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Research report

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ABSTRACT

Identifying food pricing strategies to encourage purchases of lower-calorie food products may be particularly important for black Americans. Black children and adults have higher than average obesity prevalence and disproportionate exposure to food marketing environments in which high calorie foods are readily available and heavily promoted. The main objective of this study was to characterize effects of price on food purchases of black female household shoppers in conjunction with other key decision attributes (calorie content/healthfulness, package size, and convenience). Factorial discrete choice experiments were conducted with 65 low- and middle-/higher-income black women. The within-subject study design assessed responses to hypothetical scenarios for purchasing frozen vegetables, bread, chips, soda, fruit drinks, chicken, and cheese. Linear models were used to estimate the effects of price, calorie level (or healthfulness for bread), package size, and convenience on the propensity to purchase items. Moderating effects of demographic and personal characteristics were assessed. Compared with a price that was 35% lower, the regular price was associated with a lesser propensity to purchase foods in all categories ($\beta = -0.33$ to -0.82 points on a 1 to 5 scale). Other attributes, primarily calorie content/healthfulness, were more influential than price for four of seven foods. The moderating variable most often associated with propensity to pay the regular *versus* lower price was the reported use of nutrition labels. Price reductions alone may increase purchases of certain lower-calorie or more healthful foods by black female shoppers. In other cases, effects may depend on combining price changes with nutrition education or improvements in other valued attributes.

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Introduction

The per capita availability of calories has increased in recent decades, and decreases in average caloric consumption will be essential to curbing and reversing the obesity epidemic (Jeffery & Harnack, 2007; Putnam, Allshouse, & Kantor, 2002; Swinburn et al., 2011). Finding effective strategies for reducing obesity is of

particular importance for black Americans. The prevalence of obesity is substantially higher in black than white Americans (Flegal, Carroll, Kit, & Ogden, 2012; Ogden, Carroll, Kit, & Flegal, 2012). National data for non-Hispanic black children ages 6 to 19 years indicate that 25% of boys and 26% of girls are obese, compared with 17% and 13% of non-Hispanic white boys and girls, respectively (Ogden et al., 2012). In non-Hispanic black adults ages 20 years and older, 39% of men and 59% of women are obese, compared with 36% and 32% of non-Hispanic white men and women (Flegal et al., 2012).

Among other factors, the black–white disparity in obesity prevalence may be related to differences in the food marketing environments to which black and white Americans are exposed. Exposure to advertising and other promotional practices that encourage the purchase and consumption of high-calorie foods and to food retail outlets that sell high-fat and high-sugar foods occurs disproportionately in black compared with white communities (Grier & Kumanyika, 2008; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007; Powell, Szczypka, & Chaloupka, 2010). These factors are targeted in obesity prevention strategies that focus on

Abbreviations: BMI, body mass index; SNAP, supplemental nutrition assistance program; NEMS-S, Nutrition Environment Measures Survey-Stores.

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black communities (Kumanyika & Grier, 2006). In addition, to the extent that consumers are price sensitive (Andreyeva, Long, & Brownell, 2010; DiSantis et al., 2013; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Hargreaves, Schlundt, & Buchowski, 2002), reducing the price of healthful lower-calorie foods may encourage purchases of these foods as substitutes for higher-calorie alternatives. Relatively, more blacks than whites have low incomes (Macartney, Bishaw, & Fontenot, 2013), and price sensitivity is greatest among low-income consumers (Andreyeva et al., 2010). Retailers often promote low prices to attract customers and increase sales, but healthy, low-calorie products are not usually the focus of such promotions (Chandon & Wansink, 2012). If anything, current retailing practices related to promotion of low prices are likely to encourage caloric overconsumption (Chandon & Wansink, 2012; Hawkes, 2009).

Studies to improve understanding of price influences on consumers' propensity to purchase foods in a broader context can inform the design of price-related policies and practices for effectiveness in obesity prevention (Faulkner et al., 2011; Powell & Chaloupka, 2009). For example, a multisite qualitative study of the influence of price on food purchases of black Americans identified convenience, healthfulness, and quantity available as additional important considerations in purchasing decisions (DiSantis et al., 2013). The present study was designed to assess the relative importance of these factors experimentally, which has been called for in order to better understand the impact of pricing strategies on consumption behaviors (Epstein et al., 2012). We assessed perceptions of purchase likelihood for typical food and beverage products while varying prices as well as caloric content/healthfulness, package sizes, and convenience. The objective was to gain insights about how product and participant characteristics influenced price sensitivity and to identify potential implications for policy and practice.

Materials and methods

Study design

We conducted discrete choice experiments with 65 black women in a university research setting. Discrete choice designs allow for quantification of the relative impact of multiple attributes that may influence an individual's decisions and are applied to many types of health research, including research on food choice (Darby, Batte, Ernst, & Roe, 2008; Epstein et al., 2012; Jeffries, Lee, Frick, & Gittelsohn, 2013), vaccination acceptability (Lee, Newman, Comulada, Cunningham, & Duan, 2012), and health care systems (Scott, 2002; Scuffham, Whitty, Taylor, & Saxby, 2010). In this within-subject design, we asked each participant to respond to the same series of hypothetical supermarket shopping scenarios for seven typical food and beverage items. The study was conducted during a 2-month period between June and July 2012.

Recruitment

Study participants were self-identified black/African American women, ages 18–65 years, who were primary food shoppers for their households and lived in a household with at least one child. Pregnant women and women who reported having a serious chronic medical illness or condition, which would affect how they shop for food, were excluded. We also excluded women who reported a high level of difficulty in feeding their families, to limit the sample to women who generally had funds (cash and/or SNAP benefits) to buy groceries.

We recruited from a pool of 36 participants in a prior study as well as women with whom we had no prior contact ("naïve" participants). The prior study involved questionnaires about shopping

patterns and collection of 4 weeks of food receipts. Both the prior and current studies recruited for a "food shopping study" through posting flyers at community sites, supermarkets and grocery stores, other community locations and word of mouth and attempted to balance the numbers of low- and middle-/higher-income, and obese and nonobese participants. Income classification was based on self-reported combined household earned and unearned income and low-income eligibility criteria used in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (United States Department of Agriculture Food and Nutrition Service, 2012). Obesity (body mass index [BMI] ≥ 30 kg/m² (NHLBI Obesity Education Initiative, 1998)) was based on BMIs calculated from self-reported weight and height.

Experimental scenarios

Selection of foods and choice options

Scenarios were presented for the following seven food categories: Bread, Chicken, Cheese, Frozen Vegetables, Potato Chips, Fruit Drinks, and Sodas (see Table 1). These foods were selected based on the commonly purchased items identified in the prior, receipt collection study, national data on contributors to calorie intake in black Americans (National Cancer Institute, 2013), and products mostly likely to be targeted in obesity policies (e.g., sugary beverages) (Eyles, Ni Mhurchu, Nghiem, & Blakely, 2012). Four attributes of these foods were varied: calorie content/healthfulness, quantity, convenience (e.g. labor- and time-savings) and price. For calorie content/healthfulness, the lower-calorie options were lower in calories but otherwise comparable to the "regular" option (mean of 32% fewer kcal per 100 grams for food items; 98% fewer kcal per 8 fl oz of beverages). The exception was the bread category, where the more nutrient-dense but sometimes more energy-dense, whole wheat bread was selected as the more healthful alternative to white bread, based on public health recommendations (United States Dietary Guidelines Advisory Committee, 2010). Quantity variations were based on commonly available sizes, where "regular" sizes represented the most commonly available and purchased size. "Larger quantity" products were sizes that were generally not considered bulk packages; they were twice the size of the regular package. "Convenience," which was conceptualized as time-saved (in preparation and clean-up) and/or labor-saved (less skill needed to prepare, less effort required) for the shopper, was an additional variable of interest for Cheese, Fruit drinks, and Chicken.

Price levels were based on an assessment of regular and discounted prices in 39 area stores (performed in May–July 2012) using an adaptation of the Nutrition Environment Measures Survey for Stores [NEMS-S] (Glanz, Sallis, Saelens, & Frank, 2007). Regular prices were averaged across the 39 stores for the "regular price, low quantity" condition. Whether the lower-calorie, more healthful version was more expensive, less expensive, or priced the same as "regular" products depended on the prices we observed in area stores; this varied by food category. We consulted area supermarket circulars to develop accurate "regular prices" for the less or more convenient items when relevant. For the "larger quantity; regular price" scenarios, the "regular quantity, regular price" price was doubled because the volume of the product was doubled. For the low price across all food categories and attributes, we used 35% off the regular price because this was the average discount observed in the stores we surveyed for both the larger and regular quantities.

Format for presenting scenarios

Picture cards were chosen as the medium for presenting scenarios based on the evidence from published reports, indicating

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