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Deal or no deal? The prevalence and nutritional quality of price promotions among U.S. food and beverage purchases

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Abstract

Objective—This study examines trends in the prevalence of price promotions among packaged food and beverage purchases, differences in prevalence by household race/ethnicity or income, and the association between price promotions and the nutritional profile of purchases.

Design—This cross-sectional study utilizes a dataset of 90 million purchases from 38,744 (2008) to 45,042 (2012) US households in 2008–2012. Chi-square tests were used to examine whether the proportion of purchases with price promotions changed over time or differed by household race/ethnicity or income. T-tests were used to compare purchased products' nutritional profiles.

Results—Prevalence of price promotions among packaged food and beverage purchases increased by 8% and 6%, respectively, from 2008 to 2012, with both reaching 34% by 2012. Higher-income households had greater proportions of purchases with price promotions than lower-income households. Asian households had the highest proportion of purchases with any price promotion, followed by non-Hispanic whites. While total price-promoted packaged food purchases had higher mean energy, total sugar, and saturated fat densities than purchases with no price promotions, absolute differences were small.

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Ethical Standards Disclosure: This study used only de-identified secondary data and was deemed exempt from formal review by the University of North Carolina Institutional Review Board.

Conclusions—Prevalence of price promotions among US household purchases increased from 2008 to 2012 and was greater for higher-income households. No clear associations emerged between presence of price promotions and nutritional quality of purchases.

Keywords

price promotions; food marketing; food costs; nutrition; packaged foods

Introduction

The low cost of unhealthy foods and beverages has often been cited as a driver of the current obesity epidemic in the United States^(1–3). Price promotions, in particular — including coupons or temporary discounts on products — incentivize consumers to purchase a food or beverage more quickly, more often, and in greater volume⁽⁴⁾. Children and adults respond strongly to price promotions on both healthy and less-healthy foods in the theoretically expected direction (i.e., lowering prices increases consumer demand)^(5–7). Despite strong evidence linking price promotions to food choice, no studies have yet examined the prevalence of price promotions among US household food purchases or whether this prevalence has changed over time. More importantly, it is currently unknown whether price promotions are more prevalent among purchases of less healthy items such as sugar-sweetened beverages, salty snacks, or desserts compared to healthier purchases like fruits and vegetables. It is also currently unclear whether a product having a price promotion is associated with poorer nutritional quality relative to similar products that do not have price promotions.

Furthermore, no studies have examined whether the prevalence of purchases with price promotions varies by socio-economic status (SES) or by race/ethnicity. Some evidence suggests that lower-SES groups may respond uniquely to price promotions^(8–10). For example, some studies suggest that the link between price, diet, and weight outcomes is stronger in lower-SES populations^(3, 11), who tend to be more cost-conscious⁽¹²⁾ and more likely to take advantage of price promotions⁽¹⁰⁾. Conversely, other research finds that lower-SES consumers are not more responsive to price cuts than higher-SES consumers^(13–17). Understanding whether the prevalence of purchases with price promotions varies by race/ethnicity and SES could inform future programs or policies seeking to reduce diet-related disparities in these groups, who often face greater barriers to achieving a nutritious diet.

Using a dataset of household food and beverage purchases among US households with children aged 2–18 years, this study aims to 1) describe the prevalence of price promotions among household food and beverage purchases, overall and by key food groups; 2) examine whether SES or race/ethnicity is associated with likelihood of purchasing products with price promotions; and 3) characterize the association between price promotions and the nutritional profile of purchases.

Methods

Dataset

This study uses data from the Information Resources, Inc. (IRI) Consumer Network panel⁽¹⁸⁾ (IRI, Chicago, IL). The dataset consists of data from households with children and adolescents aged 2 to 18 years, from 2008 to 2012⁽¹⁹⁾. Participating households scan barcodes on all packaged food and beverage purchases, gathering information on volume, price, retailer, and date of each purchase.

To gather data on price promotions, households are asked upon scanning a product whether or not they received a price reduction on that item. If they answer, “Yes,” the scanner prompts them to qualify the reduction as one of the following: a store sale (e.g., a temporary price reduction or a loyalty card discount offered by the particular store), a store coupon, a manufacturer coupon, or “other sale” (another type of discount such as senior citizen or employee). For coupons, the household enters the value of the coupon. For the purposes of this study, price promotions were classified as either coupons (combining store coupons and manufacturer coupons) or deals (combining store sales and other sales).

Finally, purchase data from these scans is linked to IRI’s product dictionary information database containing each product’s nutritional data from the nutrition facts panel (NFP) as well as any product claims made on the front of the package⁽¹⁹⁾. This allows for examination of the relative nutritional value of purchased products with and without price promotions.

The dataset contains 90,046,893 purchases from 2008 to 2012, of which 97% had NFP information for calories, 97% for sugars, 94% for total fat and 97% for sodium. All purchases contained information on whether a price promotion was present. With the exception of purchases from fruit and ready-to-eat cereal subgroups, purchases with price promotions were 4% to 34% less expensive than those without price promotions in 2012 (Supplemental Table 1).

More information about IRI’s data collection methods and detailed household characteristics can be found in the USDA Economic Research Service bulletin, “Understanding IRI Household-Based and Store-Based Scanner Data”⁽¹⁹⁾.

Food categorization

In addition to examining total packaged food and ready-to-drink (RTD) beverage purchases (i.e., beverages that are ready to consume upon purchase as opposed to requiring preparation), packaged foods and beverages were grouped into modules according to where they are found in the supermarket and aggregated to create meaningful food and beverage subgroups reflecting nutritional content as well as how the products are typically consumed. Key food subgroups included grain- and dairy-based desserts, ready-to-eat (RTE) cereals, salty snacks, sweet snacks, fruits (frozen, fresh, dried and canned), and vegetables (frozen, fresh, and canned). Beverage subgroups included soda, RTD juice and juice drinks, RTD dairy beverages, lower-calorie carbonated soft drinks (“diet soda”), and RTD sports, energy, tea and coffee drinks) (Supplemental Table 2).

Socio-demographic variables

Socio-economic status was determined using reported household income from the IRI data and grouped into low-, middle-, or high-SES based on the Federal Poverty Level (135%, 136–300%, >300%, respectively). Self-reported household race/ethnicity was grouped into four mutually exclusive categories: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic other.

Statistical analyses

Data management and computing were performed using Microsoft SQL Server 2014⁽²⁰⁾ (Microsoft Corporation, Redmond, WA). Statistical analysis was conducted using Matlab⁽²¹⁾ (Version 2014b, MathWorks, Natick, MA) and Microsoft Excel 2013⁽²²⁾ (Microsoft Corporation, Redmond, WA). First, the number and proportion of all packaged foods and beverages purchased with price promotions from 2008 to 2012 was examined using chi-square tests to determine whether the proportion of all purchases with price promotions changed over time. Next, pooled purchases from 2008 to 2012 were examined using *t*-tests (with statistical significance achieved at $P<0.01$) to determine mean nutrient density (kJ or kcal of energy, g total sugar, g saturated fat, and mg sodium per 100 g) for each type of price promotion as well as any price promotion vs no promotion. Finally, chi-square tests were used to examine whether the proportion of purchases with price promotions varied by SES or race/ethnicity. All tests were Bonferroni-corrected for multiple testing.

Results

Overall trends

From 2008 to 2012, prevalence of price promotions among purchases increased from 25% to 33% for packaged foods and 28% to 34% for RTD beverages. Deals were more prevalent than coupons for both foods and beverages (30% vs 10% for foods, and 31% vs 8% for beverages in 2012) (Figure 1).

Prevalence of purchases with price promotions increased from 2008 to 2012 for all packaged food and RTD beverage subgroups (Supplemental Figure 1). The highest proportions of price promotions were seen for RTE cereal purchases among foods (45% in 2012) and lower-calorie carbonated soft drink purchases among beverages (48% in 2012). The greatest relative increase in price promotion prevalence from 2008 to 2012 occurred in sports, energy, tea, and coffee drinks purchases (+12.7% more purchases) among beverages. The greatest increases for foods were among sweet snack and RTE cereal purchases (+10.3%) and grain- and dairy-based dessert purchases (+9.1%).

Purchases of fruits (+5.7 percentage points) and vegetables (+5.0 percentage points) among foods and RTD dairy-based beverages (+1.6 percentage points) saw the lowest relative growth from 2008 to 2012 in price promotion prevalence.

Race and SES

In 2008–2012, Asian households had the highest prevalence of food and beverage purchases with any price promotion (36.8% and 37.4% of foods and beverages, respectively; $P<0.001$

for comparison to non-Hispanic whites), followed by non-Hispanic whites (31.1% for foods and 33.1% for beverages), while non-Hispanic blacks had the lowest prevalence of purchases with price promotions (26.0% for foods and 28.7% for beverages, $P<0.001$) (Figure 2). SES was inversely related to proportion of purchases with a price promotion: for high-income households, 33.3% of food purchases and 35.4% of beverage purchases had a price promotion, compared to 25.8% of foods and 27.9% of beverages for low-income households ($P<0.001$). All race/ethnic and SES groups purchased a greater proportion of price-promoted beverages than foods.

Nutritional density of purchases with price promotions

Among total packaged food purchases, those with any price promotion had relatively higher energy density (+2.0%), total sugar density (+1.6%), and saturated fat density (+8.7%) than did food purchases with no price promotion ($P<0.001$ for all comparisons) (Figure 3), though absolute differences in nutrient densities (measured as kcal/100 g for energy and g/100 g for sugar and fat) were small (Supplemental Table 3). Packaged food purchases with any price promotion had 18% lower sodium density than those without (absolute difference -115.7 mg/100 g, $P<0.001$). Examined by specific promotion type — coupon or deal — nutrient densities generally differed from those for non-price-promoted purchases in similar directions and magnitudes, although food purchases made with coupons had much higher mean total sugar density relative to non-price-promoted purchases (+11.0% or +1.5 g/100 g) than did food purchases made with deals (+0.5% or +0.1 g/100 g) (Figure 3).

Among RTD beverage purchases, those with any price promotion had relatively lower mean total energy density (-8.5%), saturated fat density (-28.3%), and sodium density (-19.8%) but higher total sugar density (+3%) than did purchases with no promotion ($P<0.001$), though again, absolute differences in nutrient densities were minimal (Figure 3, Supplemental Table 3). For example, RTD beverage purchases with any price promotion had 8.5% lower energy density than beverages purchased with no price promotion, but this reflects an absolute difference of only 14.2 kJ (3.4 kcal) per 100 grams ($P<0.001$). Relative to purchases with no price promotion, the direction and magnitude of nutrient densities for beverage purchases with coupons and deals were similar.

There was considerable heterogeneity in the association between presence of price promotions and nutrient density by food and beverage subgroup (Table 1). Among foods, the largest relative differences were seen for fruit purchases, which had relatively higher mean energy density (+4.2%) and mean sodium density (+29.0%) but lower mean saturated fat density (-37.9%) and comparable mean total sugar density (+1.6%) relative to purchases without a price promotion ($P<0.001$ for all comparisons), though absolute differences in nutrient density were small. Considering absolute differences, grain- and dairy-based dessert and salty snack purchases with a price promotion had lower mean sodium density (-27.6 mg/100 g and -47.1 mg/100 g, respectively) relative to purchases without a price promotion; price-promoted grain-based desserts also had a lower mean energy density (-38.1 kJ/100 g or -9.1 kcal/100 g) while price-promoted salty snacks had a higher mean energy density (+23.0 kJ/100 g or +5.5 kcal/100 g) relative to purchases in those subgroups without price

promotions ($P<0.001$). Ready-to-eat cereals, vegetables, and sweet snacks showed relatively few differences between purchases with and without a price promotion.

There was also substantial heterogeneity among nutrient densities by beverage subgroup for purchases with and without a price promotion. Price-promoted low-calorie carbonated soft drink purchases had much lower mean nutrient densities than those without, but this was largely due to the very low nutrient densities of all low-calorie beverages, and absolute differences were trivial. Similarly, RTD juice and juice drink purchases with price promotions had lower mean saturated fat and sodium densities relative to those without promotions (-49.0% and -28.6% , respectively), but absolute differences were not substantial (-0.1 g/100 g and -5.5 mg/100 g, $P<0.001$) — no surprise given that these are not typically significant nutrients for these beverage groups. The largest absolute difference was seen for RTD sports, energy, tea, & coffee drinks, which had lower mean energy density, relative to purchases without price promotions (-14.8% , 19.7 kJ/100 g or -4.7 kcal/100 g, $P<0.001$). Price-promoted sodas and sports/energy drinks also had lower mean total sugar density than did non-price promoted beverages (-2.8% and -4.0% , respectively) but absolute differences were small (-0.4 g/100 g and -0.3 g/100 g, respectively) ($P<0.001$). Price-promoted RTD dairy beverages had higher mean total sugar density ($+6.1\%$ or $+0.3$ g/100 g), but lower saturated fat density (-10.0% or -0.1 g/100 g). Regarding sodium, all subgroups except lower-calorie carbonated soft drinks had lower mean sodium density for price-promoted purchases than for purchases with no price promotion, though absolute differences were small.

Discussion

The overall prevalence of any price promotion among US household purchases was roughly 34% for both packaged foods and RTD beverages in 2012. This is greater than recent estimates of the prevalence of price promotions in the national food supply: a 2016 study by Powell et al. examining promotions on food and beverage products from a nationwide sample of food stores found that 13.4% of sampled products in supermarkets, 4.5% in grocery stores, and 2.6% in limited service stores featured price promotions⁽²³⁾. The higher prevalence of promotions found among actual purchases in this study suggests that shoppers preferentially buy price-promoted items, as would be expected.

This study also found that from 2008 to 2012, prevalence of price promotions increased 8% among packaged food and 6% among RTD beverage purchases. This increase is consistent with other trends observed during and after the Great Recession (2007–2009)⁽²⁴⁾, namely an increased propensity for discount-seeking behavior^(25–27). In 2009, for example, overall coupon redemptions rose 27%, while internet coupon redemptions rose 263%^(25, 28). A 2012 Food Marketing Institute report found that 28% of surveyed consumers began new discount-seeking behaviors during the recession⁽²⁶⁾, and the 2010 American Pantry Survey indicated that 89% of consumers felt they had become more resourceful because of the economy, 93% expected to continue spending cautiously even if the economy should improve, and 55% suffered no decline in income but still felt they “should be” cutting back⁽²⁹⁾.

SES differences

Contrary to expectations, high-SES households had a higher prevalence of price promotions among purchases than low-SES households. Previous work has suggested that low-income consumers tend to be more cost-conscious⁽¹²⁾, more sensitive to price promotion strategies, and more likely to take advantage of these⁽¹⁰⁾, though studies of price elasticity are mixed as to whether low income consumers are more or less responsive to price changes^(14–17). One possibility is that these results reflect differences in where households shop, rather than responsiveness to price promotion. For example, lower-SES consumers are more likely to shop at “big-box” supercenters such as Wal-Mart or Costco^(30–32), which set lower, but less variable, prices across a wide assortment of products^(33–36). Prices at these “everyday low pricing” stores are unlikely to drop even lower via price promotions. Higher-SES households could be exposed to more price promotions where they shop, as traditional retailers with relatively higher food prices have more room to offer discounts. Some research has shown that consumers who shop at “everyday low pricing” stores are actually less sensitive to short term price changes, as well⁽³⁷⁾. Accounting for differences by preferred retailer as well as other dietary preferences that might influence exposure to price promotions (such as underlying preferences for categories that tend to be more frequently promoted) will improve understanding of price promotions’ effects on purchases.

Differences by race/ethnicity

This study found Asian households to have the highest proportion of price promotions among purchases — about four percentage points more than the next-highest group (non-Hispanic white households) and nine percentage points more than non-Hispanic black households, who had the lowest proportion. One possibility is that this is actually a function of household income, with higher-income race/ethnic groups utilizing price promotions more frequently. Census data shows that Asian Americans have the highest median household income in the United States, followed by non-Hispanic whites, with non-Hispanic blacks having the lowest median income^(38, 39).

It is also possible these race/ethnic differences simply reflect other shopping tendencies not measured here. While no studies have explicitly examined differences in response to price promotions by race/ethnicity^(40–44), some have argued that deal-proneness and price sensitivity are influenced more by a household’s shopping patterns and psychographic shopper characteristics than by demographic variables^(43, 45, 46). Response to price promotions may be higher for those who do not use shopping lists⁽⁴⁷⁾, those who are more impulsive, who enjoy trying new brands or products, or who have greater overall shopping enjoyment⁽⁴⁸⁾, and those who perceive themselves as savvy shoppers or “market mavens”⁽⁴⁹⁾. Future research will examine how price promotions affect consumer food decisions, controlling for potential confounding demographic variables, in order to better understand how price promotions might differentially affect key subgroups and thus shape nutritional outcomes.

Implications for diet quality

Food groups—Households reported price promotions on a substantial proportion of RTD beverage purchases — over 40% in 2012 for three of the five subgroups (sodas, lower-

calorie carbonated drinks, and sports, energy, tea, and coffee drinks) (Supplemental Figure 1b). The sports, energy, tea, and coffee drinks subgroup saw the greatest increase in price promotion prevalence of any subgroup from 2008 to 2012, which could indicate an increased shopper preference for these products when price-promoted or increases in manufacturer or retailer use of price promotions on them. This trend could also simply reflect increased popularity of this beverage category during the study period, as off-trade sales volumes for RTD coffee, RTD tea, sports drinks, and energy drinks increased 41%, 22%, 9%, and 45%, respectively, from 2008 to 2012⁽⁵⁰⁾.

Among food subgroups, price promotions were most prevalent for RTE cereal and sweet snack purchases and least prevalent for fruit and vegetable purchases. These findings are consistent with other research that has found lower prevalence of price promotions in the food supply for healthier product categories: Powell et al. found that in US supermarkets, prevalence of price promotions was lowest among fresh fruits and vegetables and highest among sugar-sweetened beverages⁽²³⁾. In addition, a 2014 content analysis of online grocery store coupons from six national grocery chains found that very few of the available coupons during the study period were for fruits (<1%) or vegetables (3%), and that 25% were for processed snack foods, candies, and desserts⁽⁵¹⁾. Over half of beverage coupons in the study promoted sodas, juices, and energy/sports drinks.

The higher prevalence of price promotions among purchases of RTE cereals (45%), sweet snacks (41%), and sodas (41%) found here is potentially troubling, as some research has shown people tend to consume convenience foods such as these more quickly than those requiring preparation⁽⁵²⁾. On the other hand, increased price promotions may not necessarily translate into changes in consumption if consumers simply switch brands, buy more of a product but consume it at a normal rate (forward-buying), or if they buy more but then waste the food^(4, 44). Consumers could shift from buying one more expensive, unhealthy product to a less-expensive but nutritionally similar product^(53–55), or they may use cost savings from price-promoted healthier items towards purchasing additional unhealthy items⁽⁵⁶⁾.

Some research has shown that while price promotions increase short-term sales, these promotions do not necessarily translate into long-term changes in food intake patterns or purchasing behaviors^(4, 57, 58). Interventions using vouchers or coupons for fruits and vegetables, primarily in low-income households, have generally found increased intake of these categories, but little change in overall food expenditures or nutrients, although these studies predominantly rely on self-reports, which may be biased^(59–62). More research is needed to understand how price promotions may link to long-term food and beverage purchasing patterns and dietary changes.

Nutritional quality—Though packaged food purchases with any price promotion had greater mean energy, total sugar, and saturated fat densities than purchases with no promotion, absolute differences were small, with the exception of mean sodium density. RTD beverage purchases with any price promotion had greater mean total sugar density and lower energy, saturated fat, and sodium density than purchases without promotions, but again, these did not reflect substantial differences in absolute nutrient densities for standardized 100-gram portion sizes. It should be noted that small absolute differences in

nutrient densities could possibly accumulate to more meaningful levels depending on a household's overall purchase volume and consumption of purchased products. For example, salty snack purchases with price promotions had, on average, 47 mg less sodium per 100 grams than did salty snacks with no promotion; if a household bought (and consumed) quantities of price-promoted salty snacks much higher than 100 grams (e.g., a 480-gram family-size bag of potato chips), this sodium difference could become more meaningful for that household's overall diet.

In addition, there were substantial differences in nutrient profile for products with and without price promotions by subgroup, especially for beverages. Dairy beverages with a price promotion, in particular, had substantially lower mean saturated fat, energy, and total sugar densities than did dairy beverages without a price promotion. All beverages with a price promotion had lower total sugar densities than those without, and this was particularly pronounced among sodas and energy/sports drinks. Among foods, price-promoted grain- and dairy-based desserts and salty snacks had substantially lower sodium density than non-price promoted purchases. These results run contrary to the popular notion that discounted foods and beverages are nutritionally poorer. However, given the cross-sectional nature of the data, it is impossible to establish whether price promotions elicit increased purchases of products with differential nutritional profiles, whether consumers with underlying dietary preferences are more or less responsive to price promotions, or if these findings simply reflect a tendency of retailers or manufacturers to promote certain products over others.

It is also worth noting that purchasing a food or beverage with a price promotion does not necessarily guarantee lower cost, relative to other choices in a product category. While price-promoted purchases of grain- and dairy-based desserts, salty snacks, sodas, and ready-to-drink juice and juice drinks all had consistently lower average prices compared to non-price-promoted purchases in 2008, 2010, and 2012, purchases in other categories were sometimes more expensive when price promoted. For example, price-promoted fruit purchases in this sample cost 7 cents more per 100 grams than fruits with no price promotion in 2008 and 3 cents more per 100 grams in 2012 ($P < 0.001$). This could reflect what consumers actually bought, or that fruits that are price-promoted tend to be more generally more expensive than fruits that are not (e.g., pomegranates vs bananas).

Limitations and future directions

This study is a cross-sectional description of the overall prevalence of price promotions among US household packaged food and RTD beverage purchases across a relatively limited time span (2008–2012). As such, these results do not inform the degree to which price promotions elicit a certain consumer response, nor whether they lead to improved nutritional quality of purchases. Results pertaining to the nutritional quality of purchases with or without price promotions must be interpreted carefully, as it is unclear whether the price promotions lead consumers to buy products with a different nutritional quality, or whether individuals who share a certain set of dietary preferences are more likely to purchase products with price promotions. Furthermore, this paper aimed to examine just one type of marketing technique — price promotions — and the associated nutritional quality of price-promoted purchases; an important area for future exploration will be the energy and nutrient

cost of products overall and by serving size. In addition, this descriptive work did not examine whether price promotions have a differential association with nutritional profile of purchases across SES strata or by race/ethnic group. Addressing this possible heterogeneity in response will be important for future research in examining potential determinants of diet-related disparities in the United States. Finally, it will be important to understand if associations between price promotions and nutritional quality are changing over time, as scholars and policymakers consider potential strategies for improving dietary quality.

While studying purchases provides a helpful understanding of how commonly this marketing strategy appears among purchases of healthy vs less healthy food groups, the prevalence of price promotions among household purchases is a function of both the frequency of these promotions on foods and beverages as well consumer's response to them. The fact that a consumer purchased a price-promoted product indicates that the promotion may have "worked," but the data ultimately represents a combined effect of the price promotion, itself, with moderators such as frequency and duration of promotions, marketing intensity, competitive reactions from other retailers or manufacturers, and shopper characteristics such as deal-proneness⁽⁶³⁾. This study did not examine these moderating factors or different types of price promotions in detail, nor did it examine the presence of other sales promotions (i.e., feature or display promotions) or related advertising, which can enhance the effects of a price promotion⁽⁴⁾. Future research will benefit from using longitudinal models to control for selectivity issues such as where consumers shop, unobserved preferences, and socio-demographic characteristics in order to identify how price promotions link to consumer choice.

Conclusions

US households commonly take advantage of price promotions when purchasing packaged foods and ready-to-drink beverages, and the proportion of these purchases made using price promotions increased from 2008 to 2012. Nutritional differences in purchases of price promoted vs non-price-promoted products were small in 2012 for both foods and beverages, but could potentially reflect meaningful differences over total household food purchases and intake. Higher-income and Asian households had the highest percent of purchases with price promotions in 2012. More research is needed to better understand the causal mechanism between price promotions and consumer choice, as well as downstream implications for nutritional quality and dietary disparities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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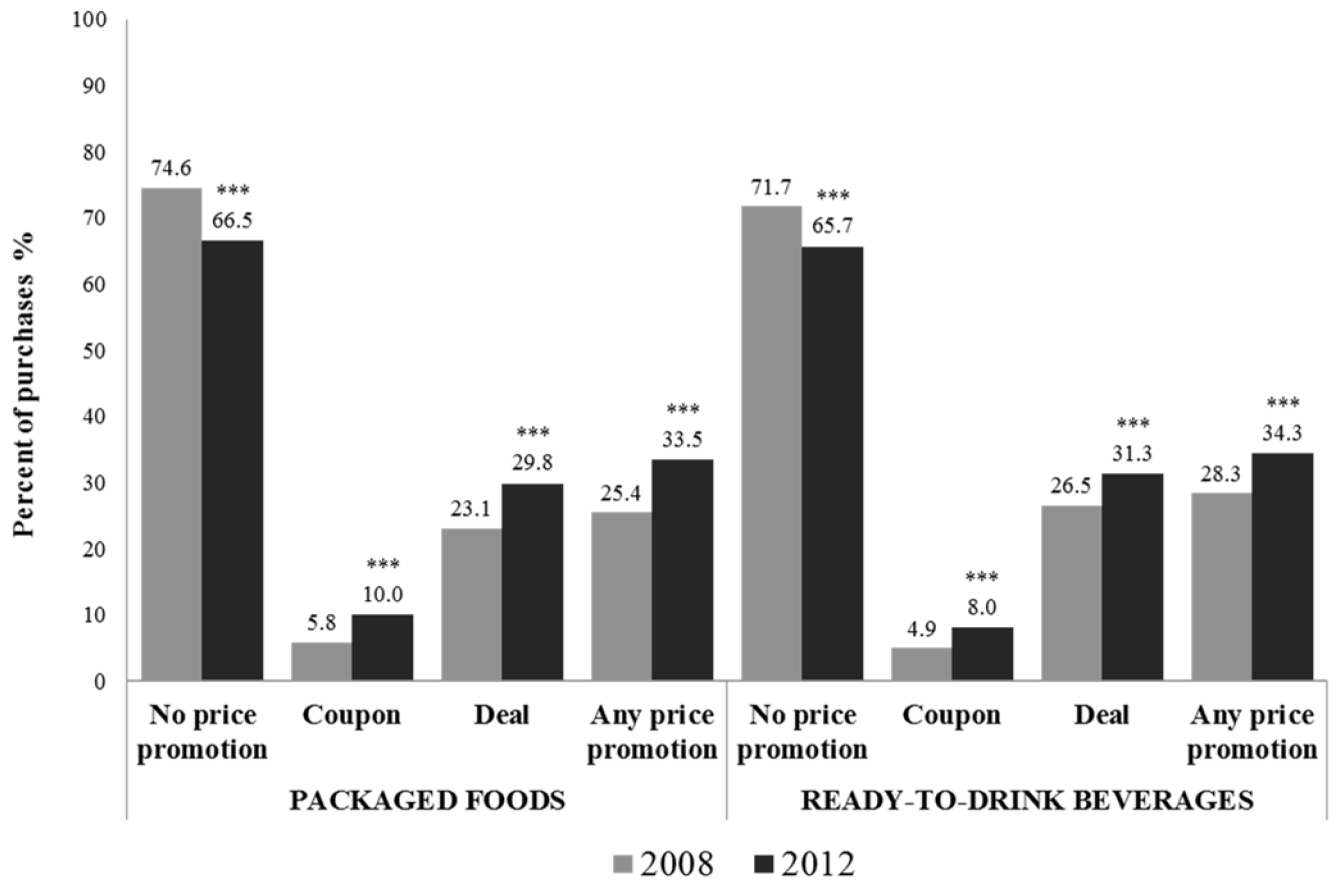


Figure 1. Trends in mean per capita percent of IRI Consumer Network[†] panel purchases[‡] with price promotions from 2008 to 2012

[†] IRI, Chicago, IL; [‡] n=90,046,893 purchases

*** P <0.001 for 2012 vs. 2008

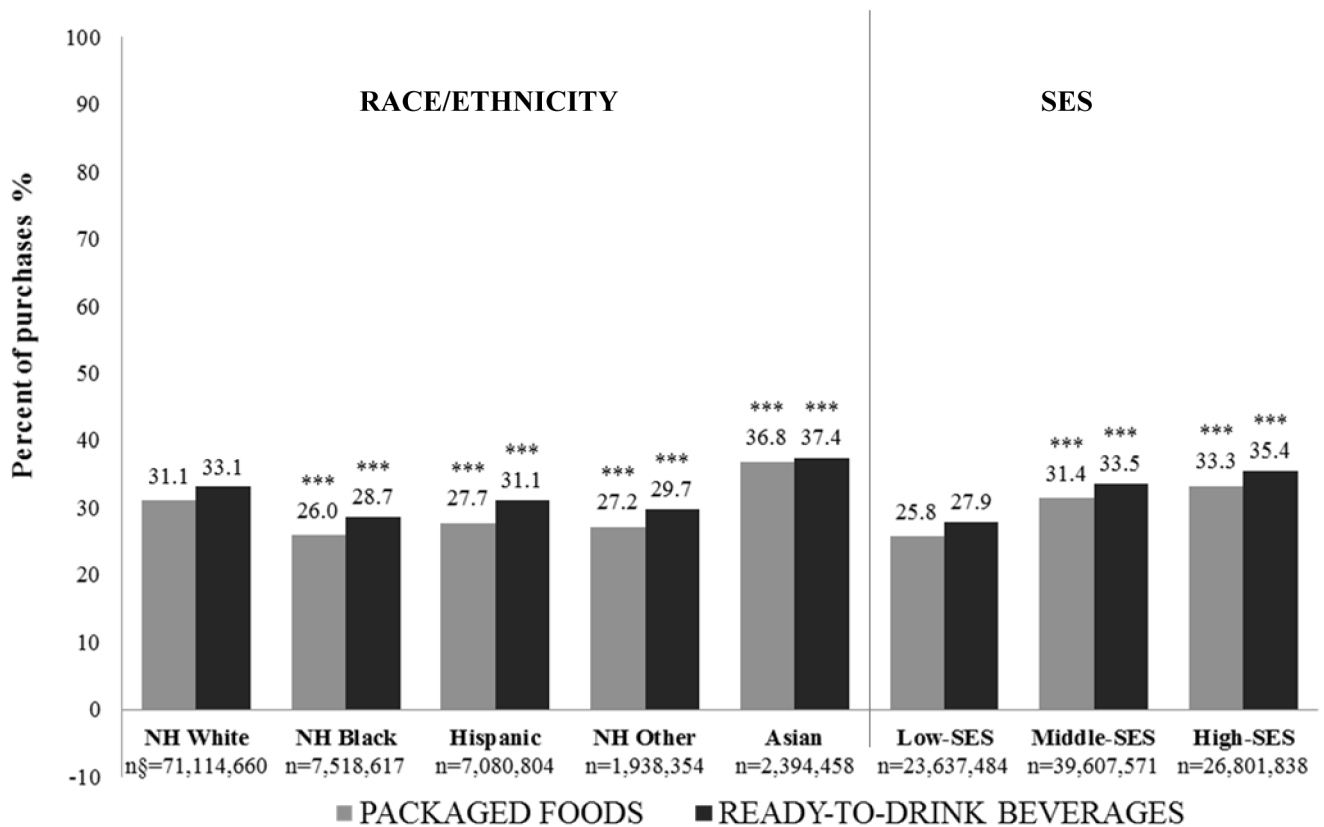


Figure 2. Mean per capita percent of IRI Consumer Network[†] panel purchases with any price promotion[‡] from 2008–2012, by household race/ethnicity and socio-economic status

NH, non-Hispanic; SES, socio-economic status

[†] IRI, Chicago, IL

[‡] “Any price promotion” defined as all coupons and deals self-reported by households participating in the IRI Consumer Network panel⁽¹⁸⁾ (IRI, Chicago, IL) from 2008–2012

[§] n = (number of packaged food purchases) + (number of ready-to-drink beverage purchases) for each race/ethnic and socio-economic group.

*** P <0.001 for race/ethnic group vs. non-Hispanic white and SES group vs. low-SES

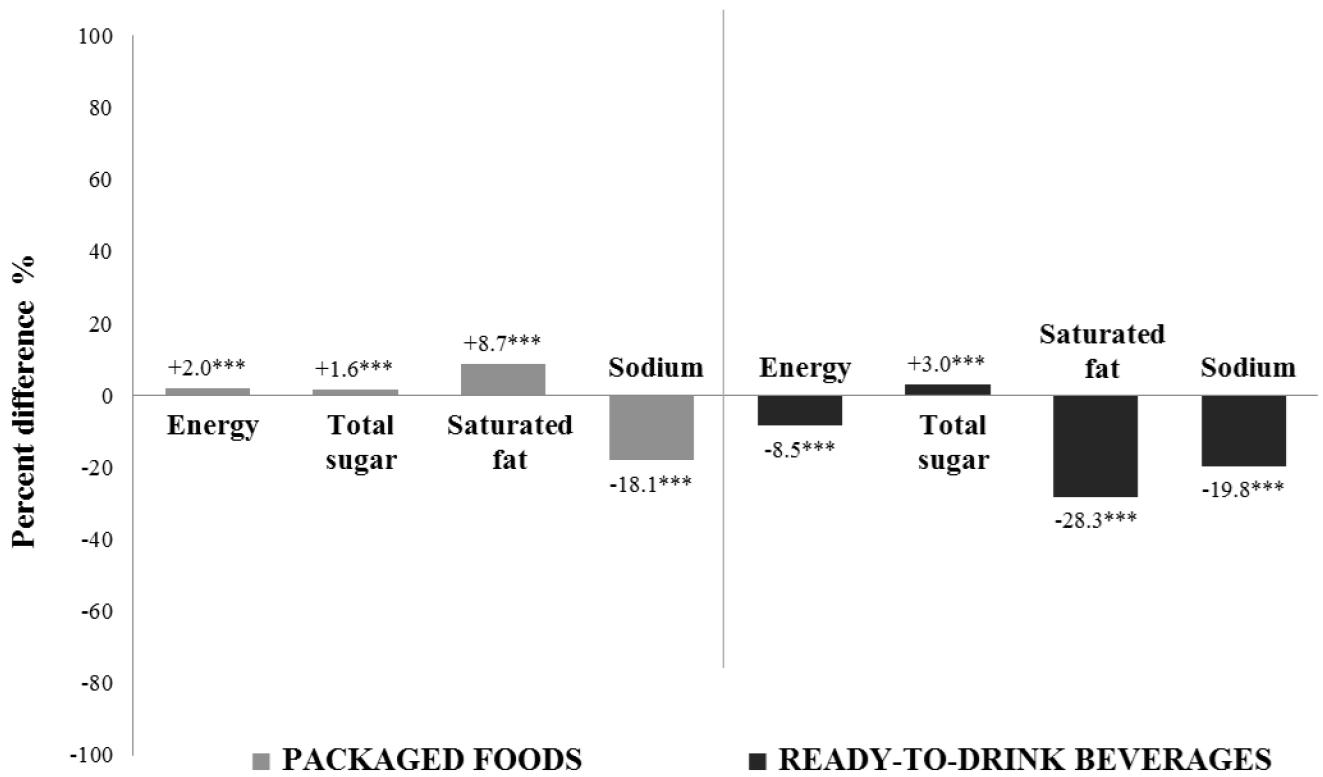


Figure 3. Relative differences in mean nutrient densities for 2008–2012 IRI Consumer Network[†] panel purchases of packaged foods[‡] and ready-to-drink beverages[§] with any price promotion vs. no price promotion

[†] IRI, Chicago, IL

[‡] n=76,857,754 food purchases

[§] n=13,189,139 beverage purchases

*** P <0.001 for any price promotion vs. no price promotion

Table 1

Absolute[†] and relative[‡] differences in mean nutrient densities of packaged food and ready-to-drink beverage subgroup purchases with any price promotion[§] vs no price promotion, 2008–2012

	NUTRIENT DENSITY							
	Energy		Total sugar		Saturated fat		Sodium	
	Absolute difference (kcal /100 g)	Relative difference (%)	Absolute difference (g/100 g)	Relative difference (%)	Absolute difference (g/100 g)	Relative difference (%)	Absolute difference (mg/100 g)	Relative difference (%)
PACKAGED FOODS								
Total packaged foods	5.6 ***	2.0	0.2 ***	1.6	0.3 ***	8.7	-115.7 ***	-18.1
Grain & dairy-based desserts	-9.1 ***	-2.4	-0.6 ***	-2.1	0.1 ***	1.1	-27.6 ***	-6.4
Salty snacks	5.5 ***	1.1	-0.1 ***	-2.3	-0.1 ***	-2.1	-47.1 ***	-6.4
RTE cereals	-3.4 ***	-0.9	-0.7 ***	-2.5	0.0 ***	-2.6	-1.9 ***	-0.4
Fruits, frozen, fresh, dried, and canned	5.3 ***	4.2	0.4 ***	1.6	-0.1 ***	-37.9	7.2 ***	29.0
Vegetables, frozen, fresh, and canned	-1.2 ***	-2.0	0.0	0.1	0.0 ***	5.4	0.4 *	0.2
Sweet snacks	-2.5 ***	-0.6	-1.2 ***	-3.7	-0.4 ***	-7.0	16.8 ***	5.5
RTD BEVERAGES								
Total RTD beverages	-3.4 ***	-8.5	0.2 ***	3.0	-0.1 ***	-28.3	-6.0 ***	-19.8
Soda	-0.4 ***	-0.9	-0.4 ***	-2.8	0.1 **	16.0	-0.5 ***	-3.2
RTD juice & juice drinks	0.6 ***	1.5	0.2 ***	2.2	-0.1 ***	-49.0	-5.5 ***	-28.6
RTD dairy-based beverages	-0.3 ***	-0.5	0.3 ***	6.1	-0.1 ***	-10.0	-0.4 ***	-0.6
LC carbonated soft drinks	-0.1 ***	-22.5	-0.1 ***	-27.7	0.0 ***	-70.1	0.1 ***	1.1
RTD sports, energy, tea, & coffee drinks	-4.7 ***	-14.8	-0.3 ***	-4.0	0.0 ***	-19.7	-3.2 ***	-8.3

RTE, ready to eat; RTD, ready to drink; LC, lower-calorie

[†]Absolute difference = (mean nutrient density of subgroup purchases with price promotions) – (mean nutrient density of subgroup purchases with price promotions);

[‡]Relative difference = [(absolute difference) ÷ (mean nutrient density of subgroup purchases without price promotions) * 100]

[§]Any price promotion” is defined here as all coupons and deals reported by households participating in the Information Resources, Inc. Consumer Network panel⁽¹⁸⁾ (IRI, Chicago, IL) from 2008–2012.

1 kcal = 4.184 kJ;
* $P < 0.05$;
** $P < 0.01$;
*** $P < 0.001$

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