



Calorie information effects on consumers' food choices: Sources of observed gender heterogeneity

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ABSTRACT

A larger portion of males is overweight than is females. Females' food choices in comparison to those of males reflect the greater importance that females attribute to health and physical appearance; their more complex attitude toward risk; the greater esteem in which they hold home-cooked food; and sociological factors. This paper explores the variables that affect consumers' food choices, shedding light specifically on the choice process and analyzing whether gender affects predispositions toward foods, perceptions, choice processes, or all three. Perceptions and choice processes based on memory judgments serve only as a benchmark used to compare choices consumers make under calorie information. The results of two experiments wherein the researchers exposed subjects to two forms of calorie information on three fast food items suggest that differences in perceptions of foods' healthfulness and taste aspects account for gender differences in memory-based choices. In addition to this baseline difference in perceptions, a gender difference in reaction to calorie information in terms of consumers' behavior exists. While calorie information affected both perceptions and choice processes for females, information changed the perceptions of food only for males.

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1. Introduction

Females' food choices are healthier than those of males (Centers for Disease Control [CDC], 2008), and their likelihood of being overweight is less overall (National Institute of Health [NIH], 2010). Females are more conscientious than are males about their own diets and health (Gerend, 2009; Roininen & Lahteenmaki, 1999; Wyant & Meiselman, 1984), consume more healthful foods, and rate such foods as tastier (Digby & Stewart, 1996; Rappoport, Peters, Peters, McCann, & Huff-Corzine, 1993).

Since overweight is a major risk factor increasing the likelihood of diabetes, heart attack, and stroke, and affects mortality rate as well as quality of life, the need to understand the factors that have led females to adopt healthier lifestyles has inspired many studies. The academic literature suggests that socio-cultural variables, genetics, evolution, importance attributed to health and looks, and economic variables such as differences in income and price sensitivity account for observed gender differences in food choices.

Social factors, also termed *sociopolitical factors* (Herbert et al., 1997; Miller, Abdel-Maksoud, Crane, Marcus, & Byers, 2008), including social desirability and social acceptance, largely affect consumers of both genders. Females' sense of social acceptance is more strongly bound up in physical appearance (look) than is that of males (Feingold, 1990). Since in the West, thin look is the ideal of many females, while strong build is the ideal of many males, eating is tightly bound up with body shape, image, and social acceptance.

Aside from the sociopolitical variables, the literature explains gender differences in food choices by referring to genetic differences in sensory systems that affect taste (Fisher, Griffin, England, & Garn, 1961); differing metabolisms resulting in differing energy needs (Lovejoy, 1998); taking health hazards more seriously (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000); and attributing higher importance to looks and health relative to foods' tastiness (Gerend, 2009; Roininen & Lahteenmaki, 1999). Naturally, some of these constructs are related. Evaluation of one's self (and others') body image (look) depends on the ideal look, which is culturally derived (Beardsworth et al., 2002). Likewise, culture affects perceptions of food's taste (Zellner, Garriga-Trillo, Centeno, & Wadsworth, 2004), as well as risk perceptions (Kahan, Braman, Gastil, Slovic, & Mertz, 2005).

Studying what lies behind gender differences in food choices is of great importance, as better understanding of the factors underlying females' healthier food choices can aid in influencing males to make healthier food choices. Uncovering the sources for gender differences in memory-based choices serves in a benchmark case only; studying the effect of calorie information on choices, and exploring whether or

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not females respond differently to this information than do males provide additional insights.

The purpose of this paper is twofold: first, to explore the sources of gender differences in food choices in a constructed methodology; and second, to study how calorie information affects males' and females' choice processes. Toward this end, this study analyzes whether preferences for leaner choices result from socio disposition; whether they are the outcome of differences in knowledge; and finally whether differences in food choices are the result of differences in sensory perceptions between males and females. In addition, this paper studies the effect of calorie information on consumers' choice processes between food items, and whether such information widened or narrowed the gap between the genders therein. Previous literature suggests that calorie information affects females' choices, shifting their selections toward lower-calorie foods, while calorie information does not change males' choices (Driskell, Dymont, Mauriello, Castle, & Sherman, 2008; Gerend, 2009). Analyzing both perceptions and choice processes results in better understanding of information's effect on final choices, and helps identify the sources of gender differences in response to calorie information.

2. Literature review

Men and women behave differently vis-à-vis their choices of what to eat: Men consume more beef, eggs, and poultry; while women eat more fruits and vegetables and consume less fat than do men (CDC, 2008; Johansson & Andersen, 1998). Consumption of fruits and vegetables is considered an efficient strategy in balancing diet, fighting obesity, and maintaining health. Furthermore gender differences in preferences for more healthful foods begin in childhood. Previous literature suggests that girls choose more healthful food and are fonder of fresh produce than are boys (Le Bigot Macaux, 2001; Wardle, Haase, Nillapun, Jonwutiwes, & Bellisle, 2004). Boys rate beef, processed meat, and eggs as more desirable than do girls. Wardle et al. (2004), however, word their findings cautiously, suggesting that these findings may have physiological origins (higher energy requirements for boys), or lie in social desirability, which has a stronger impact on girls' behavior.

The literature provides several explanations for the difference in choices and higher (lower) preferences for more healthful foods. Among the explanations are an information gap indicating that females are more aware of and have better knowledge of nutrition than do males (Johansson & Andersen, 1998), differences in sensory taste (Duffy & Bartoshuk, 2000), evolution (Faas, Barbro, & de Vos, 2010), and cultural norms (Zellner et al., 2004). Nutrient knowledge is a necessary, though not sole condition, for making wise food choices. The state of being more knowledgeable results from differing media exposure, where media sectors that target women place emphasis on health, appearance, education, and other topics believed to arouse their audience's interest.

Sensory (taste) differences between the genders are the second most widely ventured explanation for gender differences in food choices, although genetic differences may not actually exist. While the popular media argue that females prefer sweetness and dislike bitterness, and while males may enjoy bitterness (Shah, 2010), academic literature on this matter is less conclusive. The bitter taste receptor, gene TAS2R38, has been associated with the ability to taste PROP (6-n-propylthiouracil), one source of genetic variation in PROP and PTC taste. Individuals who experience bitterness strongly are assumed to also experience sweetness strongly relative to those who experience PROP as only slightly bitter (Reed, Tanaka, & McDaniel, 2006). While previous studies found that inherited taste-blindness to bitter compounds such as PROP may be a risk factor for obesity, this literature has been hotly disputed (Keller et al., 2010).

The distribution of perceived PROP bitterness differs among women and men, as does the correlation between genetic taste measures and acceptance of sweetness (Duffy & Bartoshuk, 2000). A higher percentage of women are PROP and PTC tasters, sensing bitterness above threshold (Bartoshuk, Duffy, & Miller, 1994). Some scholars suggest

that women are more likely to be *supertasters*, or those who taste with greater intensity than average. PROP and PTC sensitivity, however, does not fully explain the supertaster phenomenon (Bartoshuk et al., 1994).

The correlation between PROP sensitivity and vegetable consumption appears mixed: Early studies suggested that consumers who are sensitive to bitterness (PROP sensitivity) are more likely to dislike foods that contain coffee, beer, and bitter vegetables, such as uncooked cabbage and spinach (Fisher et al., 1961). Yet later studies report only minimal effects of PTC taster status on the consumption of bitter vegetables (Jerzsa-Latta, Kronl, & Coleman, 1990; Niewind, Kronl, & Shrott, 1988). More recently, Dinehart, Hayes, Bartoshuk, Lanier, and Duffy (2006) showed that the stronger the perceptions of vegetables' bitterness, the lower the preference ratings, and the lower the likelihood that subjects will choose such foods. The correlation between strong ability to sense bitterness and lower odds of choosing vegetables begins at an early age. In a study conducted among children, 8% of the nontaster children declined vegetables in a free-choice test, compared with 32% of taster children. Gender was not correlated to tasters or nontasters/PROP sensitivity (Bell & Tepper, 2006).

Accepting the premise that more women than men are supertasters, and therefore are more sensitive to bitterness, might suggest that the likelihood of women's choosing green salad is lower than that of men. The literature, however, suggests that the reverse holds, that is, women are by far greater salad eaters. Rejecting the genetic explanation on the grounds of not (yet) providing conclusive and comprehensive explanations provides backward to the idea that differences in hormone composition are responsible for differences in food preferences and choices (Bierma, 2005). For example, during pregnancy, women desire (and need) salty food, and the threshold for bitterness increases (see Faas et al., 2010 for review). While preferences for sweetness and fat, and avoidance of bitterness and tart tastes are indeed the outcome of genetics, nothing indicates that the distributions of these traits differ between males and females (Keller et al., 2010). Arguments based on evolution, for example that avoiding bitterness results from mothers' need to protect their infants from poisonous plants (Faas et al., 2010), provide another group of explanations for gender differences in preferences.

While evolution and differences in genetics may create predispositions toward certain foods, the choice of whether to consume vegetables, meat, carbohydrates or sweets is socially and culturally dependent (Zellner et al., 2004) and related to the importance the individual places on healthfulness and physical appeal, as well as on foods' availability (Birch, 1999).

Wansink, Cheney, and Chan (2003) find that while men rate steak, casserole, pizza, and pasta as being sources of pleasure (comfort food), females rate candy, chocolate, salad, and soup as comfort foods. This finding raises speculation about the role of sociopolitical factors in shaping taste and the perceptual correlations between tastiness and healthfulness. While males perceive steak and casserole as healthful, females experience guilt after eating chocolate, indicating perceived undesirable attributes of certain foods, such as small contribution to health, or calorie density. While gender differences in preference for chocolate over steak is consistent with culture, evolution, chromosomes, metabolism, and motivational system theories, females' classification of the American-style salad as comfort food is not intuitively understood. Since salad's taste is likely to be ranked lower than that of French fries or hamburger, only consumers who consider a tradeoff between pleasure, health, and the danger of weight gain and assign high importance weight to non-hedonic attributes will eventually choose the salad. Consequently the following hypothesis is formulated:

H1. A higher perception of raw vegetables' (salads') tastiness among females relative to males reflects gender differences.

The literature suggests that females are more conscientious than are males regarding their own diet and health (Gerend, 2009; Roininen &

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