

## A Survey of Shopping Changes under COVID-19

Kristen S. Park<sup>a</sup>, Adam Brumberg<sup>b</sup>, and Koichi Yonezawa<sup>c</sup><sup>ⓧ</sup>

<sup>a</sup>*Extension Associate, Charles H. Dyson School of Applied Economics and Management,  
Cornell University,  
475 Warren Hall, Ithaca, NY 14853, USA*

<sup>b</sup>*Research Support Specialist, Charles H. Dyson School of Applied Economics and Management,  
Cornell University,  
475 Warren Hall, Ithaca, NY 14853, USA*

<sup>c</sup>*Research Associate, Charles H. Dyson School of Applied Economics and Management,  
Cornell University,  
475 Warren Hall, Ithaca, NY 14853, USA*

---

---

### Abstract

Before COVID-19, less than 7% of annual American grocery sales took place online. We hypothesize that during the COVID-19 pandemic, shoppers have decreased in-person shopping and increased online shopping. We conducted a survey of 780 grocery shoppers in five Northeastern states in May 2020. The percent of groceries purchased online increased from 8.4% pre-COVID-19 to 21.1% during COVID-19, whereas the percent of purchases from physical stores declined from 85.3% to 72.4%. Increases in online purchases resulted from 1) an increase in the number of online users, and 2) an increase in the amount purchased online by pre-COVID-19 online users.

**Keywords:** online, shopping behaviors, supermarkets, COVID-19

---

<sup>ⓧ</sup>Corresponding author:

Tel: (607) 255-7215  
Email: ksp3@cornell.edu

## **Introduction**

Shopping for groceries and preparing food are common activities in American households. During the current COVID-19 pandemic, we hypothesize that those activities have changed. The current situation that has resulted from COVID-19 is unprecedented. People have lived under stay-at-home orders; restaurants, schools, and other places where consumers obtain foods have closed; and food supply chains, processing plants, and farms have all been disrupted due to COVID-19 outbreaks among workers. And nowhere, at the time of the study, was the pandemic having a greater impact than in our study region, which includes Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania.

On March 21, the study region started implementing statewide stay-at-home orders (Ballotpedia, 2020). When the survey launched May 21, consumers had been living under the orders for approximately two months.

Before the pandemic, online grocery sales were increasing quickly. Nielsen's Brandbank reported average 2019 online sales as being 4% of total grocery sales (Dunning 2020). Online sales increased throughout the year, and in December 2019, Brick Meets Click, a consulting group that studies digital effects on the grocery sector, reported that online grocery sales accounted for 6.3% of the total amount spent on groceries in the United States (Melton, 2019). They predicted online sales would increase to approximately 7.0% of the market in 2020.

In March 2020, society changed. Although grocery stores remained open as essential businesses, the emergence of the pandemic, stay-at-home orders, and food service shutdowns caused online grocery sales to accelerate sharply. Many consumers were concerned for their safety and shopped in the shelter of their homes while retailers fast-tracked emerging online shopping operations to meet the demand (Redman, 2020).

## **Methods**

We surveyed shoppers in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania, the region most heavily affected by COVID-19 at the time of the survey. A survey panel was recruited by Qualtrics, and survey data were collected May 21-26, 2020. Shoppers in New York state provided 41% of the survey responses, which is a slightly higher proportion than the state represents in the survey region's total population.

Respondents self-described the type of area in which they lived as being rural, urban, or suburban, with 26.7% indicating that they lived in a rural area, 37.2% from a suburban area, and 36.2% from an urban area (Table 2). Using the Census Bureau definitions for urban and rural areas, 87.3% of the population in the five-state region surveyed lives in urban areas and 12.7% in rural areas (Iowa State University). Therefore, our survey overrepresents the rural population in the region.

Responses to the demographic questions in the survey are presented in Table 1. One psychographic question was included in an effort to provide additional strength to the analyses. This question

asked respondents about how much information or news they follow about COVID-19. The purpose of the question was to describe to what degree respondents were worried about the disease, and, therefore, how they might be changing their normal shopping habits.

**Table 1.** Respondent Demographics

<b>Variable</b>	<b>Description</b>	<b>% of Respondents</b>
Current employment	I am still employed at the rate of employment prior to the COVID-19 crisis.	37.2
	I am still working but not as much as prior to the COVID-19 crisis.	13.9
	I am currently furloughed.	7.8
	I became unemployed after the COVID-19 crisis hit and am not receiving unemployment.	4.7
	I am currently on unemployment due to the COVID-19 crisis.	7.2
	I am currently retired.	18.5
	Other, please describe.	10.7
News regarding COVID-19	I follow as much information about COVID-19 as I can.	29.4
	I follow information about COVID-19 every day.	44.2
	I follow information about COVID-19 on occasion	23.3
	None, I do not follow information about COVID-19.	2.8
Marital status	Single	38.9
	Married	55.1
	Other	6.0
Children	Number of children under 18 (number)	0.55
Education	Less than high school	1.0
	High school/GED	20.4
	Some college	16.7
	2-year college degree	9.5
	4-year college degree	30.1
	Graduate/professional degree	22.3
Household income in 2019 before taxes	I prefer not to say	3.6
	Less than \$20,000	10.6
	\$20,000–\$39,999	15.4
	\$40,000–\$59,999	15.1

**Table 1. (continued)**

Variable	Description	% of Respondents
Household income in 2019 before taxes	\$60,000–\$79,999	17.2
	\$80,000–\$99,999	10.8
	\$100,000–\$119,999	6.3
	\$120,000–\$139,999	5.1
	\$140,000–\$159,999	5.1
	\$160,000–\$179,999	2.3
	\$180,000–\$199,999	2.9
	\$200,000 or greater	5.5

**Results**

Respondents reported a large increase in the percent of groceries purchased online “normally,” from pre-COVID-19 to “currently,” from 8.4% to 21.1% (Table 2), an increase of 152%. This increase is counterbalanced by the decrease in the proportion of in-store grocery purchases from 85.3% to 72.4%. Other shopping methods, such as direct from farm, remained essentially unchanged.

**Table 2. Percent of Groceries Purchased from Different Retail Types, Normally and Currently**

	Ordered online			
	A physical store <sup>1</sup>	and either picked up or delivered <sup>2</sup>	Farmer direct <sup>3</sup>	Other
Normally, before COVID-19	85.3%	8.4%	4.3%	1.9%
Currently	72.4	21.1	4.1	2.5

Note: <sup>1</sup>Such as a supermarket or other grocery store

<sup>2</sup>Such as Kroger, Walmart, Instacart, Shipt, AmazonFresh, Fresh Direct, Peapod, etc.

<sup>3</sup>Such as farm stand, farmers market, CSA, online farm store, etc.

The total increase in online grocery purchases resulted from 1) an increase in the amount purchased online by pre-COVID-19 online users (59.2% of those who previously purchased online increased their online grocery purchases), and 2) an increase in total online users, from 30.8% of respondents to 45.5%.

Respondents from our five-state region reported 8.4% of their groceries were purchased online prior to COVID-19. This number is between the figure reported by Bricks and Clicks and that reported by FMI, and we feel the responses from our survey of the region are valid.

We used OLS (ordinary least squares) to examine which consumers were normally associated with greater purchasing online pre-COVID-19 (regression estimates and *p*-values shown in Table 3). Before COVID-19, those who were likely to have purchased more groceries online were urban,

male, younger than 65, and respondents with children under 18. Income<sup>1</sup> was not significant in explaining greater online grocery purchases pre-COVID-19.

**Table 3.** Regression Estimates for Percent of Groceries Ordered Online, Pre-COVID-19

Variable	Estimate	Std. Error	t-ratio
Intercept	6.788***	1.761	3.854
Higher educated	0.275	1.277	0.216
Income	1.876	1.260	1.489
Rural	-0.947	1.466	-0.646
Urban	5.696***	1.349	4.224
Female	-5.312***	1.168	-4.546
18–34 years old	-0.398	1.448	-0.275
65 years old or older	-3.243*	1.509	-2.148
Child(ren)	5.314***	1.334	3.983
Married	0.059	1.326	0.044
R-squared	0.136		

Note: Single, double, and triple asterisks (\*, \*\*, \*\*\*) indicate significance at a 10%, 5%, and 1% level.

As reported earlier, 59.2% of those who purchased online pre-COVID-19 increased their online grocery purchases during the pandemic. Those respondents who increased their purchases online were more likely to be those with four years or more of college, urban, those who consume information about COVID-19 daily,<sup>2</sup> and those with children under 18 (Table 4).

**Table 4.** Coefficients for Those Who Increased Their Percent of Groceries Ordered Online

Variable	Estimate	Std. Error	t-ratio
Intercept	-2.263***	0.388	-5.826
Higher educated	0.504**	0.186	2.707
Income	0.301	0.179	1.681
Rural	0.204	0.217	0.940
Urban	0.562**	0.192	2.922
Female	-0.129	0.168	-0.768
18–34 years old	0.265	0.208	1.274
65 years old or older	-0.009	0.276	-0.033
Employed	0.136	0.297	0.457
Unemployed	0.312	0.324	0.965
Retired	0.017	0.386	0.043
COVID-19 information	0.494*	0.194	2.542
Child(ren)	0.452*	0.189	2.393
Married	0.331	0.194	1.711
Log-likelihood value	-449.122		

Note: Single, double, and triple asterisks (\*, \*\*, \*\*\*) indicate significance at a 10%, 5%, and 1% level.

<sup>1</sup> For the regression models, we convert each income category to a numeric value by assuming each observation lies at the mean of its associated category.

<sup>2</sup> This variable was not included in the question about shopping pre-COVID-19, because it would not have been a logical option.

As reported earlier, more people started online shopping after COVID-19 struck and stay-at-home orders were issued. Were these additional consumers in the same demographic group as previous users, or did the pandemic provide incentive to consumers in different demographic groups to use online grocery shopping?

A logit model was used to analyze which respondents started shopping online during the pandemic in spring 2020 (regression estimates and *p*-values are shown in Table 5). Respondents new to online grocery shopping during the COVID-19 pandemic in the spring were very different from those who shopped online prior to COVID-19, and were more likely to have completed four years or more of college and be female and married.

**Table 5.** Regression Estimates for New Online Grocery Shoppers during COVID-19

Variable	Estimate	Std. Error	<i>t</i> -ratio
Intercept	-2.774***	0.481	-5.770
Higher educated	0.582*	0.234	2.483
Income	-0.242	0.231	-1.048
Rural	0.226	0.260	0.869
Urban	-0.022	0.243	-0.090
Female	0.815***	0.222	3.662
18–34 years old	0.257	0.258	0.995
65 years old or older	-0.207	0.344	-0.602
Employed	-0.034	0.349	-0.097
Unemployed	0.114	0.382	0.298
Retired	0.249	0.450	0.554
COVID-19 information	0.071	0.235	0.304
Child(ren)	0.129	0.238	0.541
Married	0.524*	0.242	2.169
Log-likelihood value	-324.088		

Note: Single, double, and triple asterisks (\*, \*\*, \*\*\*) indicate significance at a 10%, 5%, and 1% level.

## Conclusions

The disruptions caused by the changes in grocery purchasing patterns have been extensive, and researchers and industry need to understand the extent of the changes.

We feel shoppers in the five-state region of the United States hardest hit by COVID-19 in the spring of 2020 acted as a bellwether for how shoppers reacted in the rest of the United States as the pandemic unfolded. With COVID-19 still prevalent, online grocery shopping is expected to remain higher than pre-COVID-19 levels, even though industry sources indicate that the growth is slowing.

We examined the demographics of those respondents who had been shopping online. We then looked at which respondents were more likely to have increased their online shopping and which respondents were more likely to have started shopping online during the pandemic. The respondents who increased their online shopping during the pandemic shared demographic descriptors, with a larger set of those who had already been shopping online pre-COVID-19.

The respondents who started shopping online appear to be different demographically and were more likely to have more than four years of college, be female, and be married.

Opportunities to expand the online shopper base continue to exist, especially during the pandemic and as online shopping becomes even more available to the vast majority of consumers. Demographics to target in the future include females and those older than 65.

Beyond targeting specific demographics, retailers can encourage larger online shopping baskets and/or more frequent use of online shopping. According to our survey, of those respondents currently shopping online, only 46.4% of their groceries are being purchased online. Therefore, they are still shopping in store for 55.4% of their groceries. Given that shoppers are limiting the number of visits to and reducing the amount of time spent in grocery stores, retailers might want to investigate why online shoppers are not purchasing more of their groceries in this way.

The Food Marketing Institute has suggested ways in which retailers can improve their online shopping (Markenson, 2020). These operations include better product selection, faster delivery, easier-to-use websites, more and better product information, and more accurate search functionality

Some factors may decrease or stall online shopping. Many retailers and online shopping services charge for picking, handling, or delivery and may place a surcharge on the products themselves. These generally higher costs of online shopping could dampen sales if the country enters a recession.

Can retailers keep their new online shoppers? Most industry experts believe online shopping will remain higher than pre-COVID-19 levels, although it may drop after the pandemic is over (Bitter 2020).

If retailers want to continue or expand their current online presence, they will need to be prepared to manage their online shopping programs innovatively and effectively to maintain sales and customers.

## References

- Ballotpedia. 2020. *States That Issued Lockdown and Stay-at-Home Orders in Response to the Coronavirus (COVID-19) Pandemic*. Available online: [https://ballotpedia.org/States\\_that\\_issued\\_lockdown\\_and\\_stay-at-home\\_orders\\_in\\_response\\_to\\_the\\_coronavirus\\_\(COVID-19\)\\_pandemic,\\_2020](https://ballotpedia.org/States_that_issued_lockdown_and_stay-at-home_orders_in_response_to_the_coronavirus_(COVID-19)_pandemic,_2020).
- Bitter, A. 2020. "Online Grocery Growth Softens as COVID-19 Restrictions Ease." *S&P Global*. Available online: <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/online-grocery-growth-softens-as-covid-19-restrictions-ease-59098168>.
- Dunning, A. 2020. "Capitalizing on the Outbreak of Online Grocery Sales." *Nielsen Brandbank*. Available online: <https://www.brandbank.com/us/capitalizing-on-the-outbreak-of-online-grocery-sales/>.
- Iowa State University. n.d. "Urban Percentage of the Population for States, Historical." Ames, IA: Iowa State University, Iowa Community Indicators Program. Available online: <https://www.icip.iastate.edu/tables/population/urban-pct-states>.
- Markenson, S. 2020. "Grocery's Ecommerce Evolution during COVID-19." *Voice of the Food Industry Blog*. Available online: <https://www.fmi.org/blog/view/fmi-blog/2020/06/23/grocery-s-ecommerce-evolution-during-covid-19>.
- Melton, J. 2019. "2019 Ecommerce Sales in Review: U.S. Online Grocery Sales." *Digital Commerce 360*. Available online: <https://www.digitalcommerce360.com/2019/12/24/2019-ecommerce-in-review-online-grocery-sales/>.
- Redman, R. 2020. "U.S. Online Grocery Sales Growth Tails Off in June." *Supermarket News*. Available online: <https://www.supermarketnews.com/retail-financial/us-online-grocery-sales-growth-tails-june>.
- U.S. Department of Commerce. 2019. *2010 Census Urban and Rural Classification and Urban Area Criteria*. Suitland, MD: U.S. Department of Commerce, U.S. Census Bureau. Available online: <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html>.