, the results contribute to our understanding of contemporary convenience food options (i.e., meal kit boxes), which have already demonstrated their potential to change consumption patterns and daily food habits in a relatively short time (Hill and Maddock, 2019). Meal kit boxes adopt convenience-food positioning, yet have largely avoided the negative connotations usually associated with such foods due to the marketing of a wide range of fresh and high-quality ingredients (Hertz and Halkier, 2017; Hill and Maddock, 2019). However, as noted in the Introduction, healthy marketing

campaigns do not necessarily mean these meals are lower in calories or offer smaller portion sizes than other, similar, ready-to-eat convenience foods. This “halo effect” was evident in the results of the present research, as the food items used in each of the live experiments (brownie, s’more) were selected specifically for their hedonic qualities.

Finally, our results are replicated for foods categorized as relatively healthy (i.e., trail mix) and unhealthy (i.e., brownies and s’mores), whereas previous research has suggested preparation involvement only impacted consumption of healthy foods in studies with adult samples (Dohle *et al.*, 2016). This may identify “food type” as a relevant boundary condition, particularly since prior research examined healthiness as a boundary condition but only considered it within the context of beverages (Dohle *et al.*, 2016). Extant food consumption literature has identified differing results for food and beverage stimuli (Lefebvre and Biswas, 2019); this research, coupled with our findings, highlights the importance of the distinction between food and beverage contexts when researching consumption behaviors.

6.2. Limitations and extensions for future research

The present research provides a solid foundation for future studies; yet, as with any research, there are limitations which must be acknowledged. First, while the effect of food preparation involvement on the (mis)perception of calorie content and portion size was consistently replicated, and different food items were used in each experiment to add generalizability to the findings, the current research examined items typically consumed as snacks rather than as complete meals. Thus, the level of preparation involvement was not as extensive as that of a full meal. Second, while the experimental manipulations in each of the studies compared calorie perceptions (and, in Experiment 2, portion size perceptions) by consumers in the high-involvement condition against calorie/portion size perceptions by consumers in the low-

involvement condition, these perceptions were not compared against actual calories or against a nutrition-label serving size. Examining these differences would be an important direction for future research.

Furthermore, the food items used were primarily hedonic in nature. Therefore, in addition to the aforementioned boundary condition of “healthy vs unhealthy food type”, it would be interesting for future research to examine whether more complex preparations and/or other categorizations of foods (e.g., indulgent vs. non-indulgent, breakfast vs. dinner, snack vs. meal) would alter the results.

In addition, recent research has that found prettier foods are more highly rated in sophistication, which signals higher levels of quality and healthiness (Hagen, 2018). Future research should examine the role and potential underlying mechanism of visual appeal in the relationship between preparation involvement and perceived attributes. This would be particularly relevant for meal kit box, whether purchased online through a subscription service or in a retail grocer, as consumer choice in terms of which meals they order is typically based on the images of completed meals viewed online or on the kit’s external packaging (Hill and Maddock, 2019).

6.3. Conclusion

The present work suggests involvement in food preparation influences perceptions of calorie content and portion size perception and consequently, desirability of the food item. Participants were more likely to perceive a food item was lower in calories and smaller in portion size when they had the opportunity to be involved with its preparation than when the food item was presented in a ready-to-eat format. A smaller portion size, in turn, made the food item less desirable. Together with the suggested extensions for future research, these results provide a foundation for a fruitful area of study.

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