Preventive Medicine Reports 2 (2015) 287–291

Contents lists available at ScienceDirect

Preventive Medicine Reports

journal homepage: http://ees.elsevier.com/pmedr

Shopper marketing nutrition interventions: Social norms on grocery carts increase produce spending without increasing shopper budgets ☆

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ARTICLE INFO

Available online 18 April 2015

Keywords:
Behavioral economics
Grocery store
Fruits
Vegetables
Shopper marketing
Social norms

ABSTRACT

Objectives. We assessed the efficacy of an easy-to-implement shopper marketing nutrition intervention in a pilot and two additional studies to increase produce demand without decreasing store profitability or increasing shopper budgets.

Methods. We created grocery cart placards that detailed the number of produce items purchased (i.e., descriptive norm) at particular stores (i.e., provincial norm). The effect of these placards on produce spending was assessed across 971,706 individual person grocery store transactions aggregated by day. The pilot study designated a baseline period (in both control and intervention store) followed by installation of grocery cart placards (in the intervention store) for two weeks. The pilot study was conducted in Texas in 2012. In two additional stores, we designated baseline periods followed by 28 days of the same grocery cart placard intervention as in the pilot. Additional interventions were conducted in New Mexico in 2013.

Results. The pilot study resulted in a significant difference between average produce spending per day per person across treatment periods (i.e., intervention versus same time period in control) (16%) and the difference between average produce spending per day per person across stores in the control periods (4%); Furthermore, the same intervention in two additional stores resulted in significant produce spending increases of 12.4% and 7.5% per day per person respectively. In all stores, total spending did not change.

Conclusions. Descriptive and provincial social norm messages (i.e., on grocery cart placards) may be an overlooked tool to increase produce demand without decreasing store profitability and increasing shopper budgets.

Introduction

The current nutritional content of the nation's grocery cart suggests underrepresentation of fruits and vegetables and overrepresentation of packaged and processed foods (Guthrie et al., 2013). This under and overrepresentation of more and less healthy foods, respectively, has only worsened over time (Center for Disease Control and Prevention, CDC, 2014). Given that grocery stores account for over 50% of all food expenditures (U.S. Census Bureau, 2014), successful attempts to increase fruit and vegetable demand could significantly impact public health (Just and Payne, 2009; Payne et al., 2014). Yet, very little nutrition intervention research targeting fruits and vegetables is conducted in grocery stores, perhaps because of concerns of overall efficacy and economic sustainability for both store and consumer (Payne and Niculescu, 2012). In response, we attempt to increase fruit and vegetable spending by leveraging powerful in-store marketing (i.e., shopper marketing), which attempts to capture that portion of shoppers' already fixed budgets that are allocated to "unplanned wants and forgotten needs" (Payne et al., 2014). In doing so, we provide preliminary evidence of a shopper marketing nutrition intervention that could significantly improve public health and is economically sustainable for stores (i.e., by promoting higher margin fresh fruit and vegetables) and shoppers (i.e., by not increasing shopping budgets).

We describe the process of creating a shopper marketing nutrition intervention, the method by which the intervention was deployed, and the results obtained from produce spending, total spending, and the proportion of produce spending to total spending from a pilot study including a treatment and control store, as well as two additional stores. We also describe how these types of interventions could be a boon to both grocery store and consumer. Finally, we describe how using social norms (e.g., describing what and how much fruit and vegetables are normal or appropriate to purchase) could result in a sustained upward shift of fruit and vegetable purchases.

☆ Financial support: This work was supported by the Paso del Norte Health Foundation (grant numbers 1796, 1726).

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http://dx.doi.org/10.1016/j.pmedr.2015.04.007

Study 1: pilot shopper marketing nutrition intervention

Methods

Shopper marketing material development

We developed a shopper marketing nutrition intervention targeting fresh fruits and vegetables with five goals in mind—i.e., salient, easy-to-interpret, provide shopping benchmarks, grocery store economic sustainability, and shopper economic sustainability. To increase intervention saliency, the intervention was designed to be noticed throughout the duration of the trip. Considering the shopping cart is with the shopper throughout the duration of the trip, we concentrated our efforts on this physical location for placement of the intervention.

Easily interpreted messages in the grocery store imply reduced cognitive processing capability considering the demands placed on shoppers' attention (Cohen and Babey, 2012; Shiv and Fedorikhin, 1999). For the grocery cart, we conceptualized ease of interpretation by producing messages that had fonts (i.e., Calibri and Arial) known to be easily processed and to generate positive attributes, and high contrasting colors to assure clarity (Alter and Oppenheimer, 2009; Wang, 2013). All grocery carts included messages with these attributes that were placed on eleven inch wide by eight inch long placards attached on the inside front (i.e., facing the shopper) and outside front (i.e., facing other shoppers) of the cart. In addition, considering the locations of the intervention (El Paso, TX and southern New Mexico), Spanish and English were used to maximize reach of the messages. Finally, to help interpretation of the messages for those who may be minimally literate, we included graphics of popular fruits and vegetables (i.e., popular for the particular store) on the placards as well as the Arabic numeral 5 (Zebian and Ansari, 2012), which shoppers could use to benchmark their behavior.

Messages that allow shoppers to benchmark their own behavior against what is suggested are most easily conceptualized as social norms. For the grocery cart, we conceptualized social norms as descriptive (Cialdini, et al., 1990; Cialdini, 2003; Reno et al., 1993)—i.e., the number of produce items normally purchased—and provincial (Goldstein et al., 2008)—i.e., the number of produce items normally purchased at the specific store. Specifically, we stated on the placards, "In this store, most people choose at least x produce items" (i.e., "x" denoting the average number of produce items purchased in that store). In addition, we listed the top ten fruits and vegetables purchased in the store to give shoppers a specific idea of not only the appropriate or normal amount of fruits and vegetables to purchase, but also the most common types of fruits and vegetables purchased (see Fig. 1). For both types of information (i.e., produce amount and type), we obtained sales reports from the grocery store to accurately represent descriptive social norms in the particular store.

One limitation to applying descriptive norms in the grocery store, however, is a potential boomerang effect. A boomerang effect exists when a social norm results in both increasing and decreasing a target behavior towards the norm (Schultz et al., 2007). In the case of fresh fruit and vegetable purchasing, this would mean that those below the purchasing norm (i.e., roughly half of shoppers) would increase their purchasing (our main goal), but those above the purchasing norm would decrease their purchasing—effectively, washing out any purchasing gains produced. To reduce the likelihood of a boomerang effect, social approval information (e.g., a smiley icon) was added to the descriptive social norm (e.g., "In this store, most people chose at least x produce items") to reinforce existing high produce purchasing and encourage existing low produce purchasing to increase (Schultz et al., 2007).

Finally, we created the shopper marketing nutrition intervention (i.e., grocery cart placards) with grocery store and shopper economic sustainability in mind. That is, it is not enough to simply show efficacy of any shopper marketing nutrition intervention. If the intervention is not sustainable for grocery store and consumer, the likelihood of its adoption is minimal. We hypothesized that shoppers' budgets are generally fixed when they arrive at the grocery store, but part of their fixed budget is allocated to unplanned purchases (~50% of all purchases) (Stilley et al., 2010), which are highly influenced by shopper marketing (Payne et al., 2014). Because this approach attempts to move shoppers' unplanned purchases towards higher margin, fresh fruits and vegetables, stores benefit economically even if shoppers' budgets do not increase.

Shopper marketing nutrition intervention pilot study design

We chose two grocery stores that were similar in size, owned by the same company, located in zip codes that had similar demographics in terms of ethnicity (94.5% vs. 96.2% Hispanic), sex (53% vs. 53.4% female), age (male 26.8 vs. 29.2; female 28.9 vs. 32.3), unemployment (6.7% vs. 7.4%), and percentage finishing high school (25.3% vs. 22.5%). Both stores were located approximately nine miles apart on the same road in El Paso, TX. Furthermore, baseline produce purchasing per person per day was significantly correlated between control and intervention

Fig. 1. Placard placed in grocery carts.

stores ($r = .68$, $P < 0.001$). This suggests any significant departure from produce purchasing trends between control and intervention stores could be attributable to an intended effect.

We executed the shopper marketing nutrition intervention as follows. One store was used as a control and no interventions were made in this store throughout the study period. In the intervention store, we first deployed the eleven inch wide and eight inch tall placards (on the inside front and outside front of grocery carts) with the aforementioned messaging on all grocery carts in the store (~70 carts) (see Fig. 1) for fourteen days.

Results

Prior to data collection, we determined that the interaction of store (i.e., control store/intervention store) with matched time periods (i.e., baseline/treatment) on average produce spending aggregated over all dates would be of interest in rejecting or failing to reject our hypothesis (Bartlett et al., 2013). Matched time period is defined as matched baseline periods across stores as well as matched treatment periods (i.e., treatment did not occur in the control store, but evaluating spending in the control store at the same time as the treatment period in the intervention store allows for valuable comparison). We obtained spending data for 396,017 individual person transactions across stores (i.e., pilot intervention and control stores). The grocery retailer aggregated data by day (i.e., sales reports), which is the unit of analysis for results reported. We analyzed produce spending, total spending, and the proportion of produce spending to total spending. All sales data were transformed by daily customer counts so that all results represented the percentage increase (decrease) of average spending (or average proportion of produce spending to total spending) per day per person for baseline versus treatment conditions. We removed two days of baseline produce spending per person in the intervention store and one day of baseline produce spending per person in the control store because the value was equal to or more than three standard deviations from the mean produce spending per person (i.e., outliers due to holidays or other unusual occurrences). No days of total spending per person were removed because all values fell within three standard deviations for both intervention and control stores. Finally, in addition to the removal of days mentioned for produce spending, we removed one additional day of the proportion of produce spending to total spending per person during the baseline time period in the intervention store because the proportion equaled more than three standard deviations from the mean proportion.

We obtained 57 days of matched baseline data for both intervention and control stores. The baseline data were the 57 days that preceded the first intervention. Matched treatment data were the 14 days in which the placard was deployed and the same 14 days in the control store in which the placard was not deployed. This resulted in a 2 (store: control/treatment) × 2 (matched time period: baseline/treatment) analysis of variance (ANOVA) test for produce spending per person per day, total spending per person per day, and produce spending per person per day proportionate to total spending per person per day.

We report percentages instead of dollar values (or proportions) to protect grocery store proprietary sales information (i.e., percentages represent mean dollar value differences or proportion percentage differences). Our primary target, the interaction between store (control/treatment) and matched time period (baseline/treatment) was significant ($F(1, 135) = 4.25$, $P = 0.04$) (See Fig. 2). Follow-up simple main effect analyses revealed that the difference between average produce spending per day per person across stores in the matched treatment period was significantly larger (+16%; $F(1,26) = 11.9$, $P < 0.01$) than the difference between average produce spending per day per person across stores in the matched baseline periods (+4%; $F(1,109) = 2.8$, $P =$ n.s.).

In other words, when placards were introduced into the intervention store, it resulted in a significant increase in produce spending per day per person compared to the same time period in the control store with no placards. Considering the high correlation between intervention and control stores in baseline average produce spending per day per person ($r = .68$, $P < .001$), these results strongly suggest that the intervention worked. Finally, the interaction of control/intervention store and matched time periods (i.e., baseline/treatment) on total spending per day per person was not significant ($F(1,138) = 0.03$, $P =$ n.s.). This suggests that the difference between average total spending per day per person across stores in matched treatment periods (+6.8%) was not significantly larger than the difference between average total spending per day per person across stores in matched baseline periods (+6.2%). This is a preferable result considering our intent was not to increase total budgets of shoppers, but rather encourage them to switch to healthier produce.

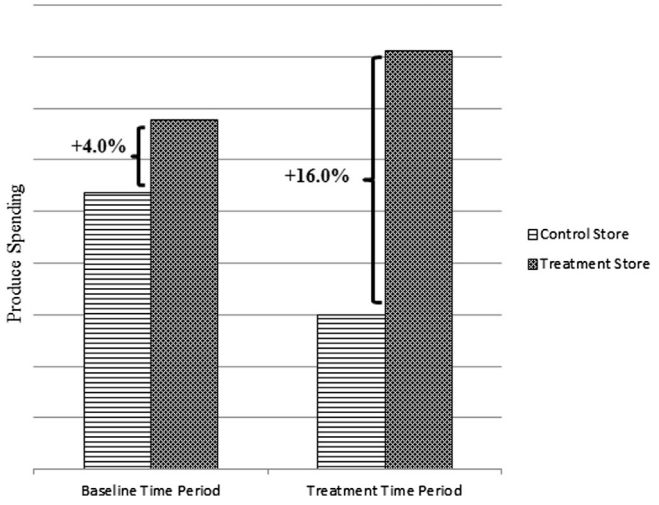

Fig. 2. Pilot study results—Texas 2012.

Further evidence of switching comes from analysis of produce spending proportionate to total spending. That is, given total budgets stay the same, we should see a greater proportion of produce to total spending. The interaction between store (control/treatment) and matched time period (baseline/treatment) on the proportion of produce to total spending was marginally significant ($F(1,134) = 3.75$, $P = 0.06$) (See Fig. 3). A simple follow-up simple main effects analyses revealed that the difference between the proportion of produce to total spending per day per person across stores in the matched treatment period was marginally significantly larger (+8.5%; $F(1,26) = 3.2$, $P = 0.09$) than the difference between the proportion of produce to

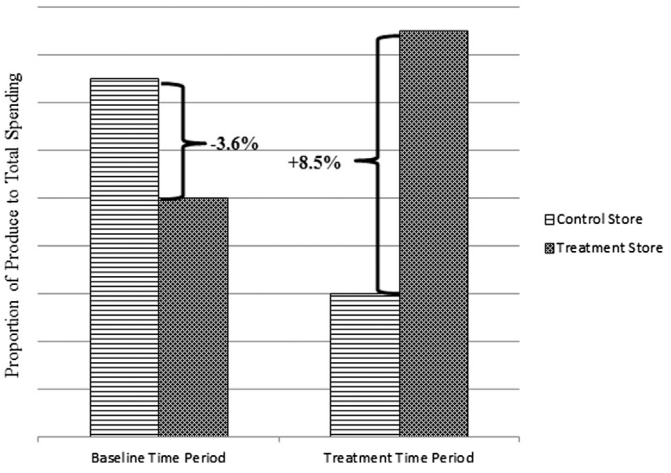

Fig. 3. Pilot study produce proportion results—Texas 2012.

total spending per day per person across stores in the matched baseline periods (−3.6%; F (1,108) = 1.6, P = n.s.).

Study 2: shopper marketing nutrition intervention expansion

Methods

Considering the strong results of the pilot study, we expanded the placard intervention to two additional stores in the same grocery chain located in southern New Mexico. The purpose of expanding the placard intervention was threefold: First, we wanted to test the placards in two additional locations (i.e., to see if we could generalize the effect). Second, we wanted to test the placards in two additional time periods (compared to one time period in the pilot stores). Third, we wanted to test the placard intervention over the course of four weeks (compared to the pilot of two weeks).

We obtained spending data for 252,115 and 323,574 individual person transactions aggregated by day for store #1 and store #2 respectively. We removed two days of produce spending per person in store #2 because the value was equal to or more than three standard deviations from the mean (i.e., outliers due to holidays or other unusual occurrences). Also, grocery store sales reports had one day of missing data for store #1 and four days of missing data for store #2. No days of total spending per person per day were removed from store #1 or #2 because all values fell within three standard deviations of the mean. For store #1, we were able to obtain 78 days of baseline data (77 days resulting from one day missing data). The intervention data were 28 days in which the placard was deployed. For store #2, we were able to obtain 106 days of baseline data (103 days after outlier removal and missing data). The intervention data were 28 days (25 days with missing data) in which the placard was deployed. This resulted in four target results. These included planned t-tests (i.e., one planned *t*-test for each stores' shopper produce spending per day aggregated over all days and one planned *t*-test for each stores' shopper total spending per day aggregated over all days) (see Fig. 4).

Results

Produce spending for store #1 per person per day significantly increased by 12.4% (t (103) = 5.7, P < 0.001) as compared to baseline. In addition, total spending for store #1 per person per day did not change (t (103) = 0.64, P = 0.53) between treatment and baseline. Produce spending for store #2 per person per day significantly increased by 7.5% (t (126) = 2.94, P < 0.01) as compared to baseline. In addition, total spending for store #2 per person per day did not change (t (128) = 0.41, P = 0.68) between treatment and baseline. In other words, the placard intervention increased produce spending for two additional stores, across two different time periods, over the course of a month, and without significantly increasing total shopper budgets.

Not increasing total shopper budgets is again a preferable result considering our intent was not to increase total budgets of shoppers, but rather encourage them to switch to healthier produce. Like in study 1, evidence of switching would occur if there was a greater proportion of produce to total spending in treatment versus baseline conditions. For store #1, the proportion of produce to total spending per day per person was significantly greater in the treatment period versus baseline period (proportion increased by 13.3%; (t (103) = 6.0, P < 0.001)). For store #2, the proportion of produce spending to total spending per day per person was significantly greater in the treatment period versus baseline period (proportion increased by 8.5%; (t (126) = 4.1, P < 0.001)) (see Fig. 5).

General discussion

We created a novel shopper marketing nutrition intervention that was salient (i.e., on the grocery cart), easy-to-interpret (i.e., graphics and symbols, font types, color contrasts, multilingual), and provided information (social norms: descriptive and provincial) that can be easily compared to shoppers' current behavior. This shopper marketing nutrition intervention significantly increased higher margin produce spending (on average per day per person), without significantly increasing budgets (on average per day per person). Furthermore, the shopper marketing nutrition intervention significantly increased the proportion of produce spending to total spending (on average per day per person)—suggesting shoppers may switch non-produce items for produce items.

Strengths and limitations

Shopper marketing nutrition interventions as conceptualized in this study, however, are not a panacea. For example, we do not yet know if (or when) increases in produce spending begin to decay over the course of the intervention. It may be that these types of interventions need to be removed after a period of time and reinstalled to regenerate interest. Furthermore, if too much shopper marketing is deployed in a store for a single purpose (e.g., increasing fruit and vegetable purchases), shoppers may begin to react negatively (Stilley et al., 2010; Clee and Wicklund, 1980).

If using social norms, as we suggest in this work, results in increases in produce purchases over time, new descriptive (and provincial)

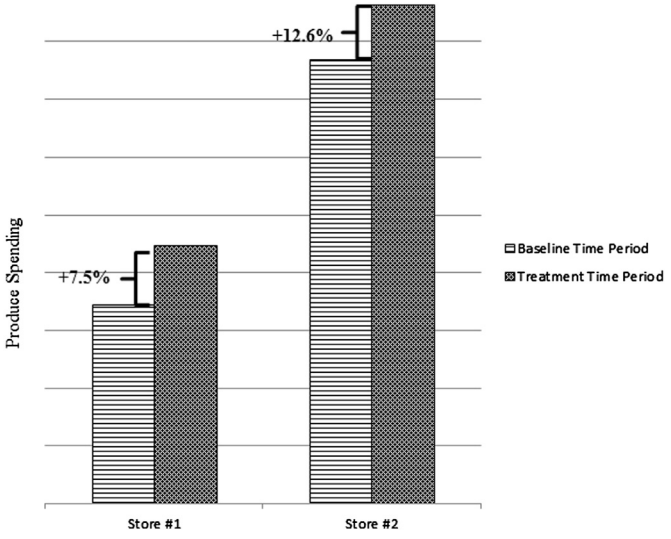

Fig. 4. Additional stores produce results—New Mexico 2013.

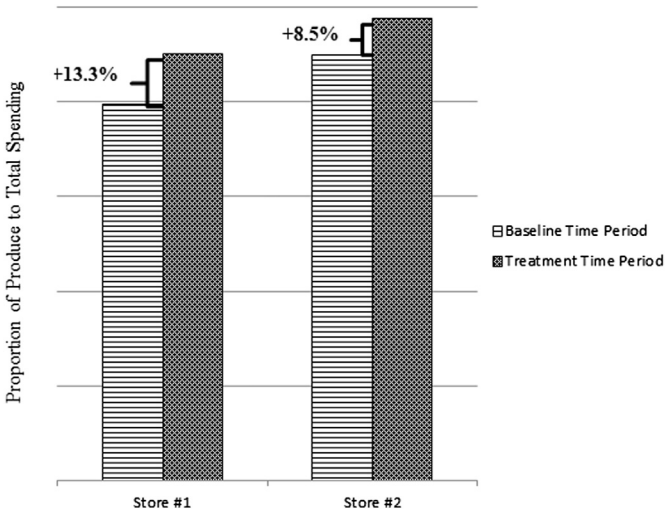

Fig. 5. Additional stores produce proportion results—New Mexico 2013.

norms would result. This would be especially important for those stores (or communities) which already have low produce purchasing norms. For example, instead of "5" being descriptive of the provincial norm for the number of produce items purchased in the store before this study, "6" may be more descriptive of the provincial norm after the study as a result of produce purchase increases. If this was the case, keeping this shopper marketing nutrition intervention in the store would perpetually increase produce purchasing (i.e., as long as new provincial norms replaced the old provincial norms). However, to understand profitability and shopper economic sustainability better, obtaining inventory data is essential to know which fruits and vegetables are being purchased to know exactly their respective profit margins. In this study, inventory data (and associated profit margins) were not accessible.

Inventory data is also essential to understand better which types of food items are being traded for healthier produce items. That is, knowing exactly which non-produce items (or categories of non-produce items) are being traded for healthier produce items will help grocery stores anticipate demand. Furthermore, obtaining inventory data will help understanding how different types of nutritionally vulnerable populations are impacted by these types of interventions. That is, beneficiaries of the Supplemental Nutrition Assistance Program (i.e., SNAP) and Women, Infants, and Children (i.e., WIC) program have gaps in their produce purchasing. For example, only 20% (Cohen et al., 1990) of SNAP benefits are used to purchase produce and 21% (Esposito, 2013) of WIC fruit and vegetable benefits go unused. Efficacious shopper marketing nutrition interventions that track these populations' produce purchasing coupled with inventory data may be a powerful way to help those who are most nutritionally vulnerable (Payne et al., 2014). While poverty levels were quite high (between 33.1% and 43.4%) (U.S. Census Bureau, 2015) in areas served by grocery stores in our studies, neither WIC nor SNAP grocery store data was accessible to understand how this shopper marketing nutrition intervention affected spending for those receiving government food assistance.

Finally, we assume that extra produce purchased is extra produce consumed. This may not be the case. There may be a tendency to waste extra produce purchased simply because it is more difficult to prepare than packaged or pre-made foods. However, behavioral economic studies suggest volitional food choices are most likely to be food consumed (Just and Wansink, 2009; Wansink and Johnson, 2015). If this is the case, a non-invasive method for measuring fruit and vegetable consumption is needed to substantiate this for produce purchases made as a result of shopper marketing nutrition interventions. Such a method is available (i.e., resonance Rahman spectrometry—RRS), portable, and shown to be highly valid and reliable (Jahns et al., 2014; Zidichouski et al., 2009). RRS can detect carotenoids (a biomarker of fruit and vegetable consumption) in the skin, allowing researchers to quickly assess (a scan takes 20–30 s) shopper fruit and vegetable consumption over time. Future research using shopper marketing nutrition interventions should incorporate RRS into its methodology to understand better if produce purchased is produce consumed.

Conclusion

Considering the current nutritional content of the nation's grocery cart—with underrepresentation of fruits and vegetables and overrepresentation of packaged and processed foods—understanding how to increase healthier purchases is paramount (Guthrie et al., 2013). To this end, we created a novel shopper marketing nutrition intervention that promoted descriptive and provincial social norms of what and how much higher margin fruits and vegetables to purchase. To our knowledge, our findings represent the first time a grocery store nutrition intervention was found to be both efficacious and provided evidence of economic sustainability for grocery store (i.e., higher margin fresh produce spending, no total spending decrease) and shopper (i.e., no total spending increase, higher proportion of produce spending to total spending).

Conflict of interest statement

The authors declare no conflicts of interest.

Acknowledgments

We would like to thank Pay and Save, Inc. for allowing us access to their stores and sales data and Andrea Taylor for her help in retrieving and formatting the data. The authors have no conflicts of interest.

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