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The impact of price discounts and calorie messaging on beverage consumption: A multi-site field study

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ABSTRACT

Objectives. To examine the efficacy of alternative approaches for shifting consumers toward zero calorie beverages. We examined the effect of price discounts and novel presentations of calorie information on sales of beverages.

Methods. This prospective interrupted time-series quasi-experiment included three sites in Philadelphia, PA, Evanston, IL, and Detroit, MI. Each site received five interventions: (1) a 10% price discount on zero-calorie beverages; (2) the 10% discount plus discount messaging; (3) messaging comparing calorie information of sugared beverages with zero-calorie beverages; (4) messaging comparing exercise equivalent information; and (5) messaging comparing both calorie and exercise equivalent information. The main outcome was daily sales of bottled zero-calorie and sugared beverages. Data was collected from October 2009 until May 2010 and analyzed from May 2010 until May 2011.

Results. The overall analysis failed to demonstrate a consistent effect across all interventions. Two treatments had statistically significant effects: the discount plus discount messaging, with an increase in purchases of zero calorie beverages; and the calorie messaging intervention, with an increase in purchases of sugar-sweetened beverages. Individual site analysis results were similar.

Conclusions. The effects of price discounts and calorie messaging in different forms on beverage purchases were inconsistent and frequently small.

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Introduction

Rapidly rising health care costs and an increasing recognition of the connection between heart disease, diabetes, hypertension and obesity have resulted in the nation's obesity epidemic taking center stage as a public health concern. Poor nutrition and physical inactivity leading to obesity is one of the top preventable causes of death in the United States (Mokdad et al., 2004). As a result population-level policy and environmental interventions targeting diet and exercise behaviors are becoming more frequent. These include recent local and national policies such as sugary beverage taxation and calorie-labeling on menus. McDonald's is now posting calories next to the price of all menu items, and New York City Mayor Michael Bloomberg has banned the sales of sugar-sweetened beverages in sizes larger than sixteen ounces. Yet, in many cases, the evidence is still mixed on the utility and success of these types of interventions at altering consumer behavior.

While some studies of calorie labeling suggest some modest impact (Chu et al., 2009; Milich et al., 1976; Roberto et al., 2010; Tandon et al., 2010), several studies investigating fast food purchases have found minimal impact of calorie labeling on calories purchased and consumed. (Downs et al., 2009; Dumanovsky et al., 2011; Elbel et al., 2009; Finkelstein et al., 2011; Harnack et al., 2008). In one study of an urban low-income population, many customers reported that they were influenced by calorie information postings, but data from meal receipts revealed no change in behavior (Elbel et al., 2009). In contrast, a study of calorie information posting in New York City found a 6% decline in calorie consumption following labeling, but this decline was due to changes in food rather than beverage purchases (Bollinger et al., 2010).

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Some studies have found that raising the price of soft drinks is effective at reducing consumption with estimated effects of an 8–10% decrease in consumption for every 10% increase in price (Andreyeva et al., 2010; Block et al., 2010). However, there has been considerable political opposition to such taxes, as observed by legislative defeats in both New York City and Philadelphia, as well as the immense public outcry over Mayor Bloomberg's ban.

The objective of this study was to examine the efficacy of some alternative approaches intended to shift consumers toward zero calorie beverages consumption. Specifically, we considered the impact of two simple visual presentations of calorie content: posters which emphasized the average number of calories in a typical beverage and/or the amount of physical activity required to burn those calories. One recent study presenting caloric information as physical activity equivalents found a modest effect on sugared beverage purchases (Bleich et al., 2012). In addition, we examined the impact of a price discount and a combination of a discount with explanatory messaging.

Methods

This was an interrupted time-series multi-site quasi-experiment with five different interventions. The sites for the study were three hospitals located in Philadelphia, PA (Site A); Detroit, MI (Site B); and Evanston, IL (Site C). The first two are urban settings, and the latter is suburban. A fourth site, a suburban site, was excluded before study analysis due to an inability to obtain daily sales data. The interventions were conducted in the hospitals' cafeterias and convenience shops operated by ARAMARK food services. Site A included two cafeterias and two convenience shops; Site B, one cafeteria; and Site C, one cafeteria and one convenience shop. At all three sites, the cafeterias and shops are used by patients, families, and staff. At Site A, the registers were computerized to take bar scans, so recording was automatic, and the discounts were automatically added or removed, depending on the phase of the intervention. At Sites B and C, cash registers were adjusted to charge appropriate discounts as well as record sales of bottled zero-calorie and sugared beverages. Staff entered purchases manually and were trained to correctly ring up the beverages. Periodic spot-checking to confirm reliability was performed. It was not possible to collect either individual or site-specific demographic data on customers served at the sites.

The data were collected over 30 weeks, from October 27, 2009 to May 23, 2010. The two interventions involving price discounts occurred from November 5, 2009 to December 22, 2010. The three calorie messaging interventions were implemented from February 16, 2010 to May 23, 2010. Several periods of non-intervention data were captured: (1) baseline data before the first and third interventions and after the fifth intervention, and (2) washout periods between interventions lasting 1–2 weeks (Fig. 1). During the washout periods, prices reverted to baseline, and all messaging posters and signs were removed.

The two price interventions investigated the effect of discounting the price of zero-calorie beverages. The specific interventions were (1) a 10% price discount on all zero-calorie bottled beverages, with prices labeled accordingly, and (2) a 10% price discount on all zero-calorie bottled beverages plus messaging that explained the reason for the discount. Messaging consisted of colorful marketing posters, flyers, and signs displayed prominently in the cafeteria These promoted the 10% price discount with the message, "Lighten up for less — 10% off all zero-calorie bottled beverages and water," as shown in Appendix A. The size of the discount was chosen through discussion with the food service provider and to conform to previous studies. The average price discount for a zero-calorie beverage was $0.13.

The three calorie messaging interventions examined the impact of alternative visual calorie messaging on the purchase of bottled beverages. Like the price discount messaging, the calorie messaging interventions were also delivered in posters, flyers, and signs prominently displayed which promoted switching to zero-calorie beverages by providing information about (1) the caloric content in sugared beverages (e.g. 260 calories in a 20 ounce soda), (2) the amount of time one would need to spend on a treadmill to burn the calories in a sugared beverage (e.g. 50 minutes to burn off the 260 calories in a 20-ounce soda), and (3) a combination (Appendix A). Both displays used the average calories in the bottled sugared beverages sold across the sites (260 calories). Exercise equivalents were estimated based on an average weight person (160 lbs) walking briskly (at 3 mph).

All messaging posters were developed by the ARAMARK marketing team in conjunction with the research team. The research team developed the messaging to influence behavior and the marketing team applied their experience to select appropriate images and wording. The posters were vetted internally by the research team, but no pretesting of the posters was performed.

Analysis

Data were analyzed from May 2010 until May 2011. Daily sales of bottled sugared beverages and zero-calorie beverages during all times within the study were measured. Bottled sugared beverages were defined as beverages that were sweetened with sugar (including sucrose, fructose, corn syrup), and included regular soft drinks and iced teas. Bottled zero-calorie beverages were defined as beverages that contained no calories per serving and included diet soft drinks, diet teas, and water. Since the items of interest were bottled sugared beverages and zero-calorie beverages, a number of other beverages were excluded (e.g. juices, milk, and coffee). Fountain-dispensed beverages were also excluded because of the inability to discern the type of beverage purchased.

The sales of both sugared and zero-calorie bottled beverages during the intervention periods were compared to the baseline periods. It was hypothesized that the interventions would cause a decrease in sugared beverage sales

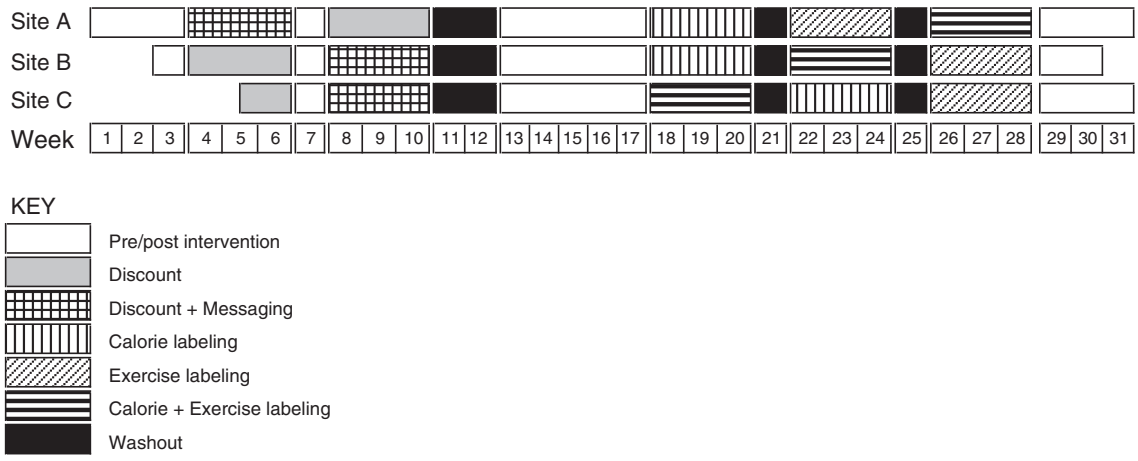

Fig. 1. Study timeline for price discounts with and without messaging and calorie- and exercise equivalent messaging, in Philadelphia, PA, Detroit, MI and Evanston, IL, October 2009–May 2010.

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and an increase in zero-calorie sales, and that the combination interventions (i.e., price discounts plus discount messaging and calorie plus exercise equivalent messaging) would augment any such effects.

Regression models were run with both sales of sugared beverages and sales of zero-calorie beverages as the primary outcome. The main predictors were the five interventions. Covariates in each model included day-of-the-week effects and total daily transactions as a control for fluctuations in customer traffic. Weekends were excluded from the analysis because some sites were closed while others experienced significant declines in traffic. Separate analyses by site were conducted as well as an overall analysis. In all cases, data was analyzed using over-dispersed Poisson regression models. Poisson regression generalizes ordinary least squares to situations where the errors follow a Poisson distribution rather than a Gaussian distribution, as is the case with count or rate data. The total number of transactions was included as an offset adjusting for traffic. For ease of interpretability, coefficients were converted to percentage change in sales from baseline. Because of the large number of hypothesis tests conducted (40 in all) a Bonferroni correction should be applied to determine the proper reference p-value to judge significance while maintaining overall Type I error at the 0.05 level. Applying this multiple testing correction, a p-value less than 0.00125 would be considered statistically significant. All analyses were conducted using R version 2.12.1

Results

Fig. 2 displays the daily sales data for both sugar-sweetened and zero-calorie beverages at each of the three sites (washout periods removed). Superimposed solid horizontal lines reflect the average sales during that particular intervention (for control periods, the plotted average is for all control periods at the site). The two deep dips in sales of both types of beverages at Site A around days 35 and 55, reflected particularly bad snow storms that resulted in partial campus closure.

The results of the overall analysis (all three sites combined) failed to find a consistent effect across the five interventions on sales of either sugared or zero-calorie bottled beverages (Table 1). There were two statistically significant results; (1) an increase in zero-calorie beverage purchases with the price discount intervention and (2) an increase (rather than the expected decrease) in sugared beverage purchases with the calorie messaging intervention (Table 1). The remaining interventions had negligible effects that are not statistically significant.

Site-by-site analysis

Site-by-site analyses found varying effect directions and magnitudes (Fig. 3), some of which were statistically significant. During the discount and the discount plus discount messaging interventions the most consistent effect was at Site B: bottled sugared beverage sales decreased 12.2% ($p = .0008$) and 12.7% ($p = 0.0004$) respectively; and bottled zero-calorie beverage sales increased 35.9% ($p < .0001$) and 27.7% ($p < .0001$) respectively. Bottled zero-calorie beverages also increased 16.7% ($p = .0008$) at Site C during the discount intervention. During the calorie messaging intervention, there was an unexpected 7.3% ($p < 0.0001$) increase in sugared beverage sales at Site A. During the exercise-equivalent messaging intervention, there was an unexpected 19.1% ($p = .0006$) decrease in zero-calorie beverage sales at Site B. Similarly unanticipated, during the calorie plus

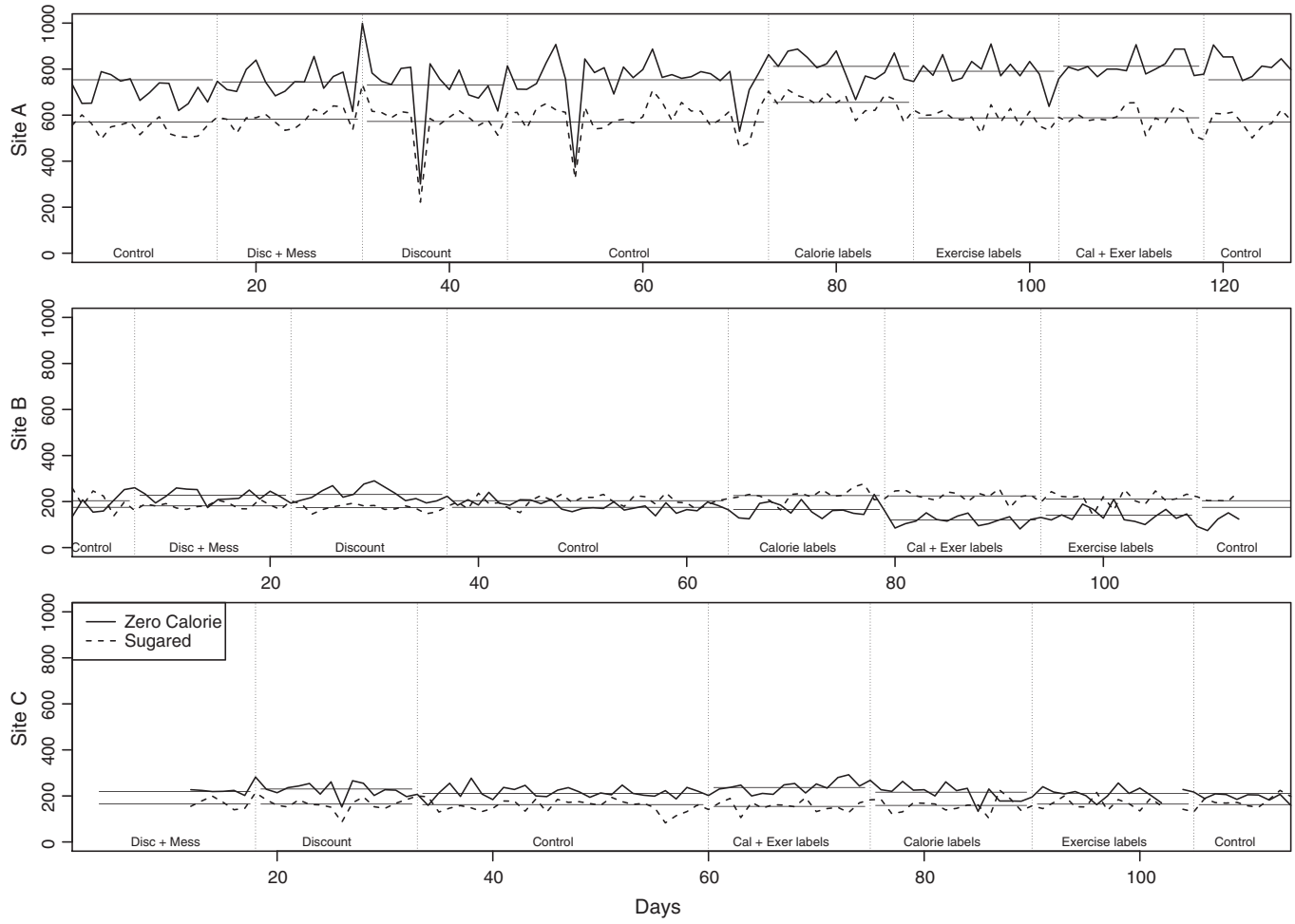

Fig. 2. Total sugared and zero-calorie bottled beverages sales with price discounts with and without messaging and calorie- and exercise-equivalent messaging, in Philadelphia, PA, Detroit, MI and Evanston, IL, October 2009–May 2010.

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Table 1
Percent change in sales of bottled sugared and zero-calorie beverages in response to price discounts with and without messaging and calorie- and exercise-equivalent messaging, at three national sites Philadelphia, PA, Detroit, MI, and Evanston, IL (combined analysis), October 2009–May 2010.

Intervention	Sugared beverages			Zero-calorie beverages		
	Estimate	95% CI[b]	*p*-Value[a]	Estimate	95% CI[b]	*p*-Value[a]
Discount	2.23%	(−1.4, 6.0)	0.23	9.55%	(5.1, 14.1)	0.000
Discount + discount messaging	−1.42%	(−5.1, 2.3)	0.45	4.54%	(0.1, 9.1)	0.04
Calorie messaging	7.30%	(3.7, 11.0)	0.000	0.71%	(−3.3, 4.9)	0.73
Exercise equivalent messaging	1.27%	(−2.3, 4.9)	0.49	−1.21%	(−5.3, 3.0)	0.57
Calorie + exercise equivalent messaging	−0.10%	(−3.4, 3.7)	0.96	−1.36%	(−5.4, 2.8)	0.52

CI, confidence interval.
[a] Uncorrected *p-values* are presented here. To account for multiple testing for significance, the p-value should be <0.00125.
[b] Displayed confidence intervals are not adjusted to account for multiple testing.

exercise-equivalent messaging intervention, there was a 12.6% ($p = .0008$) increase in sugary beverage sales and a 30.0% ($p < 0.0001$) decrease in zero-calorie sales at Site B.

Discussion

In the overall analysis, our multi-site study of price discounts and calorie messaging did not have a consistent impact across the five interventions. We did observe an increase in the purchase of zero-calorie bottled beverages in response to the price discount intervention as well as, counter intuitively, an increase in sugared beverage sales in response to calorie-messaging alone. Examining the sites individually, we observed the hypothesized effect, decreased sugared beverage sales and increased zero-calorie beverage sales, at two sites during the price discount interventions. However, we also found that the calorie messaging and exercise equivalent messaging had a similar impact at two sites but in the opposite of the intended direction. This inconsistent evidence across sites, interventions, and outcomes leads us to believe that observed variations in the purchase of zero- and nonzero-calorie beverages may be affected by the interventions, but that the size of these effects may be influenced by other factors such as customer demographics, anchored preferences, personal habits, and indifference to the health consequences. Many of these possibilities have been remarked on in previous literature.

Our multi-site study raises caution when it comes to generalizing results obtained at a single site to the general population: the interventions had varying impacts at the three sites. One possible explanation for these varying effects could be the different demographic characteristics of the site populations. In one study looking at the effects of soda taxes, low-income families were found to be more price-sensitive than higher-income families (Sturm et al., 2010). Differing responses at the sites could also have resulted from unmeasured differences, such as the placement of the signs or the effectiveness of the staff at different locations.

The price discount of 10% may have been too small to change existing preferences. Block et al. found a 26% decrease in the purchase of sugared soft drinks in response to a 35% increase in price. Moreover, discounts may not have as large an impact as equivalent magnitude taxes, given the robust findings that losses are more motivating than similarly sized gains (Kahneman and Tversky, 1979). Epstein et al. (2010) found that price increases on unhealthy items decreased overall calories purchased by shifting purchases from fats to more protein. However, price subsidies on healthy items did not have the same effect leading instead to increased purchases of unhealthy items. It was theorized by the authors that this was due to the income effect: people used the money saved from the subsidy on healthy items to finance purchases of additional unhealthy items that they enjoyed consuming. The unexpected finding of increased sugared beverage sales with calorie messaging could be related to consumers having previously overestimated the calorie content of those beverages: the information actually made them feel better about sugared beverages once they knew the calories and walking time.

It is also possible that the posted signs failed to gain the attention of consumers at the point-of-purchase. Though the signs were colorful and prominently placed, attracting the attention of a consumer in the few seconds preceding a purchase is difficult. In addition there was no significant pre-testing of the design of the signs. It is also possible that many consumers did not understand the exercise equivalence of time

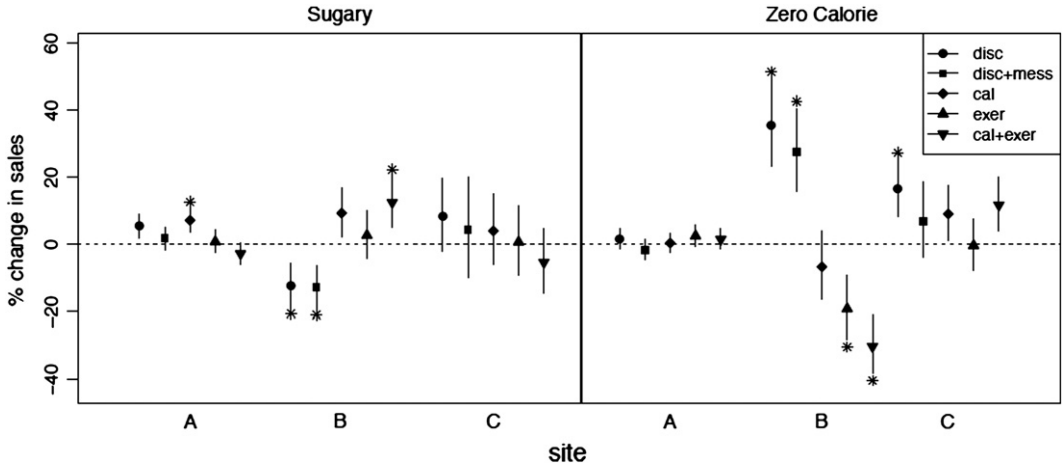

Fig. 3. Percent change in beverage sales in response to price discounts with and without messaging and calorie- and exercise-equivalent messaging, by site in Philadelphia, PA, Detroit, MI and Evanston, IL, October 2009–May 2010.

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on a treadmill. Another explanation could be that in the brief time it takes to make a beverage choice the interventions were simply insufficient to overcome consumers' ingrained preferences.

Though the combination of a price discount and calorie or exercise messaging was not tested, it is unlikely that such a combination would yield greater success. In a recent laboratory study involving hypothetical food choice, Giesen et al. found that a tax of ≥25% on high-calorie foods decreased the demand for calories, but that calorie information interfered with that effect (Giesen et al., 2011).

Limitations

Although this study introduces improvements over prior research examining similar issues, this study has its own limitations. There were some missing and flawed data. The missing data consisted of: Site C — 3 weeks pre-intervention (registers not capturing); Site B — 2 weeks pre-intervention (registers not yet capturing) and 1 week post-intervention (failed to include the last week). All missing data reflected control periods and its effect was to reduce power. Flawed data was from Site C: in the first 13 days of the discount phase, sales were extremely high, 1000–2000 units of zero-calorie and sugared beverages a day in the flawed data compared to the rest of the study where not a single day saw sales over 400 units of zero-calorie or sugared beverages. Suspect data were omitted from the regression models. Also, because we were not able to capture sales of fountain drinks, we were unable to determine if there were any substitution effects. Finally, generalizability is limited by the fact that, while this was a multi-site study, the three study sites cater to urban and suburban, as opposed to rural, populations. Generalizability may also be limited to other workplace cafeteria type settings such as these hospital cafeterias. Because we lacked specific demographic information about the various customers using each site, we were also limited in our ability to interpret the role that demographics could play in the results we found.

The statistical methods employed make some improvements over those used in previous similar studies. Over-dispersed Poisson regression models are more appropriate than ordinary least squares models when the outcome is measured as counts. The use of total transactions as an offset accounts for daily customer traffic, so the model can be interpreted as addressing the number of sales relative to the potential for sales. However, these models do not account for the time-series structure of the data collection procedure. While accounting for the dependence between the observations over time is desirable, it is unlikely that doing so would change the qualitative findings reported here since the estimated effects will not change, only the variability. Any increase in statistical power gained through an appropriate accounting of variation will likely be offset by an increase in uncertainty caused by the estimation of many additional parameters with small amounts of data.

Conclusions

This research augments previous work finding weak, null or even contradictory effects of calorie labeling and price discounts. Our results point to the need for further studies examining the effectiveness of these interventions and their potential moderators. The reality of varying effects in different settings and different populations need be analyzed carefully before contemplating policy interventions such as calorie labeling or sugar taxation in order to avoid ineffective interventions and unintended consequences.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ypmed.2012.10.009.

Conflict of interest statement

J. Jane Jue declares no conflict of interest.
Matthew J. Press declares no conflict of interest.
Daniel McDonald declares no conflict of interest.
Kevin P. Volpp declares no conflict of interest.
David A. Asch declares no conflict of interest.
Nandita Mitra declares no conflict of interest.
Anthony Stanowski is employed by ARAMARK healthcare, the outsourced service supplier in whose sites the study was performed.
George Loewenstein declares no conflict of interest.

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References

Andreyeva, T., Long, M.W., Brownell, K.D., 2010. The impact of food prices on consumption: a systematic review of research on the price elasticity of demand for food. Am. J. Public Health 100, 216–222.
Bleich, S.N., Herring, B.J., Flagg, D.D., Gary-Webb, T.L., 2012. Reduction in purchases of sugar-sweetened beverages among low-income Black adolescents after exposure to caloric information. Am. J. Public Health 102, 329–335.
Block, J.P., Chandra, A., McManus, K.D., Willet, W.C., 2010. Point-of-purchase price and education intervention to reduce consumption of sugary soft drinks. Am. J. Public Health 100, 1427–1433.
Bollinger, B., Leslie, P., Sorensen, A.T., 2010. Calorie Posting in Chain Restaurants. NBER Working Paper.
Chu, Y.H., Frongillo, E.A., Jones, S.J., Kaye, G.L., 2009. Improving patrons' meal selections through the use of point-of-selection nutrition labels. Am. J. Public Health 99, 2001–2005.
Downs, J.S., Loewenstein, G., Wisdom, J., 2009. Strategies for promoting healthier food choices. Am. Econ. Rev. 99, 159–164.
Dumanovsky, T., Huang, C.Y., Nonas, C.A., Matte, T.D., Bassett, M.T., Silver, L.D., 2011. Changes in energy content of lunchtime purchases from fast food restaurants after introduction of calorie labeling: cross sectional customer surveys. Br. Med. J. 343, 1–11.
Elbel, B., Kersh, R., Brescoll, V.L., Dixon, L.B., 2009. Calorie labeling and food choices: a first look at the effects on low-income people in New York City. Health Aff. 28, w1110–w1121.
Epstein, L.H., Dearing, K.K., Roba, L.G., Finkelstein, E., 2010. The influence of taxes and subsidies on energy purchased in an experimental purchasing study. Psychol. Sci. 21, 406–412.
Finkelstein, E.A., Strombotne, K.L., Chan, N.L., Krieger, J., 2011. Mandatory menu labeling in one fast-food chain in King County, Washington. Am. J. Prev. Med. 40, 122–127.
Giesen, J.C., Payne, C.R., Havermans, R.C., Jansen, A., 2011. Exploring how calorie information and taxes on high-calorie foods influence lunch decisions. Am. J. Clin. Nutr. 93, 689–694.
Harnack, L.J., French, S.A., Oakes, J.M., Story, M.T., Jeffery, R.W., Rydell, S.A., 2008. Effects of calorie labeling and value size pricing on fast food meal choices: results from an experimental trial. Int. J. Behav. Nutr. Phys. Act. 5, 63.
Kahneman, Daniel, Tversky, Amos, 1979. Prospect Theory: An Analysis of Decision under Risk. Econometrica XLVII, 263–291.
Milich, R., Anderson, J., Mills, M., 1976. Effects of visual presentation of caloric values on food buying by normal and obese persons. Percept. Mot. Skills 42, 155–162.
Mokdad, A.H., Marks, J.S., Stroup, D.F., Gerberding, J.L., 2004. Actual causes of death in the United States, 2000. JAMA 291, 1238–1245.
Roberto, C.A., Larsen, P.D., Agnew, H., Baik, J., Brownell, K.D., 2010. Evaluating the impact of menu labeling on food choices and intake. Am. J. Public Health 100, 312–318.
Sturm, R., Powell, L.M., Chriqui, J.F., Chaloupka, F.J., 2010. Soda taxes, soft drink consumption, and children's body mass index. Health Aff. 29, 1052–1058.
Tandon, P.S., Wright, J., Zhou, C., Rogers, C.B., Christakis, D.A., 2010. Nutrition menu labeling may lead to lower-calorie restaurant meal choices for children. Pediatrics 125, 244–248.