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**FROM STORE TO STOVETOP: COOKING AND CONSUMING
HABITS OF MIDWESTERN RESIDENTS**

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S. R. Dominick, Natalie Donovan, and Nicole J. Olynk Widmar

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FROM STORE TO STOVETOP: COOKING AND CONSUMING HABITS OF MIDWESTERN RESIDENTS

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Abstract

Cooking habits and product quality can impact consumer's in-grocery and at-home food decisions. On February 12, 2016, a survey was launched; data collection concluded two weeks later for a total sample of 1,265 respondents. Household demographic information was collected, as well as information about cooking habits, where respondents learned healthy eating, and acceptance of damaged food items. Males made up 48% of the sample, with those aged 45 to 64 years old representing the largest age group (38%) in the sample. In terms of method of learning healthy eating, learning from family was selected by 56% of the sample. A majority of the sample was willing to accept or buy food past the sale by date (61%), accept or buy damaged produce (53%), and accept or buy dented canned or boxed items (77%).

Keywords: consumer perceptions; food and cooking; food acceptance

JEL: Q18; D19; P46

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Introduction

Who uses recipes, where do most people go for healthy food information, and is there a relationship between cooking habits and healthy food information sources? Relationships between demographics, cooking, and food have been explored in previous studies. Hertzler and Bruce (2002) surveyed 292 university students in a nutrition class and a sample of 26 nutrition educators and found the primary recipe source for university students was family, followed by package labels, while for nutritionists it was cookbooks. They also found that female students more frequently used cookbooks and magazines/newspapers. In another university study De Backer (2013) found that females were more likely to own and use recipes from female family members (i.e. grandmothers and/or mother).

Under what conditions would a consumer change their preference for pristine foods and select damaged ones? In one study it was found that consumers were willing to accept damaged apples, but as the damage increased the willingness to accept decreased (Yue et al. 2007). Also, Yue et al. (2007) found that consumers were more willing to accept damaged apples from organic production over conventional; however, they did not include information specific to consumer demographics: were they young or old, male or female, and what level of education did they possess?

This study quantified food shopping behaviors for individuals in the Midwest and explored potential relationships between demographics and food choices at the grocery store and at home.

Materials and Methods

A survey was designed and constructed using Qualtrics software at Purdue University. On February 12, 2016 the survey was launched by Lightspeed GMI to an opt-in panel of potential respondents. Data collection was completed on February 26, 2016, resulting in a total sample size of 1,265 respondents. The sample demographics were targeted to be representative of the Midwest according to the U.S. Census Bureau, 2014 American Community Survey 1-Year Estimates. The targeted demographics included sex, age, race, and annual pretax household income. Other demographic questions included whether the respondent had obtained a college degree, and household composition.

This study sought to understand respondents' grocery and cooking habits in relationship with the demographics collected. Respondents were asked the ways they learned to eat healthy (i.e. family, classes, internet, etc.) and were asked a number of questions designed to discover cooking habits and to understand the levels of acceptance for damaged food products. With regard to cooking habits, respondents were asked to indicate whether or not the displayed statements applied to them. The statements were "I use recipes," "I consume and serve prepared ready-to-eat-meals," "I don't cook because I lack the time," "I don't cook because I don't know how," "I re-purpose food that will expire soon," and "I consume leftovers." There were also five statements about the acceptance of damaged products and respondents were asked to select "yes," "yes, but only at a discount," "yes, but only for free," or "no" for each statement. The statements were "I would buy or accept food past the sell by date," "I would buy or accept fruit that is bruised, dented, broken, spotted," "I would buy or accept vegetables that are bruised, dented, broken, spotted," "I would buy or accept boxed items that are dented," and "I would buy or accept canned items that are dented."

The data were analyzed using SPSS Statistical software. Summary statistics as well as cross-tabulations were used to understand the possible relationships between the demographics of the respondents and their cooking habits and product acceptance.

Results and Discussion

Sample Summary

Table 1. Summary of sample demographics (n=1,265)

| Variable Description | % of Respondents |
|---|------------------|
| Male | 48 |
| Age | |
| 18-24 | 08 |
| 25-44 | 33 |
| 45-64 | 38 |
| 65+ | 21 |
| Annual household income | |
| less than \$34,999 | 32 |
| \$35,000-\$74,999 | 34 |
| \$75,000+ | 34 |
| Education | |
| Has college degree | 42 |
| Does not have college degree | 58 |
| Children | |
| Has children | 29 |
| Does not have children | 59 |
| Unstated ¹ | 12 |
| How did you learn what was healthy to eat?² | |
| Family | 56 |
| Internet | 41 |
| Cookbook | 28 |
| Magazines | 27 |
| Television | 26 |
| Classes | 16 |
| Don't know | 15 |
| Other | 09 |

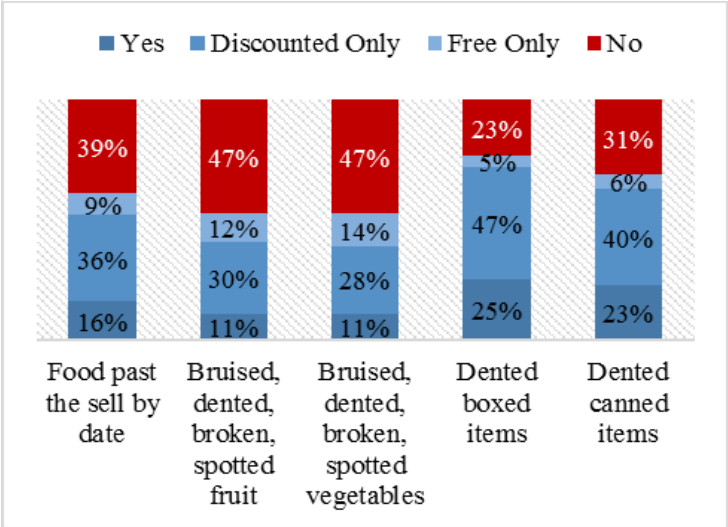
¹Disparity between multiple child-focused questions resulted in unclear results.

² Does not sum to 100% because respondents were able to select more than one option. The percent shown is percent selection of total sample.

A summary of the demographic data can be found in **Table 1**. Forty-eight percent of the sample reported being male. There were four age categories, the largest age group were people 45 to 64 with 38% of the sample, 25 to 44 had 33%, being 65 years old or older was reported by 21%, and the smallest group were those 18 to 24, making up 8% of the sample. Annual pretax income was grouped into three categories with a nearly even distribution. Respondents who earned less than \$34,999 were 32% of the sample, those earning \$35,000 to \$74,999 and those earning more than \$75,000 were 34% of the sample each. The majority of respondents (58%) reported not having earned a college degree, leaving 42% who reported possessing one at the time they completed the survey. Respondents were given the option of indicating whether or not children resided in their households and 29% specified having children, 59% indicated that there were no children in the household, and 12% did not respond or did not complete the question.

The sample was also asked how they learned what was healthy to eat and they were allowed to select more than one response. Over half the sample (56%) indicated they learned from family. Internet had 46% of respondents. Cookbook, magazines, and television had similar selection rates with 28%, 27%, and 26% of the sample respectively. Only 16% of respondents selected classes. Fifteen percent indicated that they didn't know and 9% selected having some other mode of learning what was healthy to eat.

Figure 1. *accept or buy damaged products % of responses (n=1,265)*



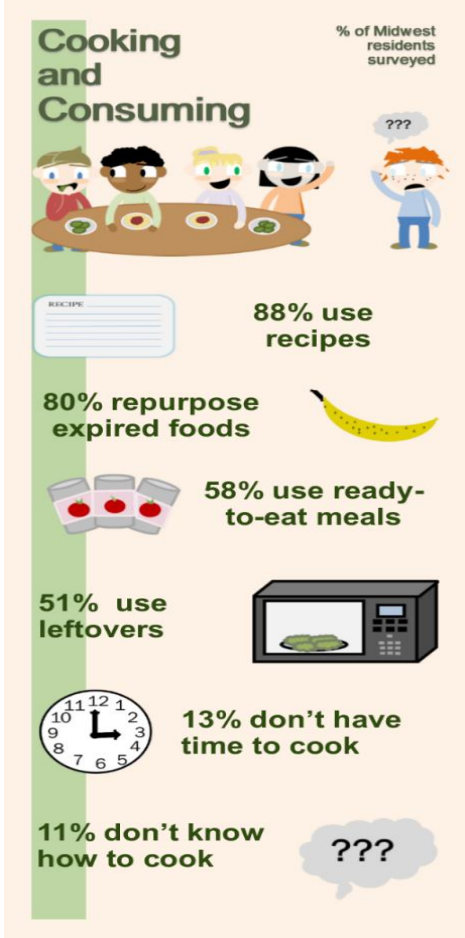
“yes” without specifying, 36% selected “yes, but only at a discount” and 9% of respondents selected “yes, but only for free.” The statements “I would buy or accept fruit that is bruised, dented, broken, spotted” and “I would buy or accept vegetables that are bruised, dented, broken, spotted” had similar levels of acceptance; “yes,” “yes but only of a discount” and “yes but only for free” totaling 53% of the sample. Eleven percent of the sample indicated “yes” for each statement respectively, 30% of the sample for fruit and 28% for vegetables indicated that they would accept or buy the damaged produce at a discount only, and 12% and 14% indicated that they would accept it free.

There was more general acceptance for “I would buy or accept boxed items that are dented” and “I would buy or accept canned items that are dented” than for any other category. A total of 77% of respondents disclosed they would accept dented boxed items under some circumstance. Specifically, 25% selected “yes”, 47% selected “yes, but only at a discount” and 5% selected “yes, but only for free”. Affirmative responses for dented canned items totaled 69% of the sample with 23% selecting “yes”, 40% at a discount, and 6% for free. The acceptance of damaged boxed or canned items could be related to perceived food safety. For these items only the packaging is damaged, whereas, for bruised, dented, broken, spotted vegetables and fruits the food product itself is compromised and may indicate food that is unsafe to eat.

Figure 2 displays respondent’s agreement with five descriptive cooking and consuming statements. A vast majority of the sample (88%) agreed with the statement “I

The survey also collected information about respondents’ level of acceptance of damaged food products, and a summary of responses can be found in **Figure 1**. For all items, the majority of respondents were willing to accept or buy all categories of food products under some stipulation, and there was more overall acceptance for dented boxed or canned items than other product categories studied. For the statement “I would buy or accept food past the sell by date” a total of 61% of respondents indicated they would buy or accept an item past the sell by date overall. Specifically, 16% selected

Figure 2. *summary cooking and consuming % of respondents (n=1,265)*



use recipes”. Eighty percent agreed with the statement “I re-purpose food that will expire soon.” The statements “I consume and serve prepared ready-to-eat-meals” and “I consume leftovers” had a similar amount of agreement with 58% and 51% respectively. The final categories, “I don’t cook because I lack the time” and “I don’t cook because I don’t know how” had 13% agreement and 11% agreement.

Cross Tabulations

Cooking Habits and Sources of Information about Healthy Eating

To investigate relationships between respondents’ demographics and cooking and consuming habits cross tabulations were performed. All cooking and consuming questions were crossed with five demographic characteristics: sex, age, income, the presence of children in the household, and education. The results for the five habit statements as well as the methods for learning how to cook are displayed in **Table 2**.

There were a number of significantly different results between the sexes. Respondents who reported being female answered “yes” to the statements; “I use recipes” (86%), “I re-purpose food that will expire soon” (57.4%), and “my household consumes leftovers” (92.6%) more frequently than respondents who reported being male (74.1%, 43%, and 82.7% respectively). Male respondents, however, more frequently selected “yes” to “I don't cook because I don't know how” with 14% of male respondents and 7.6% of female respondents. For statements “I don’t cook because I lack the time” and “I consume and serve prepared ready-to-eat meals” there was no significant difference between the sexes. These comparisons were similar to those found in Hertzler and Bruce (2002), for which recipe ownership and use had a stronger link through female members. For the question “How did you learn what was healthy to eat?” female respondents differed from male respondents, they more frequently selected cookbook (32.8% compared to 23.1%) and magazines (29.8% compared to 23.1%). While family and internet were the most selected methods for the combined sample, there were no statistical differences between the sexes, nor were there differences for television, classes, and other.

The proportion of respondents were also compared across the age categories and few statistical differences were found. Generally, the older category was statistically different from the younger category. The one exception was for the statement “I use recipes,” for which 25 to 44 year olds (83.6%) and 45 to 64 year olds (81.6%) more frequently agreed with the statement when compared to 18 to 24 year olds (72.9%) and 65 year olds or older (75.5%). For the statement “I consume and serve prepared ready-to-eat meals” the respondents in the youngest three categories more frequently agreed with the statement and were statically different from the eldest category, but not statistically different from each other. Similarly, the youngest two categories more frequently identified with the statements “I don't cook because I lack the time” and “I don't cook because I don't know how.” For “My household consumes leftovers” the oldest categories selected “yes” more frequently, the most frequent being those 45 to 64 years old with 95.1%. For the statement “I re-purpose food” only the respondents in the two older categories showed statistical difference from each other but not from the younger categories.

For the two leading methods of learning what was healthy to eat, family and internet, the younger categories more frequently selected these methods than the older categories. To look specifically at family, 68.8% of 18 to 24 year olds and 61.7% of 25 to 44 year olds selected family compared with 52.8% and 49.4% of 45 to 64 year olds and 65 year olds or older. For internet, there was a wider gap with 62.5% of 18 to 24 year olds and 51.8% of 25 to 44 year olds selecting internet, but only 34.8% and 28.3% for 45 to 64 year olds and 65 year olds or older. There were no statistical differences across age groups for learning from a cookbook, magazines, and television. Respondents 18 to 24 years old more frequently selected learning from classes while the older categories more frequently selected don't know and other.

In terms of income, statistical differences were present for the statements "I don't cook because I lack the time" and "I don't cook because I don't know how" between the highest income category and lowest income category. Respondents with higher income more frequently agreed with the statements, 16.6% and 13.2% correspondingly, compared with 9.3% and 8.6% in the lowest income categories. Statistical difference existed between the lowest two income categories and the highest income category for all methods of learning what was healthy to eat except for television and classes. The highest income category more frequently selected family, internet, magazines, and cookbook. The lower two categories more frequently selected don't know and other.

For almost all cooking habit statements and learning methods, respondents who disclosed having children in the household were statistically different from the remaining respondents who either expressed having no children in the household or did not indicate either way. Households with children more frequently agreed with all cooking statements except "My household consumes leftovers" when compared with remaining households. One potential explanation for this finding is that perhaps there are fewer leftovers with children living in the household, simply due to more family members consuming meals when first cooked or served. The same pattern existed for learning methods, with households with children more frequently selecting all methods except other. The healthfulness of a child's diet may be important enough to invest more in learning about healthy food options, than for adults alone.

The education demographic had few differences between respondents with college degrees and those without. Respondents who earned a college degree agreed more frequently with the statement "I don't cook because I lack the time," 15.1% compared with 9.9%. Those without a college degree, however, selected "yes" more frequently for "My household consumes leftovers," 91.2% as opposed to 84.7%. Respondents with college degrees were statistically different from those without and more frequently selected family, internet, and classes as a learning method.

Table 2. Purchasing, Cooking and Consumption Patterns % of responses (n=1,265)

| | Sex | | Age | | | | Income | | | Children | | Education | |
|---|-------------------|-------------------|--------------------|--------------------|---------------------|---------------------|-----------------------|----------------------|--------------------|------------------------------|-------------------|----------------------|-----------------------|
| | Male(A) | Female(B) | 18-24 (C) | 25-44 (D) | 45-64 (E) | 65+ (F) | less than \$34,999(G) | \$35,000-\$74,999(H) | \$75,000+(I) | No/ Cannot be determined (J) | Yes (K) | No college degree(L) | Yes college degree(M) |
| Habits | | | | | | | | | | | | | |
| I use recipes | 74.1 ^B | 86.0 ^A | 72.9 ^{DE} | 83.6 ^{CF} | 81.6 ^{CF} | 75.5 ^{DE} | 71.7 ^{HI} | 81.2 ^{GI} | 87.5 ^{GH} | 76.9 ^K | 88.9 ^J | 77.9 | 82.1 |
| I consume/serve prepared ready to eat meals | 60.5 | 56.5 | 65.6 ^F | 63.4 ^F | 58.6 ^F | 48.0 ^{CDE} | 56.0 | 58.1 | 61.0 | 55.9 ^K | 64.7 ^J | 55.9 | 60.3 |
| I don't cook because I lack the time | 12.9 | 12.9 | 29.2 ^{EF} | 22.2 ^{EF} | 8.0 ^{CDF} | 1.5 ^{CDE} | 9.3 ^I | 12.5 | 16.6 ^G | 9.8 ^K | 20.6 ^J | 9.9 ^M | 15.1 ^L |
| I don't cook because I don't know how | 14.0 ^B | 7.6 ^A | 24.0 ^{EF} | 17.3 ^{EF} | 6.2 ^{CD} | 3.7 ^{CD} | 8.6 ^I | 10.1 | 13.2 ^G | 8.5 ^K | 16.1 ^J | 9.0 | 11.9 |
| I re-purpose food | 43.0 ^B | 57.4 ^A | 44.8 | 49.9 | 55.5 ^F | 44.6 ^E | 52.6 | 48.9 | 50.1 | 49.0 | 54.4 | 49.2 | 51.5 |
| My household consumes leftovers | 82.7 ^B | 92.6 ^A | 83.3 ^{EF} | 78.3 ^{EF} | 95.1 ^{CDF} | 91.1 ^{CDE} | 90.4 | 86.1 | 87.1 | 90.9 ^K | 80.0 ^J | 92.1 ^M | 84.7 ^L |
| How did you learn what was healthy to eat? | | | | | | | | | | | | | |
| Family | 55.2 | 57.1 | 68.8 ^{EF} | 61.7 ^{EF} | 52.8 ^{CD} | 49.4 ^{CD} | 48.9 ^{HI} | 55.8 ^{GI} | 63.5 ^{GH} | 53.1 ^K | 63.9 ^J | 51.4 ^M | 59.7 ^L |
| Internet | 40.5 | 41.6 | 62.5 ^{EF} | 51.8 ^{EF} | 34.8 ^{CD} | 28.3 ^{CD} | 34.9 ^I | 39.3 ^I | 48.7 ^{GH} | 35.9 ^K | 54.2 ^J | 37.9 ^M | 43.7 ^L |
| Cookbook | 23.1 ^B | 32.8 ^A | 22.9 | 27.2 | 29.1 | 29.7 | 24.8 | 29.6 | 29.8 | 26.0 ^K | 33.6 ^J | 26.9 | 29.0 |
| Magazines | 23.1 ^B | 29.8 ^A | 20.8 | 27.0 | 26.2 | 28.6 | 19.9 ^I | 25.4 ^I | 33.9 ^{GH} | 24.4 ^K | 31.9 ^J | 23.7 | 28.6 |
| Television | 25.4 | 26.9 | 22.9 | 26.3 | 28.2 | 23.4 | 24.3 | 25.4 | 28.6 | 25.0 | 29.2 | 26.2 | 26.2 |
| Classes | 15.3 | 15.3 | 22.9 ^{EF} | 18.6 ^F | 14.0 ^C | 11.2 ^{CD} | 15.7 | 13.9 | 17.1 | 13.1 ^K | 21.7 ^J | 11.0 ^M | 18.9 ^L |
| Don't know | 17.3 ^B | 12.9 ^A | 7.3 ^{EF} | 13.5 ^C | 16.9 ^{CD} | 16.7 ^{CD} | 18.4 ^I | 15.8 ^I | 11.1 ^{GH} | 16.2 | 11.9 | 18.1 ^M | 12.7 ^L |
| Other | 8.1 | 9.1 | 3.1 ^{EF} | 3.1 ^{EF} | 10.1 ^{CDF} | 16.4 ^{CDE} | 10.6 ^I | 9.6 ^I | 5.8 ^{GH} | 10.4 ^K | 4.2 ^J | 9.2 | 8.2 |

Table displays percent of respondents who agree with the statement, the percent for those who do not agree can be found by taking the percent shown and subtracting it from 100%. Statistically significant differences between two measures at the 5% level are indicated by differing capital letters.

Table 3. Habits and learning % of responses (n=1,265)

| Habits | Family | | Internet | | Cookbook | | Magazines | | Television | | Classes | | Don't know | | Other | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) | No(A) | Yes(B) |
| I use recipes | 74.9 ^B | 84.5 ^A | 75.2 ^B | 87.7 ^A | 74.4 ^B | 95.5 ^B | 76.5 ^B | 90.8 ^A | 78.2 ^B | 86.4 ^A | 80.0 | 82.2 | 83.4 ^B | 62.6 ^B | 81.1 ^B | 72.5 ^A |
| I consume/serve prepared ready to eat meals | 54.7 ^B | 61.3 ^A | 57.3 | 60.0 | 58.6 | 57.9 | 56.0 ^B | 65.2 ^A | 55.9 ^B | 65.6 ^A | 57.6 | 62.9 | 59.6 ^B | 51.6 ^A | 59.2 | 50.5 |
| I don't cook because I lack the time | 9.9 ^B | 15.2 ^A | 10.3 ^B | 16.5 ^A | 14.4 ^B | 9.0 ^A | 12.6 | 13.7 | 13.5 | 11.2 | 11.3 ^B | 21.3 ^A | 13.3 | 10.5 | 13.4 | 7.3 |
| I don't cook because I don't know how | 8.3 ^B | 12.5 ^A | 9.8 | 11.9 | 13.1 ^B | 4.5 ^A | 10.5 | 11.0 | 11.3 | 8.8 | 9.7 ^B | 15.7 ^A | 10.6 | 11.1 | 10.9 | 8.3 |
| I re-purpose food | 44.6 ^B | 55.1 ^A | 48.5 | 53.5 | 45.9 ^B | 62.4 ^A | 48.8 ^B | 55.4 ^A | 49.0 | 54.7 | 47.8 ^B | 65.5 ^A | 53.1 ^B | 35.8 ^A | 49.8 | 57.8 |
| My household consumes leftovers | 88.4 | 87.3 | 89.3 | 85.8 | 86.7 ^B | 90.7 ^A | 87.9 | 87.5 | 87.6 | 88.5 | 87.6 | 88.8 | 88.4 | 84.7 | 87.2 ^B | 94.5 ^A |

Table displays percent of respondents who agree with the statement, the percent for those who do not agree can be found by taking the percent shown and subtracting it from 100%. Statistically significant differences between two measures at the 5% level are indicated by differing capital letters.

It was hypothesized there was a relationship between the methods of learning what was healthy to eat and cooking habits. In order to study this relationship cross tabulations were performed. The results can be found in **Table 3**. Family was the most selected learning method and a number of differences were found between those who selected family compared with those who did not. Of those who did not select family, 74.9% use recipes compared with 84.5% of respondents who did select family. Again the relationship between family generational recipe use found in Hertzler and Bruce (2002) could be impacting this relationship. Respondents who selected family more frequently selected “I consume and serve prepared ready-to-eat meals,” “I don't cook because I lack the time,” “I don't cook because I don't know how,” and “I re-purpose food.”

Significant differences existed for the selection of cookbook as a learning method for all cooking habits. For the statement “I use recipes” 74.4% of those who did not select cookbook also selected the statement compared with 95.5% of those who did. This seems inherent since cookbooks contain recipes. Fourteen percent of those who did not select cookbook also selected “I don't cook because I lack the time,” compared with only 9% of those who did select cookbook. Similarly, 13.1% of those who did not select cookbook, compared with 4.5% of those who did, also selected “I don't cook because I don't know how.” People who selected cookbook more frequently selected “I re-purpose food” (62.4% compared to 45.9%) and more frequently selected “My household consumes leftovers” (90.7% compared with 86.7%). Only “I consume and serve prepared ready-to-eat meals” showed no difference across cookbook selection.

Respondents who selected magazines and television more frequently selected “I use recipes” and “I consume and serve prepared ready-to-eat meals,” compared with those who did not select the method. Those who selected magazines also more frequently selected “I re-purpose food” compared with those who did not.

The cross tabulations for learning what was healthy to eat from classes provided almost counter intuitive results. Those who selected classes more frequently selected “I don't cook because I lack the time” (21.3% compared with 11.3%). Also 15.7% of those who selected classes also selected “I don't cook because I don't know how,” while only 9.7% of those who didn't select classes also selected this option. It would be impossible from this analysis to know why these answers were reported but two potential reasons for this result can be hypothesized. First, people who do not know how to cook could take classes to learn more about healthy eating. On the other hand, classes that teach healthy eating may not also teach students how to cook the healthy foods covered in the course. One final result related to taking classes was that people who selected classes as a means for learning about health eating also selected “I re-purpose food” more frequently. Thus, the depth of uses for foods (including re-purposing) appears to be something that is related to learning how to cook through classes.

Table 4. *Would you buy or accept...? % of responses (n=1,265)*

| | | Sex | | Age | | | | Income | | | Children | | Education | |
|--|------------|-------------------|-------------------|--------------------|---------------------|--------------------|---------------------|-----------------------|----------------------|-------------------|------------------------------|-------------------|----------------------|-----------------------|
| | | Male(A) | Female(B) | 18-24 (C) | 25-44 (D) | 45-64 (E) | 65+ (F) | less than \$34,999(G) | \$35,000-\$74,999(H) | \$75,000+(I) | No/ Cannot be determined (J) | Yes (K) | No college degree(L) | Yes college degree(M) |
| Food past the sell by date | Yes | 20.1 ^B | 11.7 ^A | 14.6 ^D | 24.6 ^{CD} | 11.1 ^D | 10.8 ^D | 14.7 | 14.8 | 17.6 | 11.8 ^K | 25.6 ^J | 13.3 ^M | 17.5 ^L |
| | Discounted | 32.8 ^B | 38.1 ^A | 30.2 ^F | 26.3 ^{EF} | 39.2 ^D | 45.4 ^{CDE} | 35.6 | 39.5 ^I | 31.6 ^H | 38.7 ^K | 27.8 ^J | 36.1 | 35.2 |
| | Free | 9.4 | 9.4 | 13.5 ^F | 8.7 | 11.3 ^E | 5.6 ^{CE} | 13.5 ^{HI} | 8.2 ^G | 6.9 ^G | 9.6 | 8.9 | 9.0 | 9.7 |
| | No | 37.7 | 40.7 | 41.7 | 40.5 | 38.4 | 38.3 | 36.4 ^I | 37.4 | 43.9 ^G | 39.9 | 37.8 | 41.7 | 37.5 |
| Bruised, dented, broken, spotted fruit | Yes | 13.8 ^B | 8.8 ^A | 15.6 ^{EF} | 16.6 ^{EF} | 8.9 ^{CD} | 5.6 ^{CD} | 10.8 | 11.1 | 11.8 | 9.1 ^K | 16.7 ^J | 9.3 | 12.6 |
| | Discounted | 28.0 | 31.9 | 22.9 | 30.8 | 31.3 | 29.0 | 28.7 | 30.6 | 30.7 | 28.8 | 33.1 | 29.9 | 30.1 |
| | Free | 10.5 | 13.8 | 12.5 | 10.4 | 14.6 | 10.8 | 16.2 ^I | 12.0 | 8.8 ^G | 13.1 | 10.0 | 11.8 | 12.6 |
| | No | 47.6 | 45.4 | 49.0 | 42.2 ^F | 45.2 ^F | 54.6 ^{DE} | 44.2 | 46.4 | 48.7 | 49.0 ^K | 40.3 ^J | 49.0 | 44.7 |
| Bruised, dented, broken, spotted vegetables | Yes | 13.0 ^B | 8.5 ^A | 9.4 ^D | 18.3 ^{CEF} | 7.8 ^D | 4.5 ^D | 9.6 | 10.8 | 11.5 | 8.2 ^K | 16.9 ^J | 9.0 | 11.9 |
| | Discounted | 23.7 ^B | 31.2 ^A | 27.1 | 25.5 | 30.7 | 25.3 | 27.8 | 27.1 | 27.9 | 27.5 | 27.8 | 27.3 | 27.8 |
| | Free | 12.7 | 14.4 | 10.4 | 12.5 | 15.7 | 12.6 | 16.0 ^I | 15.1 ^I | 9.9 ^{GH} | 14.3 | 11.9 | 12.5 | 14.4 |
| | No | 50.6 | 45.9 | 53.1 | 43.6 ^F | 45.8 ^F | 57.6 ^{DE} | 49.7 | 47.1 | 50.6 | 50.1 ^K | 43.3 ^J | 51.2 | 45.9 |
| Dented boxed items | Yes | 26.9 | 23.6 | 34.4 ^{EF} | 31.3 ^{EF} | 23.1 ^{CD} | 16.0 ^{CDE} | 25.6 | 25.2 | 24.7 | 22.5 ^K | 31.7 ^J | 25.4 | 24.9 |
| | Discounted | 44.6 | 48.5 | 39.6 ^F | 40.7 ^{EF} | 50.3 ^D | 51.7 ^{CD} | 47.2 | 47.3 | 45.5 | 48.1 | 43.1 | 46.9 | 46.4 |
| | Free | 4.4 | 5.9 | 1.0 ^E | 5.3 | 7.0 ^{CF} | 3.3 ^E | 5.9 | 5.9 | 3.9 | 5.4 | 4.7 | 4.3 | 5.9 |
| | No | 24.1 | 22.0 | 25.0 | 22.7 | 19.6 ^F | 29.0 ^E | 21.4 | 21.6 | 25.9 | 24.0 | 20.6 | 23.4 | 22.7 |
| Dented canned items | Yes | 25.0 | 20.8 | 31.3 ^{EF} | 29.4 ^{EF} | 20.8 ^{CD} | 13.4 ^{CDE} | 21.1 | 23.1 | 23.3 | 19.7 ^K | 30.8 ^J | 24.9 | 21.4 |
| | Discounted | 39.4 | 40.3 | 36.5 | 36.6 | 42.1 | 42.0 | 41.0 | 40.9 | 37.6 | 40.1 | 39.2 | 37.9 | 41.2 |
| | Free | 6.8 | 4.9 | 4.2 | 6.7 | 6.4 | 3.7 | 6.9 | 6.1 | 4.4 | 5.5 | 6.4 | 5.0 | 6.3 |
| | No | 28.8 ^B | 34.0 ^A | 28.1 ^F | 27.2 ^F | 30.7 ^F | 40.9 ^{CDE} | 30.0 | 29.9 | 34.6 | 34.7 ^K | 23.6 ^J | 32.1 | 31.1 |

Statistically significant differences between two measures at the 5% level are indicated by differing capital letters.

Preferences for Damaged Food Products

Cross tabulations were also performed on the five categories of damaged products (food past the sell by date; bruised, dented, broken, spotted fruit; bruised, dented, broken, spotted vegetables; dented boxed items; and dented canned items) and demographics in order to explore the hypothesis that a relationship may exist between respondent demographics and respondent's reported level of acceptance of damaged products. A summary of the results can be found in **Table 4**.

For food past the sell by date; bruised, dented, broken, spotted fruit; and bruised, dented, broken, spotted vegetables a significant difference existed between the sexes, with males more frequently selecting "yes" to accepting the products, while females more frequently selected "yes, but only at a discount." Twenty point one percent of males selected "yes" for acceptance of food past the sell by date, compared with 11.7% of females, while 38.1% of females selected "yes, but at a discount" (compared with 32.8% of males). Bruised, dented, broken, spotted fruit had only one significant difference with males more frequently selecting "yes." For bruised, dented, broken, spotted vegetables males, again, more frequently selected "yes" and females more frequently selected "yes, but at a discount." There were no differences between the sexes for dented boxed items. Dented canned items showed difference only between male and female respondents who selected "no", 34% percent of females compared to 28.8% of males.

For all five product categories respondents who selected "yes" were statistically different across age categories. Respondents who reported being 25 to 44 years old more frequently selected "yes" for acceptance of food past the sell by date (24.6%). The same can be observed for bruised, dented, broken, spotted vegetables. Under bruised, dented, broken, spotted fruit, 22 to 44 years olds were not different statistically from 18 to 24 year olds and 45 to 64 year olds were not different from 65 year olds or older, but the younger two categories were different from and more frequently selected "yes" than the older two categories. The younger two age groups were different from each other, but not from the other age groups for respondents who selected "yes" for acceptance of dented boxed items and dented canned items. Other observations in the age categories were that the older two age groups were statistically different from the younger age groups and more frequently selected "yes, but only at a discount" for food past the sell by date and more frequently said "no" for most categories.

Interestingly, for the income demographic statistical differences primarily existed across incomes for respondents who selected "yes, but only for free." Generally, the lower income category more frequently selected "yes, but only for free" when compared with the middle and higher income groups. For food past the sell by date, 13.5% of respondents in the lowest income group selected "yes, but only for free" compared with 8.3% of the middle income group and 6.9% of the high income group. The high income group more frequently selected "no" to accepting or buying food past the sell by date, compared with middle and lower income groups. The lowest income group more frequently selected "yes, but only for free" for bruised, dented, broken, spotted fruit (16.2%) when compared to the high income group (8.8%). For bruised, dented, broken, spotted vegetables both of the lowest income groups more frequently selected "yes, but only for free" than the high income group.

For all product categories respondents with children more frequently selected “yes” and people without children or those who did not disclose that information more frequently selected “no.” Respondents without children in the household or who did not specify more frequently selected “yes, but at a discount” (38.7%) for food past the sell by date compared with those with children (27.8%).

There was only one significant difference across education demographics, those with a college degree more frequently selected “yes” to accepting or buying food past the sell by date (17.5%) compared to those without a college degree (13.3%). While the reasons for acceptance of food past the sell by date is beyond the scope of this analysis, it is possible that consumers with higher education may have more knowledge regarding food safety and potentially feel comfortable interpreting dates on food items more loosely for certain items.

Conclusion

This study found a majority of the Midwest respondents used recipes when cooking and re-purposed soon to be expired foods. Females were more likely to use recipes, re-purpose soon to be expired foods and consume leftovers. The middle aged respondents were more likely to use recipes, consume ready to eat meals, and consume leftovers. The higher income respondents were more likely to utilize recipes, consume leftovers, and not know how to cook. Respondents with children were more likely to use recipes, consume ready-to-eat meals, lack the time to cook, and not know how to cook, while those with a college education were more likely to lack the time to cook. One important consideration was the influence of family. Family as a method of learning healthy eating had a number of statistically different comparisons across demographics and across cooking habits. The family aspect may be a point of further study.

When examining consumer’s acceptability of lower quality foods, it was seen that males, younger respondents, lower income respondents, respondents with children, and those without a college degree were more likely to accept the bruised or dented food products. One pattern of note that emerged from this analysis was the difference of acceptance of discounted versus free lower quality produce. In every demographic (gender, age, income, having children and education) the respondents were much more likely to accept the discounted version of the lower quality food than the free version. It was expected that most people would want free food, since generally speaking, free is preferred to not free. Perhaps free food has an adverse stigma implying the food is unsafe or of lesser quality, while discounted food’s shortcomings could be downplayed by the price point. Further studies could look at what environmental, sociological, or economic underpinning might exist to explain these results.

Understanding the variability of answers across multiple demographics is important for educating the public on various issues related to access of healthful foods and limiting food waste within the United States. The results show there is opportunity for educational advancement for consumers in the forms of family health and cooking legacy, as well as food damage understanding and acceptance.

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