

## Supplemental Information

Behavioral impacts on residential food provisioning, use, and waste during the COVID-19 pandemic

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This Supplemental Information file contains additional documentation to support the methods and interpretation of results presented in the study.

Raw data and scripts used to analyze data are also provided online at Figshare:

Babbitt, Callie (2021): Behavioral impacts on residential food provisioning, use, and waste during the COVID-19 pandemic. figshare. Dataset.

<https://doi.org/10.6084/m9.figshare.13308539.v1>

## **S.I. Section 1: Survey Instrument:**

### **Front text:**

Informed consent  
Prolific ID  
Survey instructions

### **Part 1: Food purchasing**

1.1 Did the amount of food purchased to eat in your household change during COVID-19 compared to normal?

Choice options:

- Decreased a lot
- Decreased some
- No change
- Increased some
- Increased a lot

1.2 During COVID-19, did your household purchase more or less of the following types of food?

Matrix rows:

- Canned goods
- Frozen foods
- Fresh fruits or vegetables
- Meats
- Dairy products
- Single-serve packaged foods

Choice options:

- Purchased less
- No change or N/A
- Purchased more

1.3 Due to COVID-19, did you do the following activities more or less frequently than normal?

Matrix rows

- Grocery shopping in person
- Ordering groceries online or by Instacart-type services
- Purchasing directly from farmers or farm markets
- Growing your own food
- Buying meal subscription boxes

Choice options:

- A lot less
- Somewhat less
- No change
- Somewhat more
- A lot more

1.4 Due to COVID-19, did you do the following activities more or less frequently than normal?

Matrix rows:

- Cooking meals at home
- Ordering take-out meals
- Stockpiling food and cooking supplies
- Buying food in bulk quantities

Choice options:

A lot less  
Somewhat less  
No change  
Somewhat more  
A lot more

1.5 During COVID-19, how did your household use of the following disposable products change?

Matrix rows:

- Plastic food containers and utensils (like those provided with takeout)
- Disposable shopping bags (plastic or paper)
- Kitchen paper products (like paper towels or napkins)
- Disposable plastic water or drink bottles

Choice options:

Decreased a lot  
Decreased some  
No change  
Increased some  
Increased a lot

## **Part 2: Food waste generation and management**

2.1 Wasted food is any food that is discarded rather than eaten - things like banana peels, old spinach, uneaten leftovers, and plate scrapings.

Did the amount of wasted food in your household change during COVID-19 compared to normal?

Choice options:

Decreased a lot  
Decreased some  
No change  
Increased some  
Increased a lot

2.2 During COVID-19, did your household waste more or less of the following types of food?

Matrix rows:

- Vegetable peels and trimmings
- Unused ingredients
- Failed recipes
- Food that spoiled or expired before use
- Uneaten leftovers

Choice options:

- Wasted less than normal
- No change or N/A
- Wasted more than normal

2.3. Before COVID-19, how did you normally handle household food waste?

Choose all that apply:

- Compost it at my home
- Throw it away with normal household trash
- A service collects it from my house and composts it
- Drop it off for someone else to compost
- Put it down the kitchen garbage disposal
- Other: \_\_\_\_\_

2.4 During COVID-19, did you change the way your household food waste was handled?

Choose all that apply:

- Continued what I was already doing
- Started or increased home composting
- Stopped or paused home composting
- Started or increased use of a service to collect or drop-off my food waste
- Stopped or paused use of a service to collect or drop-off my food waste
- Other: \_\_\_\_\_

### **Part 3: Food use and conservation**

3.1 Due to COVID-19, did you do the following things more or less than normal?

Matrix rows:

- Finding ways to save money on food purchases
- Saving leftovers
- Freezing or preserving foods
- Eating foods after their "use by" date
- Planning meals before grocery shopping
- Finding recipes that use food you already had at home
- Replacing perishables with shelf-stable items (dry milk for example)
- Using food pantries or other free food assistance programs

Choice options:

- A lot less
- Somewhat less
- No change
- Somewhat more
- A lot more

(Note: this question was split across two matrices)

3.2 Do you agree or disagree with the following statements regarding the time between mid-March and mid-July?

Matrix rows:

- I worried the grocery store would not have foods I wanted or needed
- I enjoyed wearing a mask to grocery shop
- I felt financial strain due to higher food prices
- I spent more time thinking about food use
- I was concerned about exposure to COVID-19 through food purchases
- I worried food would run out before I was able to buy more.

Choice options:

- Disagree strongly
- Disagree somewhat
- Neither agree nor disagree
- Agree somewhat
- Agree strongly

3.3 Are there things you have done during COVID-19 that you plan to continue in the future?

Please choose all that apply:

- Buying food in bulk quantities
- Meal planning before grocery shopping
- Freezing or preserving food to make it last longer
- Stockpiling food and cooking supplies
- Ordering takeout more frequently than dining at a restaurant
- Buying groceries online more frequently than in-person shopping
- Saving leftovers
- Other: \_\_\_\_\_

3.4 Optional: Were there any other factors that changed your household food use or waste not mentioned already? Please share here:  
(Free response)

Part 4: COVID-19 Impacts and Perceptions

4.1 Have you, or has anyone in your household experienced a loss in employment income since March 13, 2020?

Choose the response that best describes your household:

- Yes, an ongoing loss of income
- Yes, a temporary loss of income
- No, but I anticipate future loss of income due to COVID-19
- No

4.2 Do you agree or disagree with the following statements?

- COVID-19 is major threat to the health of the U.S. population.
- COVID-19 is a major threat to the health of people in my household.
- COVID-19 is a major threat to my household's finances.

Choice options:

- Disagree strongly
- Disagree somewhat
- Neither agree nor disagree
- Agree somewhat
- Agree strongly

4.3 Did the number of people living or staying in your household change during COVID-19?

- Fewer people
- No change
- More people

4.4 What is the 5-digit zip code for the household you lived in between mid-March and mid-July 2020?

4.5 Who is mostly responsible for buying food for your household?

- Myself
- Someone else
- I share the responsibility with someone else
- Other: \_\_\_\_\_

4.6 Optional: Is there anything else you would like to share related to this survey?  
(free response)

## S.I. Section 2: Survey Responses and Data Analysis:

Table S1: Respondent demographics (n=300)

Gender		
	Male	42%
	Female	56%
	Non-binary	2%
Age		
	18-24	29%
	25-34	40%
	35-44	15%
	45-54	7%
	55-64	6%
	65+	2%
Education		
	No formal qualifications	1%
	High school diploma/GED	21%
	Technical/community college	6%
	Undergraduate degree (BA/BSc/other)	42%
	Graduate degree (MA/MSc/MPhil/other)	25%
	Doctorate degree (PhD/other)	5%
	Prefer not to answer	0.3%
Income		
	Under \$20,000 per year	12%
	20,000 -39,999 per year	15%
	40,000-59,000 per year	21%
	60,000-79,999 per year	14%
	80,000-99,999 per year	9%
	100,000-149,999 per year	18%
	More than 150,000 per year	12%
Race / Ethnicity		
	White / Caucasian	53%
	Black / African American	8%
	Hispanic	8%
	Asian	21%
	American Ind./Alaskan Native	0.3%
	Other Race	1%
	Multiple	8%

Table S1: Respondent demographics, continued

Baseline household size		
	1-2 individuals	36%
	3-4 individuals	43%
	Over 5 individuals	20%
	Prefer not to answer	2%
Change in household size due to COVID-19		
	No change	86%
	Fewer people	6%
	More people	8%
Responsibility for food purchases		
	Myself	52%
	I share the responsibility with someone else	33%
	Someone else	15%
Income loss due to COVID-19		
	No	40%
	No, but I anticipate future loss of income	8%
	Yes, a temporary loss of income	26%
	Yes, an ongoing loss of income	27%

\*Some values may not sum to 100% due to rounding



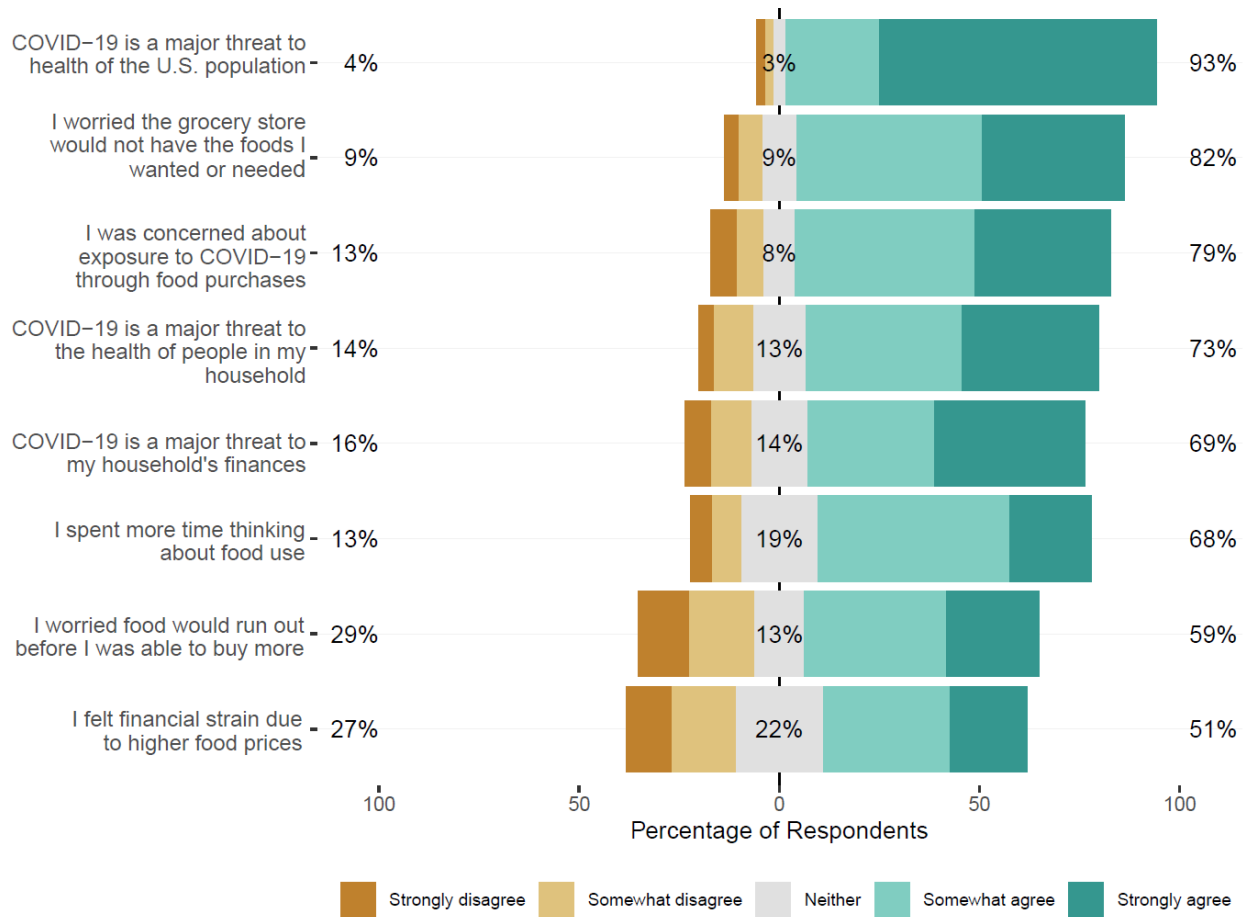


Figure S1: Beliefs related to food and COVID-19. Results are presented relative to the null option, reported at the center of the graph. The total percentage of respondents who agreed or disagreed with the presented statement to any degree is reported at the right and left of each bar, respectively.

Table S2: Comparison of mean changes to overall food purchasing and food waste generation during COVID-19

	Mean values	
Income loss due to COVID-19	Food purchase	Food waste
No (0)	0.70	-0.20
No, but I anticipate future loss of income (1)	0.50	-0.38
Yes, a temporary loss of income (2)	0.21	-0.44
Yes, an ongoing loss of income (3)	0.43	-0.24
	Mean values	
Income	Food purchase	Food waste
Under \$20,000 per year (0)	-0.15	-0.41
20,000 -39,999 per year (1)	0.36	-0.14
40,000-59,000 per year (2)	0.24	-0.48
60,000-79,999 per year (3)	0.56	-0.15
80,000-99,999 per year (4)	0.82	-0.29
100,000-149,999 per year (5)	0.98	-0.37
More than 150,000 per year (6)	0.64	-0.03
	Mean values	
Change in household size due to COVID-19	Food purchase	Food waste
Fewer people (-1)	-0.29	-0.71
No change (0)	0.50	-0.27
More people (1)	0.92	-0.13

Values represent the mean of responses on an ordinal scale of -2 to +2 (where -2 = Decreased a lot; -1 = Decreased some, 0 = No change; +1 = Increased some; +2 = Increased a lot) for Questions 1.1 and 2.1.

Values in parenthesis correspond to the categorical coding assigned to each group and referenced in pair-wise comparisons in Table S4.

Table S3: Significant results of one-way ANOVA

ANOVA: Food purchase as a factor of baseline income					
Df	Sum Sq.	Mean Sq.	F-value	p-value	Significance
6	34.4	5.73	4.84	<b>0.000101</b>	***
280	331.3	1.18			
ANOVA: Food purchase as a factor of income loss					
Df	Sum Sq.	Mean Sq.	F-value	p-value	Significance
3	10.7	3.57	2.85	<b>0.0379</b>	*
283	355	1.25			
ANOVA: Food purchase as a factor of household size change					
Df	Sum Sq.	Mean Sq.	F-value	p-value	Significance
2	14.9	7.44	6.02	<b>0.00276</b>	**
284	350.9	1.24			

Table S4: Results of Tukey's HSD test of post-hoc comparisons of groups

Comparison of means in income groups				
Groups	Mean difference	Lower interval	Upper interval	p-adjusted
1-0	0.50	-0.24	1.25	0.41
2-0	0.39	-0.31	1.09	0.65
3-0	0.71	-0.04	1.46	0.08
<b>4-0</b>	<b>0.97</b>	<b>0.14</b>	<b>1.79</b>	<b>0.01</b>
<b>5-0</b>	<b>1.13</b>	<b>0.41</b>	<b>1.84</b>	<b>0.00</b>
<b>6-0</b>	<b>0.78</b>	<b>-0.01</b>	<b>1.57</b>	<b>0.05</b>
2-1	-0.12	-0.77	0.54	1.00
3-1	0.20	-0.51	0.91	0.98
4-1	0.46	-0.32	1.25	0.58
5-1	0.62	-0.05	1.30	0.09
6-1	0.28	-0.47	1.03	0.93
3-2	0.32	-0.34	0.98	0.78
4-2	0.58	-0.16	1.32	0.24
<b>5-2</b>	<b>0.74</b>	<b>0.12</b>	<b>1.36</b>	<b>0.01</b>
6-2	0.39	-0.31	1.10	0.64
4-3	0.26	-0.53	1.05	0.96
5-3	0.42	-0.26	1.10	0.52
6-3	0.08	-0.68	0.83	1.00
5-4	0.16	-0.60	0.92	1.00
6-4	-0.19	-1.02	0.65	0.99
6-5	-0.34	-1.07	0.38	0.79

Table S4: Results of Tukey's HSD test of post-hoc comparisons of groups, continued

Comparison of groups at different degrees of income loss during COVID-19				
Groups	Mean difference	Lower interval	Upper interval	p-adjusted
1-0	-0.20	-0.85	0.45	0.85
2-0	<b>-0.49</b>	<b>-0.93</b>	<b>-0.05</b>	<b>0.02</b>
3-0	-0.27	-0.70	0.15	0.35
2-1	-0.29	-0.97	0.40	0.70
3-1	-0.07	-0.74	0.61	0.99
3-2	0.22	-0.26	0.69	0.64
Comparison of groups at with changed household size during COVID-19				
Groups	Mean difference	Lower interval	Upper interval	p-adjusted
<b>0 - -1</b>	<b>0.80</b>	<b>0.14</b>	<b>1.45</b>	<b>0.01</b>
<b>1 - -1</b>	<b>1.21</b>	<b>0.38</b>	<b>2.04</b>	<b>0.002</b>
1 - 0	0.41	-0.15	0.97	0.19

\*For definition of groups in Table S4, see categorical coding in Table S2.

Table S5: Results of the exploratory factor analysis

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Uniqueness	Complexity
Survey question	Efficient food use	Self-sufficiency	Food insecurity	Health concerns	Economic impacts	Shopping mode	Alternate provisioning	(h2)	u2	com
Planning meals before grocery shopping	0.72	-0.01	-0.01	0.12	-0.04	0.04	0.03	0.55	0.45	1.1
Saving leftovers	0.71	0.02	-0.01	-0.03	0.04	0.02	-0.03	0.53	0.47	1.0
Finding ways to save money on food	0.66	-0.03	0.00	-0.14	0.17	0.02	0.01	0.50	0.50	1.2
Finding recipes to use food already at home	0.56	0.10	0.16	0.01	-0.06	-0.01	-0.03	0.45	0.55	1.3
Freezing or preserving foods	0.49	0.30	0.16	0.01	-0.09	-0.01	-0.10	0.56	0.44	2.1
Cooking meals at home	0.46	0.30	-0.26	0.12	0.14	-0.06	-0.02	0.48	0.52	2.8
I spent more time thinking about food use	0.40	0.12	0.26	-0.02	0.02	0.00	0.10	0.38	0.62	2.1
Eating foods after their expiration date	0.32	-0.07	0.03	0.00	0.04	-0.01	0.29	0.18	0.82	2.2
Stockpiling food and cooking supplies	0.00	0.76	0.02	-0.01	0.03	0.08	-0.02	0.63	0.37	1.0
Buying food in bulk quantities	0.06	0.72	0.00	0.01	-0.05	0.02	0.03	0.57	0.43	1.0
Replacing perishables with shelf-stable items	0.05	0.39	0.19	-0.05	0.00	0.14	-0.01	0.29	0.71	1.9
Ordering take-out meals	0.13	-0.33	0.15	-0.12	0.05	0.16	0.07	0.12	0.88	2.8
I worried food would run out before I was able to buy more	-0.02	0.02	0.86	0.04	0.01	0.02	0.00	0.78	0.22	1.0
I worried the grocery store would not have foods I wanted or needed	0.19	-0.01	0.58	0.16	0.04	0.00	0.00	0.56	0.44	1.4
I felt financial strain due to higher food prices	-0.01	0.05	0.52	-0.01	0.38	-0.06	-0.07	0.55	0.45	1.9
COVID-19 is major threat to the health of the U.S. population	0.02	-0.05	0.00	0.86	0.00	0.05	-0.06	0.75	0.25	1.0
COVID-19 is a major threat to the health of people in my household	-0.05	0.04	0.05	0.76	0.10	-0.05	0.08	0.63	0.37	1.1

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Uniqueness	Complexity
Survey question	Efficient food use	Self-sufficiency	Food insecurity	Health concerns	Economic impacts	Shopping mode	Alternate provisioning	(h2)	u2	com
I was concerned about exposure to COVID-19 through food purchases	0.14	0.14	0.28	0.41	-0.06	0.08	0.10	0.50	0.50	2.6
COVID-19 is a major threat to my household's finances	0.02	0.00	0.02	0.06	0.96	0.07	0.02	1.00	0.01	1.0
Household income loss due to COVID-19	0.00	0.00	0.01	-0.08	0.63	-0.14	-0.09	0.42	0.58	1.2
Ordering groceries online	0.00	0.03	-0.01	0.00	0.02	0.99	0.01	1.00	0.01	1.0
Grocery shopping in person	0.11	-0.08	-0.03	-0.25	0.06	-0.34	0.13	0.25	0.75	2.7
Buying meal subscription boxes	0.03	-0.04	-0.04	-0.01	-0.02	0.12	0.62	0.41	0.59	1.1
Growing your own food	-0.10	0.11	0.00	0.06	0.00	-0.16	0.57	0.34	0.66	1.3
Purchasing from farmers or farm markets	0.01	-0.14	0.05	-0.11	-0.05	0.03	0.42	0.22	0.78	1.5

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
	Efficient food use	Self-sufficiency	Food insecurity	Health concerns	Economic impacts	Shopping mode	Alternate provisioning
SS loadings	2.94	2.02	1.99	1.81	1.7	1.29	1.10
Proportion of variance	0.11	0.08	0.08	0.07	0.07	0.05	0.04
Cumulative proportion of variance	0.11	0.19	0.27	0.34	0.4	0.45	0.49
Proportion of variance explained	0.23	0.16	0.15	0.14	0.13	0.1	0.09
Cumulative proportion of variance explained	0.23	0.39	0.54	0.68	0.81	0.91	1.00

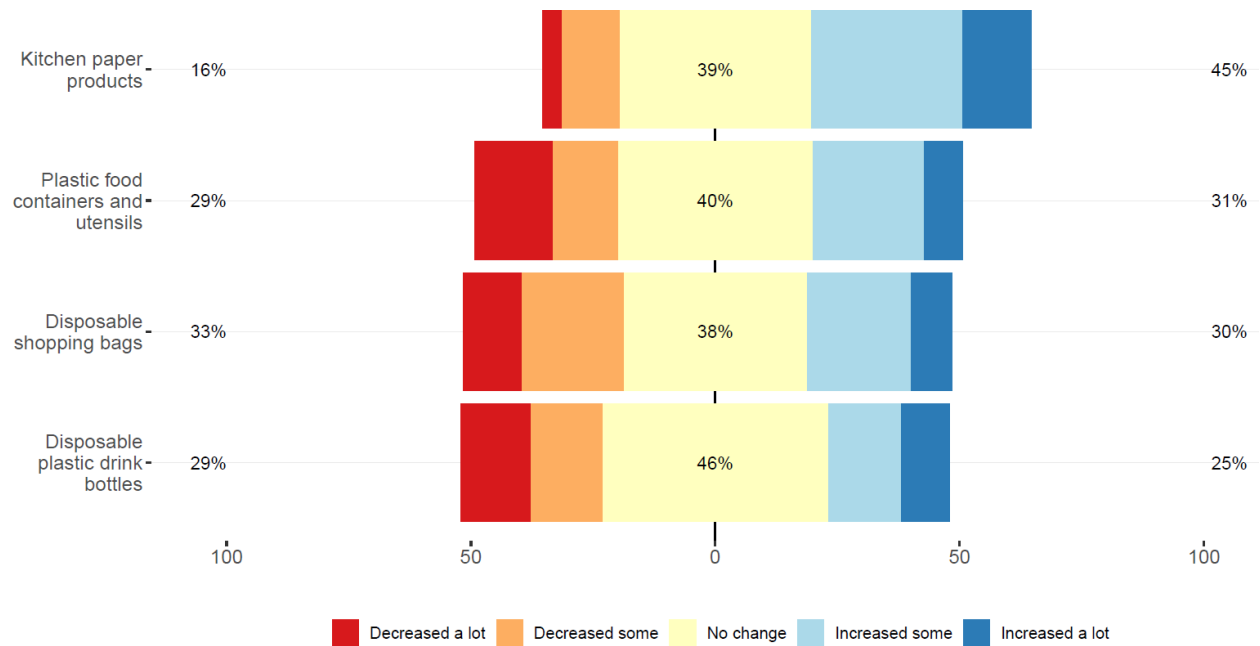


Figure S2: Changes in use of disposable products during COVID-19 Results are presented relative to the “no change” scenario shown at the center of the graph. The total percentage of respondents who increased or decreased the behavior to any degree is reported at the right and left of each bar, respectively.