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The effects of increased serving sizes on consumption☆

Chris Hydock*, Anne Wilson, Karthik Easwar

Georgetown University, McDonough School of Business, USA

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ABSTRACT

The US Food and Drug Administration recently revealed that it is considering modifying the Nutrition Facts Panels required on packaged foods. One proposed change is increasing serving sizes included on labels, which has two potential implications. Larger serving sizes could increase consumption if consumers use the serving sizes displayed as a reference point for their own consumption (McFerran et al., 2010). Alternatively, larger serving sizes that depict increased values of negative nutrients (e.g. calories) could lead consumers to perceive foods as less healthy, thereby reducing consumption (Russo et al., 1986). In study 1 (Online sample, N = 208, M_{age} = 32, SD_{age} = 12), participants saw pictures of packaged food items and nutrition labels. The labels, depicted either the existing or larger serving size. Across all foods, larger serving sizes led to lower health perceptions. Labels with larger serving sizes were rated as more representative of typical consumption. Study 2 (Online sample, N = 347, M_{age} = 31, SD_{age} = 10) used the same design as study 1, but required participants to virtually portion foods. While serving sizes did not impact the amount of food consumers portioned, those who saw labels with larger serving sizes estimated that they portioned out more calories. In study 3 (Student sample, N = 198, M_{age} = 20, SD_{age} = 1), participants were given M&Ms to eat, paired with a nutritional label depicting either the current or a larger serving size, while participating in unrelated surveys. Participants presented with the larger serving size label consumed less than those presented with the current serving size label. Together, the results suggest that the proposed increase in serving sizes on Nutrition Facts Panels could lower consumption of high-calorie foods.

Nutrition Facts Panels (NFP) (Guide to Nutrition Act, 1994), required on all food packages by the United States Food and Drug Administration (FDA), are arguably the most common source of food health information for consumers. In 2014, the FDA proposed making several changes to NFPs, including adjusting current serving sizes (FDA, 2014). This change would be in line with the Nutrition Labeling Education Act, which mandates that serving sizes on labels reflect actual amounts that people consume. Accordingly, this research examines the effect of increasing listed serving sizes on consumption. While the original purpose of standard serving sizes was to facilitate comparisons between food items, they can influence consumption more broadly. Serving sizes impact consumption because they determine the quantities of nutrient listed, numbers consumers often taken at face value.

When evaluating a food's healthfulness and nutritious value, consumers are theoretically supposed to multiply the values displayed on the package by the number of servings they plan to eat. However, past research (Cowburn & Stockley, 2005) suggests that consumers focus too much on the absolute values listed and ignore "true" nutrient content values of what they eat, which requires computation based on personal consumption. Part of the problem is that, since the adoption of uniform NFPs, average consumption amounts have greatly increased, while NFP serving sizes have remained stagnant (Schwartz & Byrd-Bredbenner, 2006; Young & Nestle, 2002). Others cite confusion regarding the meaning of serving sizes (Dallas, Liu, & Ubel, 2015; Seiders & Petty, 2004), and point to consumers' inability or insufficient motivation to complete the mental math needed to properly interpret nutritional information (Cowburn & Stockley, 2005; Roberto & Khandpur, 2014; Rothman et al., 2006).

Regardless of the cause, research has demonstrated that listing smaller serving sizes for the same quantity of food can reduce feelings of guilt and consequently increase consumption (Mohr, Lichtenstein, & Janiszewski, 2012). This may be particularly

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* Corresponding author.
E-mail address: ch937@georgetown.edu (C. Hydock).

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pronounced when a food is packaged in a container that is consumed in a single sitting, but lists multiple servings (Lando & Labiner-Wolfe, 2007; Lando & Lo, 2013; Pelletier, Chang, Delzell, & McCall, 2004). Given that calorie underestimation is an alleged contributor to obesity (Chandon & Wansink, 2007), and that consumers are unable or unmotivated to convert standard nutrition information to personalized amounts, it makes sense that obesity rates correlate with increases in serving sizes (Young & Nestle, 2002).

The Nutrition Labeling and Education Act (NLEA, 1990) required NFPs to appear on almost all packaged foods. The legislation specified that serving sizes were to be derived from "Reference Amounts Customarily Consumed" (RACC) and, "By law, serving sizes must be based on how much food people actually consume, and not on what they should eat" (Guide to Nutrition Act, 1994). However, the current RACCs are based on nationwide food consumption surveys conducted from 1977–1978 and 1987–1988 (US Food and Drug Administration, 1997). This is problematic because average consumption rates have increased in the years since NFPs were first introduced (Schwartz & Byrd-Bredbenner, 2006; Young & Nestle, 2002). Thus, as part of a broader initiative to update NFPs, the FDA proposed increasing listed serving sizes.

Motivated by the ubiquitous nature of food labels and rampant health problems in the United States, a significant amount of research has assessed how nutrition information impacts consumers' decisions. Research has considered whether NFPs actually influence dietary choices, which consumers are most likely to use nutrition information, the differential focus on negative nutrients over positive nutrients, and the mechanisms through which nutrition information may impact consumption (Campos, Doxey, & Hammond, 2011; Dallas et al., 2015; Mohr et al., 2012). A review of this literature sheds light on how the FDA's proposed changes to serving sizes is expected to impact food consumption.

Existing research is mixed on the extent to which consumers actually use NFPs. Before the introduction of standardized NFPs, researchers found that consumers wanted nutrition information, but were unlikely to actually use it (Jacoby, Chestnut, & Silberman, 1977). Some cite the fact that diet-related health problems have increased since the passage of the NLEA as evidence that nutrition labels have not had a positive impact on consumers (Drichoutis, Lazaridis, & Nayga, 2006). Others find as little as a quarter of consumers use nutrition information, and that there is little intention to use information among consumers (Brescoll, Kersh, & Brownell, 2008). Approximately half of consumers reported that they would be unlikely to use information in restaurants were it available (Krukowski, Harvey-Berino, Kolodinsky, Narsana, & DeSisto, 2006). In contrast, others have found that over 50% (Freeland-Graves & Nitzke, 2002), 60% (Ollberding, Wolf, & Contento, 2011) or 75% (Campos et al., 2011) of consumers use labels. Further, literature reviews indicate that health information does affect choices (Williams, 2005) and that there is a positive link between using nutrition labels and healthier diets (Campos et al., 2011; Kreuter, Brennan, Scharff, & Lukwago, 1996). For example, use of NFPs has been associated with lower fat intake (Neuhouser, Kristal, & Patterson, 1999). Some have found that NFPs can mitigate the impact of otherwise effective front-of-package labels (Keller et al., 1997), while others show independent effects of the two information sources (Ford, Hastak, Mitra, & Ringold, 1996).

Beyond NFPs, researchers have documented many instances of the impact of information, environmental stimuli, and packaging on consumption (Wansink, 2004). Moorman (1990) finds that stronger health consequence information elicits greater motivation to process nutrition information. Wansink and Chandon (2006) show that low-fat labels increase consumption by licensing consumers to eat more and reducing feelings of guilt. Perceptions of a food as healthy, accurate or not, can also increase consumption through the underestimation of calories. Wansink (1996), Wansink and Cheney (2005) demonstrates that larger packages and portions increase consumption. Multiple field studies indicate that nutrition information in a supermarket can positively impact consumption choices (Nikolova & Inman, 2015; Russo, Staelin, Nolan, Russell, & Metcalf, 1986). An experiment conducted in a restaurant indicates that, when coupled with a surcharge, labeling food as unhealthy reduces consumption (Shah, Bettman, Ubel, Keller, & Edell, 2014).

Research also shows that significant individual differences among consumers correlate with the likelihood of consulting nutrition information (Moorman, 1990). Specifically, substantial research finds that motivation and health/nutrition knowledge significantly affects the likelihood of referencing labels. For example, those well-informed on nutrition and disease and those with specific nutrition interests are more likely to use labels (Barreiro-Hurlé, Gracia, & De-Magistris, 2010; Szykman, Bloom, & Levy, 1997). Similarly, more motivated consumers more accurately interpret label information (Keller et al., 1997). This is important considering other research indicates that those who better understand the information on labels do a better job evaluating a food's healthfulness (Burton, Garretson, & Velliquette, 1999). Motivation may be a particularly strong factor when knowledge is low. Balasubramanian and Cole (2002) identify high motivation, low knowledge consumers as most likely to benefit from NLEA imposed labels. However, researchers have also documented differing interactive effects of health motivation and ability (Moorman & Matulich, 1993). Andrews, Netemeyer, and Burton (2009) found a curvilinear relationship between caloric knowledge and willingness to purchase a high-calorie snack bar, suggesting that only the consumers most educated in nutrition will make healthy consumption decisions.

Some researchers have noted that nutritional labeling has led to a greater emphasis on the nutrient quantities in unhealthy foods than their healthy counterparts. Principle components analysis has specifically revealed that positive and negative nutrients independently affect overall nutrition perceptions (Burton et al., 1999). Experimental data reveals a greater focus on and consequence of negative nutrients relative to healthy nutrients (Garretson & Burton, 2000). Looking at pre and post NLEA scanner data reveals increased attention to negative nutrients such as fat and salt (Balasubramanian & Cole, 2002). Similarly, Moorman (1996) found in survey data that the NLEA catalyzed an increase in the acquisition of knowledge of unhealthy product categories. Meanwhile, other research Russo et al. (1986) shows that positive nutrient information posted in supermarkets increases attitudes toward foods, but it is the negative nutrient information that actually leads to changes in behavior. In a study looking at how health framing impacts consumption, researchers show that the strongest effects occur for those most focused on avoiding negative nutrients (e.g. calories) (Mohr et al., 2012).

This literature suggests that the FDA's proposed increase of serving sizes will lead consumers to eat less. By increasing serving size, the nutrient levels associated with foods will increase (e.g., the number of calories, grams of fat, or grams of protein). Because consumers have a greater focus on unhealthy nutrients relative to healthy nutrients, consumers' perceptions of foods health will be more influenced by the increased amount of calories, than by the increased amount of vitamins or protein. Ultimately, this will cause foods to be viewed as less healthy. While there is great variability, past research also suggests that a