The Portion-Size Effect: How Increasing the Number of Portion-Size Options Can Increase the Volume of Food Consumption

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In two experimental studies it was found that the choice for larger portion-sizes of food increased as the number of available options increased. Specifically, the “Large” portion-size was chosen more often when an “Extra Large” option was added to the option set of “Small, Medium and Large”. Conversely, the choice for the “Small” portion-size decreased with increasing options. These effects were found for both beverage and fast food meal choices, but they disappeared when calorie information was provided. It is proposed that these effects occur due to changes in consumption norms and consumption guilt as the number of portion-size options increases.

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Research Background and Hypotheses

Among the many contributing factors to obesity, the steadily increasing portion-sizes of food over the past 30 years (also known as “super-sizing”) are among the most criticized (e.g., Cutler et al. 2003; Wansink 2004). The increase in portion-sizes is said to have affected both the consumption norms (i.e., how much is appropriate to eat?) and the consumption monitoring accuracy (i.e., how much has been eaten?), and has ultimately led to increasing food intake (Chandon and Wansink 2007; Wansink and Itursem 2007). While these two factors may explain why consumers overeat in a given portion size, it is not clear what causes them to choose a portion size (e.g., large) that is larger than their physiological need (e.g., medium) in the first place. In the current research, we propose that consumers’ choice for portion-sizes is influenced by the number of portion-size options available in the environment. Specifically, it is proposed that merely adding larger portion-size options (e.g., adding an “Extra Large” option to the set of “Small, Medium and Large”) can increase the volume of food consumed. In other words, over-consumption can occur not only by increasing the portion-size of existing options but also by adding new (and larger) portion-size options. We propose that this effect occurs as a result of 1) the change in consumption norms for the appropriate portion-size, and 2) the reduction in the consumption guilt associated with consuming larger portion-sizes. These two mechanisms are explained in detail below.

Wansink and colleagues (e.g., Kahn and Wansink 2004) suggest that people tend to rely on consumption norms to decide how much is appropriate to eat. These norms can be influenced by external cues that are present in the environment. The number of available portion-size options can be one such cue. For example, if the number of larger portion-size options (e.g., large, extra large drink; double, triple hamburger) increases, people may assume that there is a reason that these larger options are offered and use this information to guide their choices (Schwartz 1996). Specifically, the increasing presence of larger size options may signal that it is appropriate or socially acceptable to order a larger portion-size. As a result, the choice for larger portion-sizes may increase and accordingly the average consumption volume of food would increase.

Secondly, while the current super-sized environment may lead consumers to believe that “more is better” (Wansink 2004), the current environment of “calorie-consciousness” also leads consumers to regulate how much they consume (Cutler et al. 2003). The latter self-regulation may make consumers feel guilty to choose the “large” option from the set of “small/medium/large” (S/M/L) options. However, if another “extra-large” (XL) option is added to this set, consumers may feel less guilty to choose the “large” option from the set of S/M/L/XL options. The reduced feeling of guilt may consequently increase the choices for larger sizes as the number of portion-size options increases.

Experiments and Results

Two experimental studies were conducted to test the effect of increasing portion-size options on consumption volume. The studies used hypothetical scenarios where subjects were told to imagine that they were in a restaurant and decided to order either a beverage or a fast food meal from different sets of portion-size options. Experiment 1 (n=64) employed a 2 (3 vs. 4 portion-size options) * 1 (vanilla milkshake) between-subjects design, in which participants had to choose from either 3 options (small/medium/large) or 4 options (small/medium/large/extra large) of vanilla milkshake. We also asked the participants to estimate the amount of calories contained in each portion-size after they made the choice. We found that in the 4 (vs. 3) option condition, more people chose the “Large” option (33.3% vs. 13.4%, z=1.69, p=0.05) and fewer people chose the “Small” option (26.2% vs. 45.5%, z= -1.56, p=0.06). The proportion of people choosing “Medium” was not significantly changed (35.7% vs. 40.9%, z= -0.41, p=0.34). We also found that the average number of calories consumed was significantly increased when participants were given 4 (vs. 3) portion-size options (629 vs. 523 calories, t=2.69, p<0.001). Furthermore, we found that participants significantly underestimated the number of calories contained in each portion-size (p<0.001 for all conditions).

Experiment 2 was conducted to investigate if the above results can be replicated in a fast food meal scenario and whether providing calorie information would influence participants’ portion-size choices. Experiment 2 (n=187) employed a 2 (3 vs. 4 portion-size options) * 2 (calorie information provided vs. not provided) between-subjects design using a fast food meal scenario (chicken salad). We found that more people chose the “Large” option in the 4 (vs. 3) option condition when no calorie information was provided (45.7% vs. 20%, z=2.69, p<0.001), whereas this change was not significant when calorie information was provided (38.8% vs. 31.0%, z=0.78, p=0.22). We also found that fewer people chose the “Small” option in the 4 (vs. 3) option condition regardless of whether calorie information was provided or not (8.2% vs. 21.4%, z= -1.80, p=0.04; 6.5% vs. 18.0%, z= -1.70, p=0.04). Furthermore, the results show that the average number of calories consumed was significantly increased when participants were given 4 (vs. 3) portion-size options (393 vs. 333, t=4.42, p<0.001).

Implications

The above results confirm our prediction that the choice for larger portion-sizes increases as the number of portion-size options increases. This finding violates the principle of regularity based on the normative probability choice model (e.g., Tversky 1972); specifically that the probability of choosing a particular option (e.g., “large”) cannot be increased when the number of offered options increases. More importantly, our finding indicates that the mere increase in the number of portion-size options offered can lead to over-consumption. The two proposed underlying reasons that lead to this effect, namely the changes in consumption norms and consumption guilt, are to be tested in subsequent studies. Overall, this research aims to provide insights into the impact of a specific type of