

## **ONLINE APPENDIX**

**for**

### **How do Shoppers Respond to Information on Price Changes in Multiple Product Categories? Evidence from a Field Experiment in Online Supermarket Shopping**

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## **Appendix 1: Follow-up Surveys**

Our main finding is that providing shoppers with information on categories with on-sale items increases the purchase rate within the category for the regularly priced substitutes. This behavior may be viewed as anomalous if the following is true:

1. Shoppers prefer organic items if they are not more expensive than their non-organic counterparts.
2. Shoppers would switch brands if a competing brand is reduced to, or below, the price of the regular brand they usually purchase.

To verify these assertions, we conducted two follow-up surveys. The first was sent only to the participants of our study and had a response rate of only 24 percent (55 shoppers). 91 percent of the responders answered that they would choose an organic item if it was weakly cheaper than its non-organic alternative. 80 percent of the responders reported that they would switch brands for a discount of 20 percent.

Because of the low response rate of our first follow-up survey, we conducted an additional survey using the Qualtrics platform on 378 American participants ranging from 18 to 30 years old, with at least some college education. Over 70 percent of respondents reported that they would choose organic if it was the same price as the non-organic alternative for prices ranging between \$1.00-\$3.50. This climbs to close to 90 percent when organic is cheaper than the non-organic alternative. Lastly, 68 percent of respondents replied that they would switch brands if the alternative brand was discounted to the same price as the item they usually purchased. This climbs to 80 percent when the discounted alternative becomes cheaper than the item they usually purchase.

These survey results lend support to our interpretation of the data as reflecting shopping behavior under limited attention. The behavior of our participants stands in stark contrast to the vast majority of the survey responses. While our finding that promotional materials on sales increases consumption of regularly priced alternatives is not dependent on assumptions (1) and (2), these assumptions have important implications regarding consumer welfare.

## Appendix Figures

Figure A1: Examples of Email Format During Basic Weeks

**Control** (email title: Free Shipping on ---- if you Buy a Banana!!!)

**Greetings from ----, your local grocery delivery service!**

Got a banana? Get a one-time refund on shipping for a purchase of over \$20 if you buy one banana or more!<sup>1</sup>(Click here)

<sup>1</sup> Offer valid on all bananas. Use this email address when placing your purchase and a refund of \$2.99 will be applied within 24 hours of purchase. Valid until ---

**Treatment** (email title: Free Shipping on ---- if you Buy a Banana!!!)

**Greetings from ----, your local grocery delivery service!**

Got a banana? Get a one-time refund on shipping for a purchase of over \$20 if you buy one banana or more!<sup>1</sup> (Click here)

... and if that's not enough, make sure you check our discounts for the month of February (discounted items are marked by \*\*).

**Our biggest discounts are in the following categories:**

1. Vegetables – up to 45% off select items (Click here)
2. Milk – up to 40% off select items (Click here)
3. Fruits – up to 30% off select items (Click here)
4. Eggs – up to 20% off select items (Click here)

<sup>1</sup> Offer valid on all bananas. Use this email address when placing your purchase and a refund of \$2.99 will be applied within 24 hours of purchase. Valid until ---

Figure A2: Examples of Email Format During Detailed Weeks

**Control:** (email title: Click for \$10 off your ---- purchase!!)

**Greetings from ----, your local grocery delivery service!**

Got apples? Get a \$10 refund by simply purchasing at least one apple and inserting the coupon code dcash at checkout! <sup>1</sup> (Click here)

<sup>1</sup> Offer valid on all apples. Use this email address and the dcash coupon code when placing your purchase and you will receive a \$10.00 one-time refund on your purchase of \$20 or more. The refund will be applied within 24 hours. Valid until ---.

**Treatment:** (email title: Click for \$10 off your ---- purchase!!)

**Greetings from ----, your local grocery delivery service!**

We are devoted to helping our customers get the "best bang for the buck".

So don't miss out on our April discounts! Our April sale prices are so low that organic sale items are often even cheaper than the non-organic alternative! (discounted items are marked by \*\*)

**Don't forget to consider some alternatives to your last purchase of eggs that we have on sale this month.**

*To use your \$10 refund - simply click on one of the links below to the site, purchase at least one apple and insert the coupon code found below.*

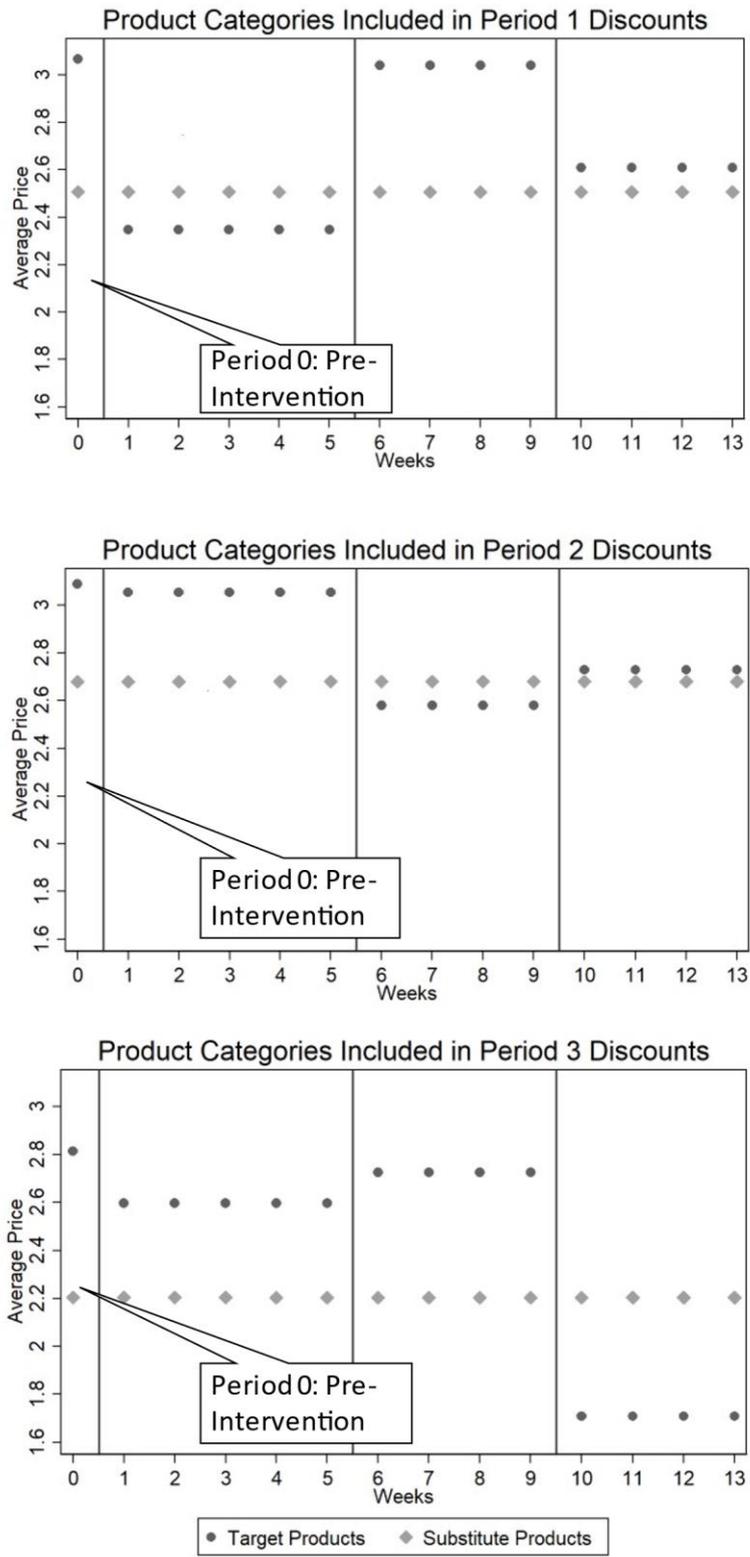
Our biggest discounts are on the following products:

1. Milk – up to 33% off select items (Click here)
2. Eggs – up to 49% off select items (Click here)
3. Fruit – up to 51% off select items (Click here).
4. Vegetables – up to 75% off select items (Click here)

Make sure to purchase one or more apples and enter coupon-code dcash at checkout!<sup>1</sup>

<sup>1</sup> Offer valid on all apples. Use this email address and the dcash coupon code when placing your purchase and you will receive a \$10.00 one-time refund on your purchase of \$20 or more. The refund will be applied within 24 hours. Valid until ---.

Figure A3: Price Variation in Target versus Substitute Items



## Appendix Tables

Table A1: Purchasing Frequency of Target & Substitute Items Prior to Experiment

Product Name	Quantity Purchased
<b><i>Bananas</i></b>	<b>357</b>
Bananas (Organic)	72
<b><i>Onions</i></b>	<b>191</b>
Onions (Organic)	42
<b><i>Kroger: Bread</i></b>	<b>139</b>
Aunt Millie's Bread	56
<b><i>Kroger: Eggs - 12ct</i></b>	<b>134</b>
Egg-Lands Best: Cage Free Large Brown Eggs - 12ct	14
Kroger: Grade A Large Brown Eggs - 12ct	19
Simple Truth: Natural Cage Free Large Brown Eggs - 12ct	78
<b><i>Kroger: Milk (1gal)</i></b>	<b>114</b>
Kroger: Milk (0.5gal)	96
Horizon: Organic Milk (0.5gal)	22
Simple Truth Organic: Milk (0.5gal)	43
<b><i>Apple (Lg)</i></b>	<b>103</b>
Apple (Organic)	69
Apple Bag - 3 lb bag	65
<b><i>Bell Pepper</i></b>	<b>99</b>
Bell Pepper (Organic)	15
<b><i>Blueberries</i></b>	<b>94</b>
Blueberry (Organic)	11
<b><i>Avocado</i></b>	<b>76</b>
Jumbo Avocado	28
<b><i>Cucumber</i></b>	<b>75</b>
Cucumber (Organic)	15
<b><i>Ice Mountain: Water - 24pk</i></b>	<b>74</b>
Kroger: Purified Drinking Water - 24pk	11
Dasani: Water - 24pk	20
Aquafina - 24pk	11
<b><i>Chobani: Greek Yogurt</i></b>	<b>71</b>
Fage: Greek Yogurt	55
<b><i>Raspberries</i></b>	<b>62</b>
Raspberries (Organic)	10
<b><i>Roma Tomato</i></b>	<b>41</b>
Roma Tomato (Organic)	4
<b><i>Romaine Lettuce</i></b>	<b>33</b>
Romaine Lettuce (Organic)	3

Broccoli, Kiwi, Lime, Kale, Pineapple, and Lemon were excluded from this table for lack of space.

Table A2: Target & Substitute Produce Items

Weeks	Target Item	Price	Sale Price	Substitute Item	Price
1-5	Organic Banana <b>(N)</b>	0.49	0.39	Regular Banana	0.39
1-5	Organic Blueberries	5.49	4.99	Regular Blueberries	4.99
1-5	Organic Kiwi <b>(N)</b>	0.99	0.79	Regular Kiwi	0.79
1-5	Organic Apple (Fuji)	1.49	1.25	Regular Apple (Fuji)	1.25
1-5	Organic Apple (Gala)	1.49	1.25	Regular Apple (Gala)	1.25
1-5	Organic Apple (Granny Smith)	1.49	1.25	Regular Apple (Granny Smith)	1.25
1-5	Organic Lime	1.29	0.89	Regular Lime	0.89
1-5	Organic Broccoli	3.49	3.25	Regular Broccoli	3.25
1-5	Organic Romaine Lettuce	3.29	2.59	Regular Romaine lettuce	2.59
1-5	Organic Cucumber	1.89	0.99	Regular Cucumber	0.99
1-5	Jumbo Ripe Avocado <b>(N)</b>	2.25	1.49	Jumbo Unripe Avocado	2.25
6-9	Organic Tomato	0.79	0.59	Regular Tomato	0.59
6-9	Organic Red Bell Pepper	2.79	2.59	Regular Red Bell Pepper	2.59
6-9	Organic Onion	2.59	1.99	Regular Sweet Onion	1.99
6-9	Organic Kale	2.19	1.99	Regular Kale	1.99
6-9	Organic Green Onion	0.99	0.95	Regular Green Onion	0.95
6-9	Apples 3 lb bag (~4 ct.)	5.39	4.49	Regular Apple	1.25
6-9	Organic Lemon <b>(N)</b>	1.49	1.29	Regular Lemon	1.29
6-9	Organic Pineapple	6.49	5.49	Regular Pineapple	5.49
10-13	Organic Banana <b>(N)</b>	0.49	0.24	Regular Banana	0.39
10-13	Organic Blueberries	5.49	4.00	Regular Blueberries	4.99
10-13	Organic Apple	1.49	1.00	Regular Apple	1.25
10-13	Organic Apple (Fuji)	1.49	1.00	Regular Apple	1.25
10-13	Organic Raspberries <b>(N)</b>	5.49	3.89	Regular Raspberries	3.99
10-13	Organic lemon <b>(N)</b>	1.49	0.99	Regular Lemon	1.29
10-13	Organic Broccoli	3.49	2.00	Regular Broccoli	3.25
10-13	Organic Cucumber	1.89	0.75	Regular Cucumber	0.99
10-13	Roma Tomato Organic	0.79	0.20	Regular Tomato	0.59
10-13	Red Bell Pepper Organic	2.79	1.99	Regular Red Bell Pepper	2.59
10-13	Sweet Onion Organic	2.59	1.00	Regular Sweet Onion	1.99
10-13	Organic Green Onion	0.99	0.50	Regular Green Onion	0.95

**(N)** – refers to neighboring categories where the target and substitute appear on the same line of the website.

Table A3: Target & Substitute Dairy, Egg, and Durable Items

*Dairy*

Weeks	Target Item	Price	Sale Price	Substitute Item	Price
1-5	Kroger: Milk (0.5gal)	2.99	1.75	Kroger: Milk (1gal)	3.99
1-5	Horizon Organic: 0% fat free Milk (0.5gal))	5.45	4.49	Simple Truth Organic: Fat Free Milk	4.49
1-5	Fage: 0% and 2% fat Yogurt (plain and cherry)	1.89	1.50	Chobani: Yogurt, Fage: Yogurt (Other)	1.89
6-9	Fage: 0% and 2% fat Yogurt (plain and cherry)	1.89	1.50	Chobani: Yogurt, Fage: Yogurt (Other)	1.89
10-13	Simple Truth Organic: Milk (0.5gal)	4.49	2.99	Horizon Organic: Milk	5.45

*Eggs*

Weeks	Target Item	Price	Sale Price	Substitute Item	Price
1-5	Kroger: Grade A large Brown Eggs-12ct	3.69	2.89	Kroger Grade A Large Eggs-12ct	2.99
1-5	Egg-Land's Best: Cage Free Large Brown Eggs-12ct	5.49	4.35	Simple Truth: Natural Cage Free Grain Fed Large Brown Eggs-12ct	4.45
10-13	Kroger: Grade A Large Brown Eggs-12ct	3.69	1.89	Kroger Grade A Large Eggs-12ct	2.99
10-13	Simple Truth: Natural Cage Free Grain Fed Large Brown Eggs-12ct	4.45	2.50	Kroger Grade A Large Eggs-12ct	2.99

*Durables*

Weeks	Target Item	Price	Sale Price	Substitute Item	Price
6-9	Kroger: Multigrain Bread	2.59	1.99	Kroger: 100% Whole Wheat Bread	2.59
6-9	Kroger: Wheat Bread	2.45	1.99	Kroger: Buttermilk Bread	2.19
6-9	Dasani: Water (N)	6.99	5.49	Ice mountain: Water	5.99
				Aquafina: Water	6.99
				Kroger: Water	5.49
				Niagara: Water	5.99
12-13	Aunt Millie's Bread: 100% Whole Wheat	3.65	2.19	Aunt Millies: 12 Whole Grain, Honey Oat, Honey Wheat, Multi Grain	3.65
12-13	Aunt Millie's Bread: Butter Top White	3.65	2.19	Kroger Whole Wheat	2.59
12-13	Aunt Millie's Bread: Whole Grain White	3.65	2.19	Kroger: Buttermilk Bread, Wheat Bread	2.45
				Aunt Millies: Italian	3.65
				Kroger: White, Italian	2.19

**(N)** – refers to neighboring categories where the target and substitute appear on the same line of the website.

Table A4: Offered Rebate Categories by Week

Week	Rebate Item	Rebate Item Price (in \$'s)	Rebate Item Refund Control Group	Rebate Item Refund Treat Group
1	Bananas	0.39	2.99	2.99
2	Blueberries	4.49	2.99	2.99
3	Apples	1.25	2.99	2.99
4	Broccoli	3.25	2.99	10
5	Bananas, Blueberries, Apples, or Broccoli	See Prices Above	2.99	10
6	Tomatoes	0.59	2.99	10
7	Red bell pepers	2.59	2.99	10
8	Bread	1.99	2.99	10
9	Yogurt	1.5	2.99	10
10	Bananas	0.24	2.99	10
11	Apples	1	10	10
12	Bread	2.19	10	10
13	Eggs	2.49	10	10

Table A5: Sample Characteristics in Pre Experiment Period

	Full Sample			Target or Substitute History		
	Control <sup>a</sup>	Treat <sup>a</sup>	Diff <sup>b</sup>	Control <sup>a</sup>	Treat <sup>a</sup>	Diff <sup>b</sup>
Number of Shopping Trips	4.373 (5.814)	4.264 (5.678)	-0.097 (0.693)	4.829 (6.122)	4.732 (5.988)	-0.097 (0.693)
Number of Items Purchased	12.544 (7.157)	13.039 (8.553)	0.856 (0.883)	13.529 (7.017)	14.385 (8.337)	0.856 (0.883)
Number of Target Items Purchased: (28 Categories)	2.198 (4.856)	2.758 (6.372)	0.65 (0.689)	2.559 (5.153)	3.209 (6.769)	0.65 (0.689)
Neighboring Categories: (6 Categories)	0.599 (1.683)	0.702 (2.397)	0.103 (0.220)	0.697 (1.798)	0.817 (2.569)	0.120 (0.254)
Non-Neighboring Categories: (22 Categories)	1.599 (3.900)	2.056 (4.989)	0.457 (0.475)	1.862 (4.151)	2.392 (5.308)	0.530 (0.546)
Number of Substitute Items Purchased: (28 Categories)	8.565 (11.585)	8.360 (12.901)	-0.205 (1.302)	9.974 (11.929)	9.725 (13.433)	-0.248 (1.455)
Neighboring Categories: (6 Categories)	2.904 (6.555)	2.427 (5.125)	-0.477 (0.624)	3.382 (6.961)	2.824 (5.428)	-0.558 (0.714)
Non-Neighboring Categories: (22 Categories)	5.661 (7.341)	5.933 (8.624)	0.272 (0.850)	6.592 (7.525)	6.902 (8.937)	0.310 (0.946)
Number of Categories Purchased	4.260 (3.587)	4.500 (3.690)	0.240 (0.386)	4.961 (3.390)	5.235 (3.462)	0.275 (0.392)
Total \$ Amount Spent on Purchase	66.186 (38.556)	65.198 (40.119)	-0.988 (4.177)	70.957 (38.403)	70.166 (39.833)	-0.791 (4.481)
Number of Shoppers	177	178		152	153	

<sup>a</sup>Standard deviations are presented in parenthesis

<sup>b</sup>Standard errors are presented in parenthesis

Our analysis focuses on 28 product categories. Six of these are classified as Neighbor Categories - categories where the substitute and target items appear on the same line of the webpage (avocados, bananas, kiwis, lemons, raspberries, and water). The remaining 22 non-neighboring categories are the following: apples, bulk apples, blueberries, pineapples, broccoli, cucumbers, kale, onions, green onions, peppers, lettuces, limes, tomatoes, bread, organic bread, eggs, brown eggs, organic eggs, milk, bulk milk, organic milk, yogurt.

Target or Substitute History is a sample that includes only shoppers who made at least one purchase of a target or substitute good during the pre-experiment period.

\*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

Table A6: Customer Purchase Decisions (Identical Rebate Weeks)

	<b>Panel A: Treated Group</b>			<b>Panel B: Control Group</b>			<b>DID</b>
	Sale=0 (1)	Sale=1 (2)	T_Diff (3)	Sale=0 (4)	Sale=1 (5)	C_Diff (6)	T_Diff- C_Diff (7)
Buy in Category (%)	28.50	42.91	14.413*** (4.671)	32.26	35.66	3.397 (4.910)	11.02 (6.739)
Buy Target (%)	4.50	15.75	11.25*** (3.022)	5.74	11.89	6.15* (3.644)	5.1 (4.708)
Buy Substitute (%)	24.00	28.35	4.35 (4.035)	26.52	23.77	-2.75 (3.707)	7.099 (5.448)
N	200	254		279	244		