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# Nutrition facts panel components: Utilization by consumers

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Caitlin A. Huth

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FOR THE DEGREE OF

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IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
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Nutrition Facts Panel Components: Utilization by Consumers

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Family and Consumer Sciences: Dietetics

2012

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### **Abstract**

The Food and Drug Administration (FDA) passed the Nutrition Labeling and Education Act (NLEA) that resulted in the appearance of the Nutrition Facts Panel (NFP) on all packaged foods in 1994. With rising rates of obesity in the country, the Panel was intended to serve as a nutrition tool to help consumers make informed food and nutrition choices. Previous research has discussed the application and use of the NFP related to consumers' demographic features, dietary outcomes, such as diet quality, and consumer behaviors, such as purchasing decisions.

The purpose of this study was to determine the use of NFP components in relationship to consumer demographics and categories of food. A total of 112 adult consumers completed a 24-question electronic survey. Data showed frequent use of NFP components among women, normal weight consumers, those with a chronic health condition, primary shoppers, and those who reported using the NFP frequently. The most frequently used components were calories, serving size, and total fat. The least frequently used components were the footnote, % Daily Value (% DV), and vitamins and minerals. More consumers used components for the food categories of snacks, grains, frozen prepared meals, desserts, dairy, nuts, condiments, and canned/jarred foods.

From this study, consumers used varying components and differing numbers of components for the categories of foods. Using this knowledge, it is important to update the NFP to promote increased understanding and effective use of the label.

### **Dedication**

This thesis is dedicated to all my instructors – past and present – who encouraged and built me up as an academic and who I feel would be proud to see me have accomplished this feat of research.

### **Acknowledgements**

I would like to extend special thanks to my parents, who have supported me and my educational goals, and to my thesis committee members, who provided guidance and stuck with me during one of the longest processes I have ever experienced.

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## **Chapter 1**

### **Introduction**

The passing of the Nutrition Labeling and Education Act (NLEA) in 1990 through the Food and Drug Administration (FDA) established food-labeling requirements. When this Act became effective in 1994, Nutrition Facts Panel (NFP) food labels became a mandatory addition to all foods under the law, with some exceptions (Golan, Kuchler, Mitchell, Greene, & Jessup, 2000).

While the NFP became required on all packaged and processed foods, consumers are frequently exposed to foods exempt from this labeling, including foods intended for immediate consumption, such as restaurant foods; foods bought without packaging, such as coffee-house baked goods; foods without considerable nutritional value, such as spices and plain coffee and tea; and unpackaged raw fruits, vegetables, and fish. Still, food manufacturers processing raw produce and fish can voluntarily display the NFP (Food and Drug Administration (FDA), 2009b).

Labeling for such foods falls under FDA regulation, while nutrition labeling for meat and poultry products is governed by the United States Department of Agriculture (USDA), specifically the Food Safety and Inspection Service (FSIS). The last major update on these rules in 1993 determined which processed products required mandatory labeling and which raw products fell under voluntary labeling (Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products, 2010).

In a recent ruling that went into effect March 1, 2012, the FSIS now requires the NFP to be included on or displayed with major cuts of raw meat and poultry. The NFP is also required on all fresh ground or cut meat and poultry. Similar to the NLEA, this new

FSIS ruling has exceptions. For consumers, the most relevant are foods in small and low weight packages and foods prepared specific to consumers' requests for additional chopping, grinding, or slaughtering of the purchased product (Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products, 2010; Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products; Delay of Effective Date and Correction, 2011).

### ***Nutrition Facts Panel Components***

Although the NLEA and the FSIS ruling determine which foods require nutrition labeling, the NLEA has established the design of the NFP and its components. To date, the mandatory components include the serving size, servings per container, total calories, calories from fat, total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrates, dietary fiber, sugars, protein, vitamins A and C, iron, calcium, the Daily Reference Value (% Daily Value or % DV), and the footnote. Although the list of ingredients is not always in the same location as or connected to the NFP, it is also a mandatory component (Nutrition Labeling of Food, 2011).

Each nutrient component – calories to calcium – is listed in relation to its amount per serving. That is, if the serving size is 1 cup, the numbers listed for each nutrient refer to the amount in that 1 cup (Nutrition Labeling of Food, 2011). As well, if a nutrient has an established Daily Reference Value (DRV) or Reference Dietary Intake (RDI), a % DV is calculated and displayed as a percentage of the amount per serving (Mahan & Escott-Stump, 2008). Further, a footnote is present to explain that the numbers of the % DV are based on the nutrient amounts recommended for a 2000-calorie-per-day diet (Nutrition Labeling of Food, 2011).

Along with the mandatory components, the NFP may also show voluntary components, which are listed at the discretion of the food manufacturer. However, if a food manufacturer makes claims about nutrients on the food's packaging, those nutrients become required components. The voluntary components include calories from saturated fat, polyunsaturated fat, monounsaturated fat, potassium, soluble fiber, insoluble fiber, sugar alcohols, other carbohydrates, and any vitamins and/or minerals other than the mandatory ones cited previously (Nutrition Labeling of Food, 2011).

Over time, nutritional discoveries have prompted the addition of more components to the NFP. Most notably were the additions of trans fat and allergen information. In 2003, the FDA ruled that trans fat be added to the NFP as an amendment to the NLEA after research and petitions accumulated on negative health consequences such as raised levels of low-density lipoprotein (LDL) and increased risk of heart disease. The ruling went into effect January 1, 2006 (Food Labeling; Trans Fatty Acids in Nutrition Labeling; Consumer Research to Consider Nutrient Content and Health Claims and Possible Footnote or Disclosure Statements; Final Rule and Proposed Rule, 2003).

In that same timeframe, the Food Allergen Labeling and Consumer Protection Act of 2004 was established and went into effect the same day: January 1, 2006. The Act determined that the eight most common food allergen ingredients – milk, eggs, fish, shellfish, tree nuts, peanuts, wheat, and soy – would be posted on the NFP. Unlike trans fat, which was added directly into the NFP under saturated fat, information on allergen-containing foods can be expressed within the list of ingredients or below the ingredients. For example, allergens listed in the list of ingredients might read “flour (wheat)” or “whey (milk).” The alternative method is to provide a statement immediately following

the list of ingredients. An example statement might read “Contains wheat and milk” (United States Department of Agriculture (USDA), 2006).

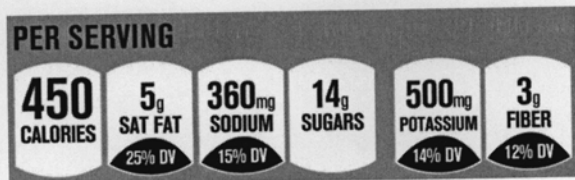
### ***Modified Nutrition Labeling***

Modified expressions of the NFP have also appeared in recent years through point-of-purchase (POP) and front-of-package (FOP) labeling. As noted earlier, the original ruling of the NLEA exempted nutrition labeling for foods purchased for immediate consumption, such as foods from restaurants. However, under the Patient Protection and Affordable Care Act of 2010, restaurants, food establishments, and vending machines will require modified nutrition labeling at the POP. Although the FDA is still finalizing requirements for labeling, the ruling requires owners with 20 or more restaurant chains or vending machines to display calorie information on each of their items so that consumers can directly see nutrition information when buying food. Information on other nutrients, such as fat, carbohydrates, or sodium, must be made available at the consumer’s request (FDA, 2010b).

FOP labeling is another modification of the NFP. Food manufacturers have been voluntarily adding certain information about nutrition to the front of their packages, although the original NFP is still present on these foods. For example, the calories, fat, or other components per serving of a food may be listed on the front of the food package as a method of advertising and promoting healthful features of a product (Figure 1). Currently, many food manufacturers have their own version of these labels, but none is governed by federal regulations (FDA, 2009a). The FDA reports that it is currently developing guidelines for the food industry regarding FOP labeling (FDA, 2010a). Similarly, the Institute of Medicine reports an ongoing project to analyze current FOP

labeling systems and determine consumers' use and understanding of such labels (Institute of Medicine (IOM), 2010).

**Figure 2.** Example Front-of-Package (FOP) Label



### *Functions of the Nutrition Facts Panel*

The Nutrition Facts Panel has been cited by federal publications and literature alike as a source of information. In effect, the NFP provides consumers with information that they can use at their discretion (Golan et al., 2000; Taylor & Wilkening, 2008; Todd & Variyam, 2008; Vierk, Koehler, Fein, & Street, 2007).

Additionally, the NFP has been considered an educational tool that can assist consumers when making dietary choices, from comparing different food options (Todd & Variyam, 2008) to adopting and maintaining healthful diets (Golan et al., 2000; Kretser, 2006; Todd & Variyam, 2008) to reducing health and disease risks (Fulgoni & Miller, 2006; Golan et al., 2000; McArthur, Chamberlain, & Howard, 2001; Taylor & Wilkening, 2008). The NFP also provides consumers with consistency, since the format of the label has been standardized, allowing consumers to see the same label design on all foods (Taylor & Wilkening, 2008).

Finally, the NFP provides health incentives for consumers and food manufacturers. Consumers may choose foods that are more healthful when provided with an NFP. Similarly, when required to post nutrition information on their products, manufacturers may improve the healthfulness of the foods they produce and sell. In

doing so, they can differentiate the healthfulness of their products compared to a competitor's products, encouraging consumers to buy those products (Golan et al., 2000).

### ***Statement of the Problem***

***Obesity.*** Despite the intended benefits of implementing the Nutrition Facts Panel, health conditions, mainly obesity, continue to be major concerns in the United States. From the 2007-2008 National Health and Nutrition Examination Survey (NHANES) data of adults 20 years and older, approximately 34% are overweight, 34% are obese, and 6% are extremely obese (Ogden, & Carroll, 2010). Data from the 2009-2010 NHANES showed no changes in rates of obesity from the previous survey (Ogden, Carroll, Kit, & Flegal, 2012).

Weight status differs by ethnicity and gender. From the 2007-2008 NHANES, approximately 32% of non-Hispanic white men, 36% of Mexican-American men, and 37% of non-Hispanic black men were obese. Additionally, 33% of non-Hispanic white women, 45% of Mexican-American women, and 50% of non-Hispanic black women were obese (Ogden, & Carroll, 2010).

Obesity is frequently linked as a risk factor in heart disease, stroke, diabetes, and some forms of cancer (CDC, 2010). It is also linked to hypertension, elevated cholesterol, sleep apnea, osteoarthritis, and fertility problems (CDC, 2009b). With the variety of related health complications, obesity itself was estimated to cost \$147 billion annually in medical expenses (CDC, 2010), while obesity-related health conditions were recently estimated as costing \$190.2 billion annually (Food and Nutrition Board, 2012).

Obesity is a multifaceted disease incorporating environmental, genetic, and behavioral components. Food choices and amounts, access to and levels of physical

activity, family history, metabolic processes, and other factors influence an individual's propensity towards obesity (CDC, 2009a). Multiple routes of intervention, including use of the NFP, are needed to improve the weight and health statuses of Americans. As stated by Fulgoni and Miller (2006), "the crisis of obesity in the United States has heightened the importance of the food label as a vehicle for dietary guidance and education" (p. 1215S).

*Label Use.* While the NFP may be important, consumers' use and understanding of the label creates additional concerns. Such concerns include the decline in consumer-reported label use since the NLEA was enacted, the low use of labels in those who are currently healthy, the reported confusion in using certain components of the label, the unlikely conversion toward using food labels in consumers who report limited use, and the consumption of foods outside of the home.

A collection of federal data from the 1995-1996 Diet and Health Knowledge Survey and the 2005-2006 NHANES tracked reported use of food labels and label components from 1995-1996 and 2005-2006 in adults age 20 and older. The respective sample sizes included 3,851 and 4,917 consumers. In the initial years after the introduction of the NLEA to just over a decade later, use of food labels and most components, such as calories, fat, and the ingredients list, dropped, while use of fiber information increased (Todd & Variyam, 2008).

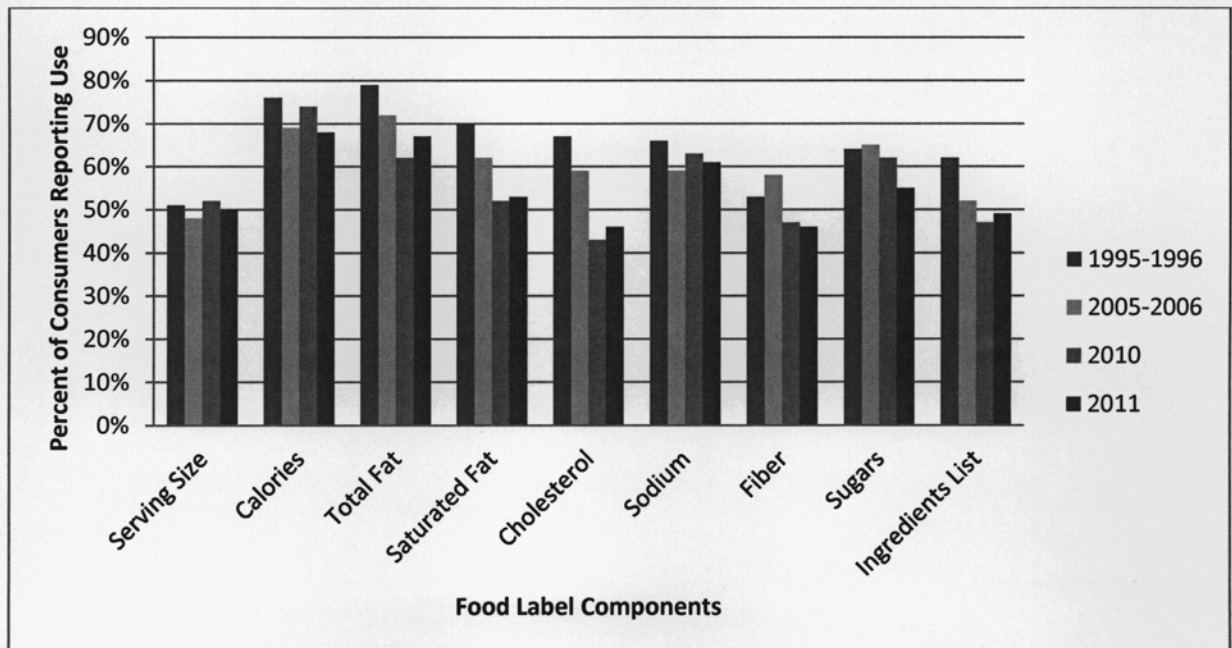
Further, the International Food Information Council (IFIC) conducted a similar investigation through its Food and Health Survey beginning in 2006. In its 2010 and 2011 studies, the IFIC surveyed adult consumers age 18 and older, with nationally representative samples sizes of 1,024 and 1,000, respectively. It was determined that use



of many components, such as calories, calories from fat, total fat, sugars, and trans fat, had significantly declined from as early as 2007 (IFIC, 2010; IFIC, 2011).

While the studies described above have different methodologies and sample sizes, the use of large, nationally representative samples gives these data some validity on this topic. As such, it is possible to compare the use of certain NFP components from 1995 to 2011 and observe an overall decline in use (Figure 2). These data support the need to examine possible reasons for the decline.

**Figure 2.** Use of Food Label Components from 1995-2011. Source: 1995-1996 and 2005-2006: Todd & Variyam (2008). Source: 2010 and 2011: International Food Information Council Foundation (2010, 2011)



Although a decline was cited across the general population, several studies have noted that persons with health conditions are more likely to use labels than persons without health conditions. Lewis et al. (2009) and Post, Mainous, Diaz, Matheson, and Everett (2010), who both analyzed 2005-2006 NHANES data, found that people with type 2 diabetes, hypertension, or high cholesterol were significantly more likely to read food labels compared to those without these health conditions. For Post et al. (2010),

approximately 60% of those without a condition read labels compared to approximately 71% of those with a condition ( $p \leq 0.0001$ ). Similarly, a study through the IFIC (2008) cited that those with a health condition were more likely to read labels, although the specific health conditions of the research were not stated. As well, Satia, Galanko, and Neuhouser (2005), looking at a cross-section of African-Americans, found that persons who were of normal weight were about half as likely to read labels as persons who were obese ( $p < 0.01$ ).

Additionally, regardless of health status, a few studies have noted that consumers report confusion with using the % DV on the food label (IFIC, 2004; IFIC, 2008; Rothman et al., 2006). As well, the IFIC (2008) study found that the footnote was confusing to consumers, specifically that they were uncertain of how to use it.

Along with confusion of specific components, data revealed that consumers who report limited or no use of the food label were unlikely to begin using the label. An analysis of the 2008 Health and Diet Survey through the FDA asked a national sample of their intentions to start using food labels if they reported rarely or never using labels. Among participants who reported rarely using the label, 49% indicated they were *not* intending to start using labels within 6 months. Among participants who reported never using a label, 69% indicated they were *not* intending to start using labels within 6 months. Other response options included the intention to *start* using labels within 30 days or within 6 months. Participants who rarely used labels were more apt to indicate the intention to start using labels within those two times compared to those who reported never being label users (Choinière & Lando, 2010).

A final concern about label use is the increase in food purchases outside the home. A USDA report by Variyam (2005), using data from the federal Continuing Survey of Food Intake by Individuals (CSFII), concluded that food purchases outside the home comprised 46% of food dollars in 2002. This was a rise from 27% in 1962. Variyam (2005) also noted that foods purchased outside the home tended to be more calorie-dense but less nutritious than foods purchased for the home.

Further, food sales for the year of 2010 showed that approximately \$585 billion was spent on foods intended for the home and approximately \$552 billion was spent on food purchases away from the home. While less was spent on foods away from home, this was a 7% increase from the previous year, compared with a 2% decrease for home purchases (Economic Research Service (ERS), 2011).

***Assessment and Conclusions.*** Issues identified as impacting use of the NFP – obesity, a decline in NFP use, the increased use of labels in those with health conditions, confusion with some components on the label, the unlikely future use of labels by those reporting limited use, and an increase in food consumption outside of the home – suggest a need for evaluating the effectiveness of the current NFP and updating it in ways that improve consumer use and understanding of the label.

Although Golan et al. (2000) noted that rates of obesity have increased despite the presence of food labels, the decline of label use, as noted above, may be one explanation as to why obesity has risen. Similarly, the minimal intention of non-label readers to begin using labels may also be linked to the decline of label use. With fewer consumers reading the NFP, there are subsequently fewer consumers using the food label as a nutrition tool to improve their health and obesity could rise.

Consumers eating most of their meals outside the home in restaurants and other food establishments are not accustomed to purchasing those foods with a food label in mind. While this trend of increasing food consumption outside the home may also relate to the decline in label use, it may also be part of the obesity problem. The label's function in encouraging healthful choices is absent in away-from-home food consumption, which may contribute to increased caloric intake among consumers. This makes a case for the presence of modified food labels at the point-of-purchase to encourage consumers to consider nutrition and health when making away-from-home food purchases.

Among studies previously described, consumers' confusion about using the % DV and the footnote may further contribute to the decline of label use. The % DV and footnote information can be used to help consumers meet daily nutrient needs. However, confusion of how to effectively use those components may prompt consumers not to use them at all. Such concerns may indicate a problem with the utilization of the NFP by consumers.

### ***Purpose of the Study***

The purpose of this study is to examine the utilization of components of the Nutrition Facts Panel food label by adult consumers relative to food categories.

### ***Objectives of the Study***

The objectives of this study include:

1. To determine the demographic features of consumers who are most likely to use the components of the food label, and

2. To determine which components of the food label consumers most often use when considering purchasing food categories.

### ***Terms in Research***

For consistency, terms that will be used in this study are defined below.

- Use of the words “NFP,” “food label,” and “label” will mean the same as “Nutrition Facts Panel” in the text. For the purposes of this study, the “Nutrition Facts Panel” will include all required components of the NFP, including the ingredients list, but will exclude other nutrition-related aspects of a product’s packaging, such as nutrient content claims, structure/function claims, other health claims, and FOP labeling.
- Reference to NFP “components” will include all of the individual parts of the food label focused on in this study: serving size, servings per container, calories, calories from fat, total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrates, dietary fiber, sugars, protein, the mandatory vitamins and minerals, the footnote, the ingredients list, and % Daily Value (% DV).
- Research and literature cited throughout this study include the terms “using,” “reading,” or “looking” when referring to the utilization of the label and its components. The term “use” will be included when describing utilization of label components or food categories in the present study.
- The phrase “nutrient components” will be used to describe calories, calories from fat, total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrates, dietary fiber, sugars, protein, vitamins and minerals. Although calories (or calories from fat) are not traditionally considered nutrients, they will be in respect

to the NFP components. This phrase will help distinguish the nutrients from the other NFP components, such as serving size or the ingredients list, which are not nutrients.

- Use of the phrase “food categories” will refer to the different groups of food addressed in this study: fruit, vegetables, grains, dairy foods, protein foods, beans or legumes, nuts, desserts, snacks, frozen prepared meals, boxed meals, canned or jarred foods, fats or oils, condiments, and beverages.
- Use of the phrase “primary or main food shopper” and “primary shopper” will refer to a person who is responsible for the majority of food shopping in his or her household. This will include food purchases made during shopping as well as consideration of purchasing foods, regardless of whether or not those foods are ultimately bought. The shopper may or may not use a food label.
- Use of the word “consumer” will refer to a person who eats food and drinks beverages, regardless of whether or not the consumer personally purchased the food or beverage. The consumer may or may not be a “primary shopper” and may or may not use a food label.

## Chapter 2

### Review of Literature

In the 18 years since the establishment of the NLEA, a plethora of research has been conducted about the NFP. Specifically regarding consumers, researchers have investigated a wide variety of topics, including: 1) characteristics and demographics of label users; 2) use or disuse of specific components; and 3) effects on diet and health from use of the NFP.

#### *Demographic Characteristics*

**Age.** While age is a frequent demographic of many research studies, few have specifically compared differences in label use by age. Satia et al. (2005) found that those between 50-70 years of age were significantly more likely to use labels than those 20-39 years of age ( $p < 0.05$ ). Similarly, when Krukowski, Harvey-Berino, Kolodinsky, Narsana, and Desisto (2006) compared college-age students (mean age of 20) to community residents (mean age of 50), 71% of college-age students often or sometimes reported using labels compared to 85% of the community residents ( $p < 0.001$ ).

Ollberding et al. (2010) also noted that older participants used the NFP significantly more than younger individuals. Fifty-two percent of those 18-34 years of age used the NFP compared to 66% of those 35-54 and 64% of those 55-85 ( $p < 0.001$ ). In a national sample of persons between 20 and 85 years old, Todd and Variyam (2008) noted that older individuals were more likely to use labels, although what age constituted “older” was not provided.

In a study of older adults, 68% of those in their 60's and 70% of those in their 70's read labels compared to 50% of those in their 80's, with poorer vision suggested as

one reason for the difference ( $p < 0.001$ ) (Elbon et al., 2000). However, McArthur et al. (2001) noted that persons 45 years or younger were more likely to read labels than those 46 years or older ( $p = 0.05$ ). Although more research in this area is needed for consistency, a majority of these studies suggest that older individuals, at least 50 years old, use food labels more than younger individuals.

**Gender.** Similarly to age, gender is a common demographic collected in research, and many studies have specifically compared label use between men and women. A majority of research agrees that women are more likely to read labels than men are (Blitstein & Evans, 2006; Drichoutis et al., 2009; Driskell, Schake, & Detter, 2008; Jasti & Kovacs, 2010; Krukowski et al., 2006; Misra, 2007; Ollberding et al., 2010; Rasberry, Chaney, Housman, Misra, & Miller, 2007; Satia et al., 2005; Todd & Variyam, 2008).

Post et al. (2010) noted in the study that women were three times more likely to read labels than men ( $p < 0.01$ ). Additionally, Elbon et al. (2000) and Mandal (2010) noted that women were more likely to read labels when making purchasing decisions than men were. Among college students who were surveyed, Mackesy et al. (2008) found that 75% of women, compared to 65% of men, were frequent label readers ( $p < 0.001$ ). However, Nayga (2000) noted no significant differences by gender when controlling for food label knowledge.

Among three studies with samples of women only, 76-81% of those women reported using labels always or sometimes (Alfieri & Byrd-Bredbenner, 2000; Byrd-Bredbenner & Kiefer, 2000; Byrd-Bredbenner et al., 2000). No studies were found by this author discussing label use in a male-only sample. Additional information regarding gender to label use is described in Table 1.



**Table 3.** Comparison of Gender to Frequency of Food Label Use

Author, Year	Sampling	Methods	Results
Jasti & Kovacs, 2010	N=222 Age=College	Cross-Sectional Survey	Label Use (Always & Sometimes) Men (78.6%), Women (91.1%), p=0.001
Ollberding et al., 2010	N=5,502 Age=18+	2005-2006 NHANES	Men (41.6%), Women (64.5%), p<0.001
Mandal, 2010	N=3,706 Age=37-50	2002-2006 NLYS	Men (41.5%), Women (58.5%), No significance tested
Post et al., 2010	N=3,748 Age=20+	2005-2006 NHANES	Odds Ratio: Men (1.00), Women (3.39), p<0.01
Drichoutis et al., 2009	N=4,346 Age=20+	2005-2006 NHANES	Use of Labels [ <i>Probability</i> ]: Gender [ <i>Men</i> ] (-0.757), p<0.05
Mackesy et al., 2008	N=139 Age=18-23	Survey	Men (65%), Women (75%), No significance tested
Todd & Variyam, 2008	N=8,768 Age=20+	1994-1996 CSFII 2005-2006 NHANES	NFP Use [ <i>Probability</i> ]: Men (-0.037), Women (-0.020), Not significant
Driskell et al., 2008	N=205 Age=19+	Survey	Men (42%), Women (79%), p<0.0001
Misra, 2007	N=537 Mean Age=23	Survey, Random Sampling	Men (Mean=3.02), Women (Mean=3.4), p<0.005
Raspberry et al., 2007	N=1,294 Age=College	Survey	Label Use [ <i>Score 3-15</i> ]: Men (8.27), Women (9.55), p=0.000
Krukowski et al., 2006	N=946 Age=18+	Telephone Survey, Random Sampling	Community Men (53.2%), Community Women (76.9%), College Men (29.9%), Community Women (62.7%), p<0.001
Satia et al., 2005	N=658 African-American Age=20-70	Cross-Sectional Survey	Men (73%), Women (82%), p<0.05
Elbon et al., 2000	N=475 Age=60+	Telephone Survey	Men (55%), Women (75%), p<0.001
Nayga, 2000	N=200	Survey	Label Use (with knowledge) [ <i>Probability</i> ]: Gender [ <i>Men</i> ] (1.336), Not significant
Byrd-Bredbenner et al., 2000	N=453 Women Age=17-85	Interview Survey	Women (80%), No significance tested
Byrd-Bredbenner & Kiefer, 2000	N=100 Women Age=65-85	Interview Survey	Women (81%), No significance tested
Alfieri & Byrd-Bredbenner, 2000	N=150 Women Age=25-45	Survey	Women (76%), No significance tested

**Ethnicity.** Research evaluating food label use among different ethnic groups suggests that use varies, although there is little consistency among results. Satia et al. (2005), using an entirely African-American sample, concluded that 78% of those in the study read food labels when purchasing food. Ollberding et al. (2010) found that non-

Hispanic whites were more likely ( $p < 0.001$ ) to use food labels than Mexican Americans, other Hispanic groups, non-Hispanic blacks, or other ethnic groups included in the study. Similarly, Jasti and Kovacs (2010), examining college-age students, determined students of minority ethnicities were less likely to read food labels than non-Hispanic whites ( $p = 0.02$ ). However, Drichoutis et al. (2009) found the opposite, that non-Hispanic whites were less likely to read food labels compared to Hispanic, non-Hispanic black, and other ethnicities ( $p = 0.05$ ). Further, Elbon et al. (2000), who evaluated non-Hispanic whites and blacks, found no significant differences in label reading. Similarly, Post et al. (2010) noted that the likelihood of reading labels was not significantly different among non-Hispanic whites and blacks, Mexican Americans, other Hispanics, or other ethnic groups.

***Income.*** A few studies agree that persons with higher income report increased likelihood of using or reading food labels (Drichoutis et al., 2009, Ollberding et al., 2010; Post et al., 2010). Mandal (2010) noted among participants that the reported frequency of reading labels increased with income, but dropped after an annual income above \$165,000.

McArthur et al. (2001) compared low-income participants involved or not involved in federal food assistance programs. Sixty-two percent and 65% of those involved with the programs reported reading labels in their homes and at grocery stores, respectively. This was higher, although non-significantly, than the 58% and 55% of non-participants who reported reading labels in their homes and at grocery stores, respectively.

***Education.*** A few studies have reported that the more education consumers have, the more likely they are to report using or reading food labels (Blitstein & Evans, 2006;

Drichoutis et al., 2009; Satia et al., 2005; Todd & Variyam, 2008). McArthur et al. (2001) and Post et al. (2010) noted that consumers with at least a high school education were more likely to read food labels than those with less education, ( $p=0.004$ ) and ( $p<0.01$ ), respectively. Only one study found no significant differences between education level and likelihood of reading labels (Nayga, 2000).

***Employment.*** Only one study comparing label use to employment was found by this author. Nayga (2000) noted that participants who were unemployed reported using food labels more than those who were employed.

***Socioeconomic Status.*** One study specifically compared socioeconomic status (SES) to food label use. Using case-controlled interviews, SES was not found to be related to NFP use among Latina women with or without type 2 diabetes (Fitzgerald, Damio, Segura-Pérez, & Pérez-Escamilla, 2008).

***Health Conditions.*** The presence of a health condition has been studied relative to food label use. In general, the presence of a chronic condition increases the likelihood of using a food label. In a few studies, individuals with a diagnosis of type 2 diabetes (Drichoutis et al., 2009; Lewis et al., 2009; Post et al., 2010), high cholesterol (Cook, Burton, & Howelett, 2011; Lewis et al., 2009; Post et al., 2010), and hypertension (Cook et al., 2011; Lewis et al., 2009; Post et al., 2010) reported more frequent use of food labels compared to those without abnormal blood glucose, with normal cholesterol readings, or with normal blood pressure readings. Post et al. (2010) noted that 71% of those with any of the above health conditions reported using labels compared to 60% of those without these conditions ( $p<0.0001$ ).

The IFIC (2008) noted that consumers with health conditions, although conditions were unspecified, were more likely to use food labels. Satia et al. (2005) reported the same with obese individuals, who reported more frequent use of labels than those of normal weight ( $p=0.001$ ). However, one study found that individuals without heart disease used labels more than those with the condition ( $p=0.043$ ) (Lewis et al., 2009). Vierk, Koehler, Fein, and Street (2007) reported that 63% of individuals with self-diagnosed and 77% of those with doctor-diagnosed food allergies used labels.

As well, in an internet survey of persons with chronic kidney disease, approximately 83% reported reading the NFP often (Hager et al., 2009). Although the research did not compare label use to those who did not have the disease, the study emphasizes the extent of label use among those with a health condition.

### ***Use of Food Label Components***

Research on use of label components is extensive, although researchers use slightly different evaluation criteria when asking consumers about specific components of the food label. Some may report responses to components individually, while others report components together without expressing separate frequency. A comparison of the percentages of consumers reporting use of label components is detailed in Table 2.

***Serving Size.*** Consumer use of serving size information on labels is quite variable. Satia et al. (2005) reported 74% of participants read labels for serving size, and Tanaka, Coker, Gillett, and Seaborn (2009) noted 84% of its sample read serving size frequently. In an independent study by the IFIC (2010), 52% of consumers reported use of serving size. The 2011 follow-up study found a non-significant drop to 50% (IFIC,

2011). The FDA's Health and Diet Study found that 34% of consumers used this component often and 30% used it sometimes (Choinière & Lando, 2010).

Further, Ollberding et al. (2010) noted that 47% of consumers looked at serving size at least sometimes; although Krukowski et al. (2006) reported that 5% and 12% of consumers in college and the community used this component, respectively. In a longitudinal comparison, Todd and Variyam (2008) noted that 51% of consumers used serving size on the food label between 1995-1996, but this dropped non-significantly to 48% in 2005-2006.

**Calories.** Calorie information is consistently one of the most frequently used components among consumers. Satia et al. (2005) reported 76% of consumers read this component, and Tanaka et al. (2009) found 79% reported frequent use. The FDA's Health and Diet Study found 46% of consumers used it often with 31% reporting use sometimes (Choinière & Lando, 2010). Further, two repeated studies through the IFIC reported that 74% of consumers reporting use in 2010, with a significant drop to 68% in 2011 (IFIC, 2010; IFIC, 2011). (Neither IFIC report defined the level of significance.)

In the same longitudinal comparison noted for serving size, Todd and Variyam (2008) reported that 76% of consumers used calories on the label in 1995-1996, but this dropped significantly to 69% in 2005-2006 ( $p < 0.05$ ). Alternately, only 31% and 56% of college and community consumers reported use, respectively, in one study (Krukowski et al., 2006). For a majority of studies, a large percentage of consumers report using calorie information, although a decline in use in recent years is present.

**Calories from Fat.** Two groups have looked at use of calories from fat. Researchers found that 74% of consumers reported use of this component at least

sometimes (Satia et al., 2005). In the two IFIC studies, 51% of consumers reported use of this component in 2010, with a non-significant drop to 46% of consumers when the study was repeated in 2011 (IFIC, 2010; IFIC, 2011).

**Total Fat.** Use of total fat on a food label is common. Seventy-five percent of consumers reported using fat on the label at least sometimes (Satia et al., 2005). The IFIC (2003), asking consumers how often they looked at fat on the label, found that 19% reported always using it, 36% reported using it often, and 35% reported sometimes using it. In two other IFIC studies, 62% of consumers reported total fat use on the label in 2010, with 67% reporting use in 2011 in a non-significant increase (IFIC, 2010; IFIC, 2011). Mackesy et al. (2008) noted that 58% of college-age consumers reported use of total fat information.

In the longitudinal comparison by Todd and Variyam (2008), 79% of consumers used total fat on the label in 1995-1996, but this dropped significantly to 72% in 2005-2006 ( $p < 0.05$ ). However, Krukowski et al. (2006) found 48-49% frequency of use for this component among college and community participants, respectively.

**Saturated Fat.** Compared to total fat, fewer studies have specifically discussed consumers' use of saturated fat information. In the longitudinal comparison by Todd and Variyam (2008), 70% of consumers used saturated fat on the food label in 1995-1996, but this dropped significantly to 62% in 2005-2006 ( $p < 0.05$ ). In the studies by the IFIC, 52% of consumers reported use of saturated fat in 2010, with an insignificant increase to 53% in 2011 (IFIC, 2010; IFIC, 2011).

**Trans Fat.** Few studies have compared frequency of trans fat use. In a survey-based study, Jasti and Kovacs (2010) found 63% of consumers reported use of trans fat

information. Two sequential studies through the IFIC found that 52% of consumers used this component in 2010, with a non-significant decrease to 51% in 2011 (IFIC, 2010; IFIC, 2011).

***Cholesterol.*** Few studies have compared consumer use of cholesterol on the food label, and available data show variable use. Satia et al. (2005) found that 70% of consumers reported use of this component. In the longitudinal comparison by Todd and Variyam (2008), 67% of consumers used cholesterol on the label in 1995-1996, but this dropped significantly to 62% in 2005-2006 ( $p < 0.05$ ). The IFIC (2010) noted 43% of consumers used cholesterol on the label, while the repeated study in 2011 found 46% of consumers used it, which was a non-significant increase (IFIC, 2011).

***Sodium.*** In the longitudinal comparison by Todd and Variyam (2008), 66% of consumers used sodium on the label in 1995-1996, and this dropped significantly to 59% in 2005-2006 ( $p < 0.05$ ). The IFIC (2010) noted 63% of consumers used sodium, with an insignificant drop to 61% in 2011 (IFIC, 2011).

***Carbohydrates.*** One study found 43% of consumers reported looking for carbohydrates (IFIC, 2010), with the follow-up study finding 41% of consumers reported use, which was a non-significant drop (IFIC, 2011).

***Fiber.*** In the longitudinal comparison by Todd and Variyam (2008), 53% of consumers used fiber on the label in 1995-1996, and this rose significantly to 58% in 2005-2006 ( $p < 0.05$ ). A repeated study noted 47% of consumers reported using fiber in 2010, with a non-significant drop to 46% in 2011 (IFIC, 2010; IFIC, 2011).

***Sugars.*** In the longitudinal comparison by Todd and Variyam (2008), 64% of consumers used sugars on the label in 1995-1996, and this rose non-significantly to 65%

in 2005-2006 ( $p < 0.05$ ). A repeated study noted 62% of consumers reported using sugars in 2010, with a significant drop to 55% in 2011 (IFIC, 2010; IFIC, 2011).

***Protein.*** One study found 37% of consumers reported looking for protein in 2010, with 39% reporting use in 2011, which was a non-significant increase (IFIC, 2010; IFIC, 2011).

***Vitamins and Minerals.*** The IFIC (2010) reported 32% of consumers used this set of components, with 20% reporting use of calcium. In the 2011 follow-up study, significantly more consumers (40%) reported using of this set of components, with 26% reporting use of calcium (IFIC, 2011). No other studies found by this author compared consumers' use of this component, either as a whole or by the individual mandatory nutrients that make up this component. However, some studies, as listed below in "Combined Components," reported use of individual vitamins and minerals in conjunction with other components.

***Ingredients.*** Use of the list of ingredients is fairly consistent across some research. Borra (2006) cited that 11% of consumers always looked, 32% almost always looked, and 40% sometimes looked for the ingredients list. In the longitudinal comparison by Todd and Variyam (2008), 51% of consumers used the ingredients list on the label in 1995-1996, but this dropped significantly to 48% in 2005-2006 ( $p < 0.05$ ). Ollberding et al. (2010) found that 51% of consumers at least sometimes looked at the ingredients. Two other studies noted 47-49% of consumers reported use of this component, with no significant change from 2010 to 2011 (IFIC, 2010; IFIC, 2011).

***Percent Daily Value (% DV).*** A summary report cited consumer confusion with this component (Borra, 2006). Similarly, two studies have also cited that consumers are



generally confused about using % DV (IFIC, 2004; Rothman et al., 2006). Besides confusion, the IFIC (2008) reported that use of the % DV was rare, although a specific rate of use was not stated. As well, consumers were more likely to report using grams (for example, 5 grams of total fat) on the label than using the % DV (IFIC, 2008). The FDA's Health and Diet Study found that 25% of consumers reported use of grams or milligrams compared to 16% who reported using only % DV. However, half of participants reported using both (Choinière & Lando, 2010).

*Footnote.* The IFIC (2008) noted that use of the footnote is rare, although a rate of use was not stated. No other studies about consumers' use of the footnote were found by this author.

*Combined Components.* Some studies reported general likelihood of use for some components together, and it is more accurate to report these data as researchers originally presented them. Misra (2007) found that the most used components were serving size, calories, calories from fat, and fat, while the least used were fiber, iron, and vitamin A. In a study of older adults in their 60s to 80s, on average, 68% looked at calories, saturated fat, and cholesterol and 57% looked at protein and calcium (Elbon et al., 2000).

In a study of persons with health conditions, persons with: 1) hypertension reported looking most at saturated fat; 2) high cholesterol reported mostly looking at total fat, saturated fat, and protein; 3) type 2 diabetes reported mostly looking at saturated fat and protein; and 4) heart disease reported mostly looking at total fat, saturated fat, and fiber. As well, those who were overweight reported mostly looking at protein (Lewis et al., 2009).

**Table 4.** Percentage of Consumers Using Food Label Components from 1995 to 2011

Author, Year	Year of Data	Serving Size	Calories	Calories from Fat	Total Fat	Saturated Fat	Trans Fat	Cholesterol	Sodium	Carbohydrates	Fiber	Sugars	Protein	Vitamins & Minerals	Ingredients	% DV
Todd & Variyam, 2008	1995-1996	48	76	-	79	70	-	67	66	-	53	64	-	-	51	-
IFIC, 2003	2003	-	-	-	90	-	-	-	-	-	-	-	-	-	-	-
Satia et al., 2005	2005	74	76	74	75	-	-	70	-	-	-	-	-	-	-	-
Todd & Variyam, 2008	2005-2006	51	69	-	72	62	-	62	59	-	58	65	-	-	48	-
Borra, 2006	2006	-	-	-	-	-	-	-	-	-	-	-	-	-	83*	-
Krukowski et al., 2006	2006	5*-12*	31*-56	-	48-49	-	-	-	-	-	-	-	-	-	-	-
Mackesy et al., 2008	2008	-	-	-	58	-	-	-	-	-	-	-	-	-	-	-
Tanaka et al., 2009	2006	84	79	-	-	-	-	-	-	-	-	-	-	-	-	-
Choinière & Lando, 2010	2010	64	77	-	-	-	-	-	-	-	-	-	-	-	-	16
Ollberding et al., 2010	2010	47	-	-	-	-	-	-	-	-	-	-	-	-	51	-
Jasti & Kovacs, 2010	2010	-	-	-	-	-	63	-	-	-	-	-	-	-	-	-
IFIC, 2010	2010	52	74	51	62	52	52	43	63	43	47	62	37	32	47	-
IFIC, 2011	2011	51	68	46	67	53	51	46	61	41	46	55	39	40	49	-
Number of Studies (including outliers*)		9	8	3	8	4	3	5	4	2	4	4	2	2	6	1
Mean Percent (%) (excluding outliers*)		59	72	57	69	59	55	58	62	42	51	62	38	36	49	16
Median Percent (%) (excluding outliers*)		52	75	51	70	58	52	62	62	42	50	63	38	36	49	16

### Dietary and Health Outcomes

**Diet Quality.** While studies have looked at use of components, other research has compared use of the NFP and specific components to diet quality, with additional

details about studies listed in Table 3. Consistently, among both nutrients and foods, label users have better quality diets than persons who do not use the label.

Drichoutis et al. (2009) reported that participants who rated their diets as healthful were more likely to read food labels than those reporting less healthful diets ( $p < 0.05$ ). Additionally, in a study by Satia et al. (2005), among participants who used food labels, they reported significantly higher fruit and vegetable consumption ( $p = 0.0001$ ) and lower fat intake ( $p = 0.0003$ ) than participants who reported rarely or never using labels. As well, when interviewing Latina women, label use was positively associated with better diet quality (Fitzgerald et al., 2008).

In a survey of college-age students, when food labels were present in dining centers, more students reported higher consumption of healthier foods, such as cottage cheese ( $p = 0.001$ ) and low-fat dressings ( $p = 0.049$ ), and lower consumption of junk foods ( $p = 0.009$ ) (Peterson, Poovey-Duncan, Bloyd-Null, Long-Roth, & Gill, 2010). In a similarly designed study, college students consumed fewer calories when labels were present than when labels were absent in dining centers (Chu, Frongillo, Jones, & Kaye, 2009). Further, reported label use was associated with consumption of a healthier diet in college students, and alternately, that nonuse of the NFP was associated with higher fried food consumption (Jasti & Kovacs, 2010).

A study by Pérez-Escamilla and Haldeman (2002) compared reported label use, wealth (based on participants' use or disuse of food stamps), and their Healthy Eating Index (HEI) scores. The Index considers how well consumers meet food group goals and recommendations for fat, cholesterol, and sodium. Researchers found that regardless of wealth, participants who used labels had higher HEI scores than those who did not use

labels. Additionally, regardless of wealth, participants who did not use labels were equally likely to have low HEI scores. However, as might be expected, participants who were wealthier and reported label use were more likely to have a higher HEI score than lower income participants who did or did not use labels.

Further, research has compared multiple nutrient changes with label use. In self-reported data, users of labels, compared to those who infrequently used labels, had:

- 1) a lower intake of calories and sugar when reading the NFP ( $p=0.006$  and  $p<0.001$ , respectively) and the serving size ( $p<0.001$  for both);
- 2) a lower intake of fat when reading the NFP ( $p=0.004$ ), the ingredients ( $p=0.028$ ), and the serving size ( $p<0.001$ );
- 3) a lower intake of sodium when reading the list of ingredients ( $p=0.046$ );
- 4) a lower cholesterol intake when reading the serving size ( $p<0.001$ ); and
- 5) a higher fiber intake when reading all parts of NFP ( $p<0.05$  for all ) (Ollberding et al., 2010).

Further, Variyam (2008) compared food label users to nonusers from the national Continuing Survey of Food Intake by Individuals (CSFII). Label users had more healthful intake of all studied nutrients (calories, total fat, saturated fat, cholesterol, fiber, protein, carbohydrates, sugars, sodium, calcium, iron, vitamin A, and vitamin C) than nonusers. Intakes were significantly more healthful ( $p<0.01$ ) for all nutrients except calories and sodium. Additionally, when asked about foods consumed in-home or away-from-home, reported label users had more healthful intake of nutrients than nonusers in both locations, although these data were not accessed for significance (Variyam, 2008).

Pulos and Leng (2010) tracked sales of menu items before and after modified food labels – showing calories, fat, sodium, and carbohydrates – were added to menus in studied restaurants. Based on data, customers consumed, on average, 15 fewer calories, 1.5 fewer grams of fat, and 45 fewer milligrams sodium. In another study, when researchers randomly assigned pregnant women to receive or not receive education on converting % DV calcium to milligrams, those who received education reported increased consumption of calcium-rich foods in their food logs (Block & Peracchio, 2006).

Finally, Temple et al. (2010) provided meals to randomly assigned groups of men and women who were shown or not shown food labels with their meals. Those in the label group consumed fewer calories than those without food labels, regardless of gender ( $p < 0.05$ ). Further, those in the label group consumed less of low- and high-calorie foods than those without labels ( $p = 0.04$ ).

**Table 3.** Comparison of Diet Quality to Food Label Use

Authors, Year	Sampling	Methods	Results
Temple et al., 2010	N=47 Age=18-50	Participants were randomly assigned to view label education or not; Participants were provided lunch and their consumption tracked	Those who viewed label education consumed fewer calories from food and drink than those without education ( $p=0.04$ )
Ollberding et al., 2010	N=5,502 Age=18+	2005-2006 NHANES	Label users had lower intakes of calories ( $p=0.006$ ), fat ( $p=0.004$ ), sugars ( $p < 0.001$ ), sodium ( $p=0.525$ ), and cholesterol ( $p=0.122$ ) and higher intakes of fiber ( $p=0.002$ ) than non-users
Jasti & Kovacs, 2010	N=222 College students	Cross-Sectional Survey	Odds Ratio [ <i>High Fried Food Consumption</i> ] – Use label 1.0, Not use label 4.16 ( $p=0.005$ ); Use trans fat component 1.0, Not use trans fat component 2.82 ( $p=0.04$ )
Pulos & Leng, 2010	N=206	Modified menu labeling to include calories, fat, carbohydrates, and sodium	Consumers ordered an average of 15 fewer calories per person (The mean was not significant)



Peterson et al., 2010	N=104 College students Age=18-23	Presence of menu labeling	Fewer students reported making unhealthy food choices while labels were present (p<0.001)
Drichoutis et al., 2009	N=4,346 Age=20+	2005-2006 NHANES	Probability (Diet Quality among Label Users) [ <i>Excellent v Poor</i> ] (1.343) p<0.05
Chu et al., 2009	12 College Dining entrees	Presence of menu labeling compared to calorie intake and total meal sales	Calorie intake dropped 0.298 kcal/d when labels were present (p=0.56) and rose 1.512 kcal/d when labels were no longer present (p=0.013)
Fitzgerald et al., 2008	N=201 Latinas 100 w/ T2DM 101 w/o T2DM Age=35-60	Case-Controlled Interviews	Label users were associated with consuming more fruits/vegetables (p=0.05), fewer regular sodas (p<0.05), and fewer salty snacks (p<0.001)
Variyam, 2008	N=4338 Age=20+	1994-1996 CSFII	Label users had significantly more healthful intake of multiple dietary components than nonlabel users (p<0.01) (Calorie and sodium components were not significantly different)
Block & Peracchio, 2006	N=41 Age=20-41 Pregnant	Participants randomly assigned to education on conversion of % DV to mg Calcium or not; Participants tracked calcium foods in food logs	Intervention group consumed significantly more calcium (1430mg) than control group (988mg) (p<0.001)
Satia et al., 2005	N=658 African-American Age=20-70	Cross-Sectional Survey	Frequent label readers reported consuming significantly more fruits and vegetables (2.93 servings/day) than non-readers (2.07 servings/day) (p<0.0001)
Pérez-Escamilla & Haldeman, 2002	N=2,952 Age=20-60	1994-1996 CSFII	Label users were significantly less likely to have a lower HEI index (Odds Ratio: 1.00) than non-label users (Odds Ratio: 2.59) (p<0.001)

**Body Mass Index (BMI).** One study compared NFP use with BMI. The analysis of 2005-2006 NHANES data suggested “label use does not have an effect on BMI” (Drichoutis et al., 2009, p. 522).

### **Consumer Behaviors**

**Purchasing Decisions.** Borra (2006) reported that, in general, consumers do use labels to make food purchasing decisions. On this topic, research has explored two main

areas: 1) consumers who purchase using the NFP as a whole and 2) consumers who use individual components of the NFP when purchasing.

**Purchasing with the NFP.** Among adults from 2005-2006 NHANES data, Ollberding et al. (2010) noted that 61% of participants reported using labels to make purchasing decisions at least sometimes. Alternately, in the FDA's Health and Diet Study, 49% of participants reported that labels influenced food purchases (Choinière & Lando, 2010).

In two similar studies, women reported that food labels influenced food purchasing decisions always or sometimes for 75% (Byrd-Bredbenner et al., 2000) and 79% (Alfieri & Byrd-Bredbenner, 2000) of these women. In two studies of older adults, Elbon et al. (2000) noted that 70% of men and women between 60-89 years of age read labels before purchasing food; and Byrd-Bredbenner and Kiefer (2000) reported that 85% of women between ages 65-85 agreed that food labels influenced food purchases always or sometimes.

A few studies have also looked at purchasing decisions in college-age consumers. Misra (2007) noted that 66% of college students reported that they used labels to make initial food purchases. In a dining center study, Tanaka et al. (2009) found that 53% of college students purchased food items when labels were present. As well, among a small focus group of three male and thirteen female college students, women reported that labels influenced their purchasing decisions, while the men reported that labels did not influence them (Kolodinsky, Green, Michahelles, & Harvey-Berino, 2008). When provided with nutrition labeling in college dining centers, 92% of students 19 years of age and older

reported the label influenced their purchases at least sometimes (Driskell et al., 2008). While rates of influence vary among these studies, in most of the research, at least a majority of consumers use the NFP when making food purchases.

**Purchasing with NFP Components.** A couple studies have also looked at which specific components of the NFP consumers use in making purchasing decisions. When the IFIC (2003) asked which components were used in purchasing, 58% of consumers reported use of calories, 56% used total fat, 45% used sodium, 45% used saturated fat, 42% used sugars, 39% used cholesterol, 34% used carbohydrates, 22% used protein, 22% used fiber, and 12% used trans fat.

As well, in a labeling study, when consumers were provided with calories, fat, sodium, and carbohydrates on menus in restaurants, approximately 20% reported purchasing an entrée based on its lower calorie content and approximately 17% reported purchasing an entrée based on its lower fat content (Pulos & Leng, 2010).

**Health or Nutrition Knowledge.** Consumers' perceived knowledge about health or nutrition has been reported to influence label use. In one study of over 4,000 participants, those who reported knowing "Dietary Guidelines, the Food Guide Pyramid and the 5-a-Day program" were associated with being food label readers (Drichoutis et al., 2009, p. 510). As well, Lewis et al. (2009) found, from 2005-2006 NHANES data, that persons with diabetes, a risk of diabetes, or overweight status reported better awareness of national dietary guidelines than those without these conditions or risks. Further, Lewis et al. (2009) noted persons with these conditions were significantly more



likely to read food labels than those without the conditions ( $p < 0.05$ ), excluding those with heart disease.

Satia et al. (2005) found that African-American consumers who strongly believed that diet and food choices were related to cancer risk were twice as likely to read labels as those who did not believe in a relationship ( $p = 0.01$ ). As well, in a cross-sectional survey of college students, food label use was associated with students who had knowledge about eating low-fat diets ( $p < 0.01$ ) (Jasti & Kovacs, 2010). However, Nayga (2000) found among consumers that nutrition knowledge was not significantly associated with food label use. Knowledge was scored based on consumers' correct responses to questions about the recommended daily intake of calories from fat and sodium along with picking 1 food from a pair that had more fat or cholesterol.

*Motivators for Food Label Use.* Similar to health or nutrition knowledge, motivators related to health or diet have also been linked to food label use. In many studies, the primary motivator was weight maintenance. Consumers who reported they were trying to lose weight were more likely to look at labels than those without such intentions ( $p < 0.001$ ) (Satia et al., 2005). Similarly, among surveyed college-aged students, those looking to control their weight were more likely to read labels than students who were not concerned about their weight ( $p = 0.035$ ) (Rasberry et al., 2007). As well, among college-aged students, those concerned about their weight were more likely to use food labels posted in dining centers ( $p = 0.047$ ) (Fawkes, Levy, Terry, & Edelstein, 2010).

Further, Mandal (2010), who compared NFP use with consumers' attempts at weight loss, showed that participants who used labels and were active ( $p = 0.02$ ) or were

not active ( $p=0.10$ ) lost more weight than those who did not use a label, regardless of activity level. As well, among those participants who only read labels, those who later added physical activity were better able to lose more weight than those who were only active ( $p=0.001$ ).

Beyond weight maintenance, consumers used labels for other health motivations. In a study of older adults, those who reported trying to improve diet behaviors, such as reducing cholesterol or fat intake, read labels more than those who were making no diet changes ( $p=0.0001$ ) (Elbon et al., 2000). In a small focus group, college students were more likely to use the food label if they believed the label was important (Kolodinsky et al., 2008).

Beyond consumers' self-directed behaviors, health professionals have been reported to influence label use. Consumers who were advised about weight loss were more likely to use labels than those who were given no advice ( $p<0.05$ ) (Drichoutis et al., 2009). As well, among those with a health condition of diabetes, high cholesterol, or hypertension, when advised by a doctor or health professional to lose weight, these consumers were significantly more likely to use the label than those who were not given such advice ( $p<0.01$ ) (Post et al., 2010).

***Food Label Task Manipulation.*** Other research has asked consumers to complete different tasks using the food label to assess their abilities to understand the NFP. Such task manipulation might have included finding nutrients or calculating different amounts of nutrients, such as determining the grams of fat in two or more servings of a food. In a study by the IFIC (2004), when consumers were asked to identify parts of the label, they correctly located serving size, calories, fat, carbohydrates, fiber,

sugar, protein, and % DV. Tanaka et al. (2009) asked college students to pick their typical portion size of a food and, when provided with a food label, 74% were correctly able to calculate the calories of their portion.

When asked to find and report the amounts of certain nutrients, calculate how much of a nutrient was in multiple servings of a given food, and similar tasks, a sample of women were, in general, able to locate nutrients and manipulate the label correctly (Alfieri & Byrd-Bredbenner, 2000). In a study on calcium, researchers asked a sample of consumers and a sample of doctors to translate the % DV of calcium of a food into milligrams. Only 2 of the 37 consumers and 6 of the 20 doctors were successful (Block & Peracchio, 2006). Similarly, in an internet study, only 24% of persons with chronic kidney disease were able to correctly calculate the milligrams of calcium from the % DV on a sample food label and 65% stated they were unsure of how to calculate it (Hager et al., 2009).

Research in this area also compared task completion with demographics. In a study of women, participants were asked to find nutrient information and calculate information from the label. Those who had lower education ( $p < 0.05$ ) or rated their own health fair to poor ( $p < 0.001$ ) were less successful in correctly completing the tasks than those with more education and better rated health, and older women had more difficulty than younger women ( $p < 0.05$ ) (Byrd-Bredbenner et al., 2000).

In a similar study asking older women to find nutrients and complete calculations from a label, finding nutrients did not differ by education level, but the oldest in the sample had more difficulty with task manipulation ( $p < 0.001$ ). As well, those who considered themselves label readers did better on tasks than self-reported nonreaders

( $p < 0.05$ ) (Byrd-Bredbenner & Kiefer, 2000). Lastly, when asking consumers to determine nutrient amounts, and compare nutrient amounts between different food products, those with higher incomes, education, literacy, and math skills performed better on these tasks ( $p < 0.0001$  for all) (Rothman et al., 2006).

One other task asked of consumers is to report awareness of label components. Borra (2006) reported that consumers most frequently noticed, in order, fat, sodium, sugar, carbohydrates, saturated fat, and cholesterol. McArthur et al. (2001) asked the same question and noted that 89% of consumers noticed calories, 81% noticed total fat, 75% noticed sodium, 73% noticed sugar, 72% noticed carbohydrates, 71% noticed saturated fat, 66% noticed cholesterol, 60% noticed protein, 52% noticed fiber, and 20% noticed trans fat.

***Consumer's Personal Use of Labels.*** Several research studies have questioned consumers about their personal use of food labels. As was noted earlier, one function of the NFP is to give consumers nutritional information to make healthful food choices. Agreeably, Borra (2006) noted that consumers reported reading labels as a method to improve their health or body weight. Further, those who read labels tended to be interested in health or feel that their health was important (Nayga, 2000; IFIC, 2008). As well, in older adults, those reading labels tended to feel more positively about their diet and health (Byrd-Bredbenner & Kiefer, 2000).

Consumers have also reported reading labels for the content on the food label. The FDA's Health and Diet Survey asked about reasons consumers used the NFP, including:

- 1) to have an overall understanding of the nutritional content; and

2) to find how high or low a food is in nutrient components.

The results noted that, for the first statement, 55% of consumers often used the label and 30% used it sometimes for this reason. For the second statement, 66% of consumers used the label often and 24% used it sometimes (Choinière & Lando, 2010).

Reference to specific components as a reason for use has also been reported.

Further questions by the Diet and Health Survey asked about the frequency with which consumers used labels to determine the serving size, with 35% reporting use often and 30% reporting use sometimes. The Survey also asked how frequently consumers used the label for the function of finding something within the ingredients list, with 41% and 32% reporting use often or sometimes, respectively (Choinière & Lando, 2010).

Mackesy et al. (2008) found that 55% and 58% of college women reported that calories and fat, respectively, were important when using labels. When men were asked the same questions, calories and fat were important for 45% and 50% of the men, respectively.

The FDA's Health and Diet Survey also questioned consumers about other reasons they used the NFP, including:

- 1) to decide upon a specific brand of food;
- 2) to compare different food items;
- 3) to confirm accuracy of package claims; and
- 4) to help in meal planning.

The data suggested that 1) 41% of consumers used the label often and 32% used it sometimes for this purpose; 2) 46% of consumers used the label often and 29% used it sometimes; 3) 31% of consumers used the label often and 30% used it sometimes; and 4)

31% of consumers used the label often and 31% used it sometimes (Choinière & Lando, 2010).

*Consumers' Viewing of Labels.* A majority of research that assesses how frequently consumers use the NFP and its components relies on self-reported data. To counter some of the concerns with this type of data, Graham and Jeffrey (2011) used eye-tracking software to follow consumers' eye movements and determine which components they viewed. Consumers reported the frequency with which they used the components of serving size, calories, total fat, trans fat, and sugar and then viewed NFPs for 64 foods. Data revealed that, for all surveyed components, consumers self-reported looking more often at these components than they actually viewed per the eye-tracker ( $p < 0.001$ ). Further, it was noted that consumers viewed components toward the top of the NFP (ie. calories and total fat) more than those toward the bottom of the NFP (ie. trans fat and sugar) (Graham & Jeffrey, 2011).

Further, Graham and Jeffrey (2012) conducted a similar study using the eye-tracking software to address length of viewing. Participants also viewed 64 foods with an NFP. Consumers looked longer at foods they stated they would purchase than foods they decided not to purchase. As well, consumers looked longer at "meals" (ie. pizza or soup) than other foods (ie. fruits, vegetables, crackers, etc.).

*Conclusion.* The expansive volume of research on consumers' use of food labels has examined many important areas to help better understand the characteristics of label users, the specific components that are frequently or less frequently used, and consumers' application of the label and its components. From the collection of data, women with higher incomes, higher education levels, and health conditions are more likely to use the

food label. The impact of age on label use appears to be a bell-curve, with the youngest and the oldest using labels less frequently than those whose age falls in the middle. Ethnicity, employment, and changes in BMI in connection with label use need further research to be more conclusive.

With label components, most research has consistently reported that consumers are less likely to use the % DV, although calories and total fat appeared to be the components most often used. However, because studies included different components, data on consumers' use of some components, such as trans fat or protein, is minimal. As such, it is difficult to gain an accurate assessment of consumers' use of each component. Possibly, for the components that research has not frequently explored, these components may not be considered important for study, although they remain a part of the NFP.

Related to consumers' dietary outcomes and behaviors, consumers use labels to make purchasing decisions and frequently have better diet quality than non-label users. Further, rates of label use are higher among consumers with nutrition knowledge and those motivated to maintain or lose weight.

When asked to find information or complete task manipulations, consumers were generally aware of and able to find label components. Their success in completing tasks varied, often by education and extent of self-reported label reading. Consumers noted a variety of personal reasons for using labels, including health, searching for information, and applying information to other tasks. Finally, consumers appeared to view components near the top of the NFP most often and viewed the NFP components longer for "meal"-type foods.

Much of the research reviewed focused on consumers' use of the food label and its components relative to food in general without distinguishing among different groups of food. Although much research has assessed changes in dietary adequacy or healthfulness when food labels were used (Chu et al., 2009; Fitzgerald et al., 2008; Ollberding et al., 2010; Satia et al. 2005), little research at this time has investigated consumers' use of labels as related to specific types of food (Graham & Jeffrey, 2012). This study seeks to further understanding of the relationship between consumers' use of components among different food categories.



### Chapter 3

#### Methods

The following sections reiterate the study objectives and describe the design of the study, the sample, the data collection instrument and measurement, the procedure for data collection, and the data analysis.

##### *Objectives of the Study*

The objectives of this study include:

1. To determine the demographic features of consumers who are most likely to use the components of the food label, and
2. To determine which components of the food label consumers most often use when considering purchasing food categories.

##### *Design of the Study*

This study was a quantitative, non-experimental, descriptive design that used an online 24-question survey. The survey examined consumers' use of food label components among different food categories.

##### *Sample*

The study included a convenience sample of 112 adults located in east-central Illinois venues, including a University, junior college, retirement system, and telephone and media supplier. Requests for participation were conducted via email and phone.

***Participation criteria of the sample.*** The main criterion for participation was age. For this study, participants age 20 to 64 were considered adults. Brown (2008) reported adulthood to include persons between 22 to 64 years of age (with adolescence ending at age 21 and older adulthood beginning at age 65). However, this study defined "adults" as

beginning at age 20 in efforts to match similar studies researching food label use whose “adult” samples started at age 20 (Mandal, 2010; Pérez-Escamilla & Haldeman, 2002; Post et al., 2010; Satia et al., 2005; Todd & Variyam, 2008). Although other demographic factors were collected, age was the main consideration for participation.

Additionally, those with an educational background related to nutrition were not barred from the sample nor were such participants sought out, which was different from other research that excluded such participants (Byrd-Bredbenner & Kiefer, 2000; Byrd-Bredbenner et al., 2000). The reason for not excluding these individuals was due to the understanding that such participants are consumers regardless of their education and their responses are valuable. As well, no studies comparing nutrition-educated participants to participants without nutrition education were found by this author to suggest significant differences between these groups related to label use.

*Selection of the sample.* In addition to meeting the age range set for this study, adult participants were recruited from a variety of east-central Illinois businesses. These locations were chosen based on the knowledge that adults in the target age range would be employed at these venues.

As noted, inquiries into participation were conducted via email and phone. In email invitations, the message contained a description of the study and a web-link to the online copy of the survey instrument. In phone invitations, a similar message was conveyed to the manager or department head taking the call. In these instances, once agreeing to participate, the web-link was later sent via email and distributed to volunteering participants. For this study, the goal of participation was a minimum of 100 respondents.

*Description of the sample.* The sample consisted of 39 men (35.1%) and 72 women (64.9%). The sample ranged from 20 to 64 years of age, with a mean age of 43.6 years. A majority of the sample was older than age 45 (55.8%), although a sizeable portion was under age 29 (28.8%). All participants had at least graduated high school, with a large majority having some college/vocational education (94.7%). Seventy-three participants (65.2%) completed more than four years of college/vocational training (Table 4).

Height and weight were collected from participants, which were used to calculate Body Mass Index (BMI). (Only the resulting BMI value is included for this analysis.) BMIs of the sample showed 60 participants (57.1%) were at normal weight, 25 (23.8%) were overweight, and 20 (19.1%) were obese. Seven participants declined to provide their weights (Table 4). The non-metric equation for BMI was used for the calculation:  $[\text{weight (lbs)} \div \text{height (in)}^2] * 703$ .

A majority of participants stated they had not ever been diagnosed by a physician nor were they currently diagnosed with a chronic health condition or disease: 72 (66.1%) and 76 (68.5%), respectively. Eighty-five participants (75.9%) reported being the primary shopper for their household. Further, 99 participants (88.4%) reported using the food label at least sometimes, while the remaining participants stated they rarely or never used the label (Table 4).

**Table 4.** Demographics of Sample

		n (%)	Mean (SD)	Median
Gender (N=111*)	Male (0)	39 (35.1)	0.6 (0.48)	1
	Female (1)	72 (64.9)		
Age Range (years) (N=111*)	20-24	16 (14.4)	43.6 (14.09)	49
	25-29	16 (14.4)		
	30-34	6 (5.4)		
	35-39	4 (3.6)		
	40-44	7 (6.3)		
	45-49	10 (9.0)		
	50-54	22 (19.8)		
	55-59	17 (15.3)		
Highest Education	60-64	13 (11.7)	4.4 (0.89)	5
	High School, non-graduate or less (1)	0 (0)		
	High School, graduate or GED equivalent (2)	6 (5.4)		
	College/vocational training (0-2 years) (3)	12 (10.7)		
	College/vocational training (2-4 years) (4)	21 (18.8)		
BMI Range (N=105*)	College/vocational training (more than 4 years) (5)	73 (65.2)	26 (6.78)	24
	<18.5 <sup>-</sup>	0 (0)		
	18.5-24 <sup>+</sup>	60 (57.1)		
	25-30 <sup>o</sup>	25 (23.8)		
Ever Been Diagnosed (N=109*)	>30 <input type="checkbox"/>	20 (19.1)	1.7 (0.48)	2
	Yes (1)	37 (33.9)		
	No (2)	72 (66.1)		
Currently Diagnosed (N=111*)	Do Not Know (3)	0 (0)	1.7 (0.47)	2
	Yes (1)	35 (31.5)		
	No (2)	76 (68.5)		
Primary Shopper	Do Not Know (3)	0 (0)	1.2 (0.43)	1
	Yes (1)	85 (75.9)		
Frequency of Food Label (NFP) Use	No (2)	27 (24.1)	2.6 (0.89)	3
	Always (1)	14 (12.5)		
	Most of the Time (2)	29 (25.9)		
	Sometimes (3)	56 (50.0)		
	Rarely (4)	11 (9.8)		
Never (5)	2 (1.8)			

\*N=112, unless otherwise stated

SD=Standard Deviation

<18.5<sup>-</sup>=Underweight18.5-24<sup>+</sup>=Normal weight25-30<sup>o</sup>=Overweight>30 =Obese**Survey Instrument**

One survey instrument was used in this study, termed "Food Label Use" (See

Appendix 1). The online copy was available at

<http://www.eiu.edu/cats/fcs/cahuth/survey.php>. Both paper and online copies were

intended to be used during the study. Although paper copies were available, this version was not requested by any participants. Both copies had the same content.

The online Food Label Use survey began with information about the study and a statement of consent. In this section, participants were asked to click on a link to a picture of an example food label with each component clearly marked. The example label was not needed to complete the survey, but was intended to be useful for those who were unfamiliar with each of the components or needed a reminder of which components were referred to while completing the survey. The two remaining parts of the survey followed and are described below in conjunction with the name of the instrument.

***Food Label Use – Part 1.*** This part of the instrument recorded demographic information for gender, age, participant's highest education level, height (feet and inches), weight (pounds), whether participants had ever been or were currently diagnosed with a chronic health condition, whether participants were the primary or main shopper for their household, and participants' general frequency of use of the food label. This set of questions addresses Objective 1 about demographic features that related to use of food label components.

***Food Label Use – Part 2.*** This part of the instrument asked participants to report which components they most often used when purchasing the following food categories: fruit, vegetables, grains, dairy foods, protein foods, beans or legumes, nuts, desserts, snacks, frozen prepared meals, boxed meals, canned or jarred foods, fats or oils, condiments, and beverages. The possible response options included each of the mandatory food label components, with participants able to check the component(s) they used in relation to each food category. This set of questions addresses Objective 2 about

which components of the food label consumers were most likely to use for different food categories.

This instrument was not formally evaluated for validity or reliability. However, many questions in the instrument were modeled after the Flexible Consumer Behavior Survey (FCBS) portion of the 2009-2010 NHANES, which has established validity. Question format and response options for demographic Questions 1, 2, 8, and 9 of the present instrument were modeled after comparable questions in the FCBS. Similarly, the FCBS included questions referencing groups of food, such as “fresh, dried, canned and frozen fruits” (p. 4) or “salty snacks such as chips and crackers” (p. 5) for which Questions 10-24 were modeled after. However, neither the questions nor the FCBS phrasing for foods was used directly (National Health and Nutrition Examination Survey (NHANES) 2009-2010, 2009).

#### ***Procedure for Data Collection***

The study and survey instrument were approved by the Eastern Illinois University Institutional Review Board. Data were collected electronically from May to June 2012 through the Survey Central program (Eastern Illinois University) used to create the survey instrument. All data were downloaded and organized into SPSS (Version 19) and Excel.

#### ***Procedure for Data Analysis***

Data were analyzed using SPSS (Version 19) and Excel for descriptive statistics, including frequency counts, percentages, standard deviation, and central tendency, specifically for means and medians, for each part of the instrument. Data are presented as part of the Results section below.

As noted previously, data for height and weight were used to calculate Body Mass Index (BMI) using the non-metric equation:  $[\text{weight (lbs)} \div \text{height (in)}^2] * 703$ . Thus, BMI was used during statistical analysis rather than height and weight. Participants were allowed to select “Do not wish to report” for height and weight, if preferred. As such, some BMI values could not be calculated.

Along with the missing BMI values, some participants did not respond to other questions in Part 1 of the survey. For BMI, if either height or weight was not stated, no BMI was calculated for those participants. When BMI and other missing data were identified, the number 999 was assigned to indicate “no response.” Statistical calculations were completed using total sums that were adjusted to exclude the missing responses.

In Part 2 of the survey, no data were deemed “missing.” As questions in this Part asked about use of components, only the marked components were considered “used” and were included in analysis. Unmarked components were not considered as missing data, but rather as “unused” components.

## Chapter 4

### Results

The results of this study are discussed below, divided by Parts 1 and 2 of the survey. From Part 1, demographic characteristics are explored by use of food label components and food categories. From Part 2, use of label components by food categories is first discussed, followed the reverse, where use of food categories by label components is reviewed.

#### *Part 1 - Demographics*

**Gender.** Over all food categories, women in this study used more label components than men. Of the 17 components that participants could report using, women used an average of 3.78 components (22.2%) per food category, while men used 3.47 components (20.4%). This excluded possible survey responses of “not using” any components and “not purchasing” in the food categories.

Across each food category, an average of approximately 6 men (15.9%) reported “not using” any components on the label, compared to approximately 8 women (11.7%). As well, an average of approximately 2 men (5.6%) stated they did “not purchase” among any food categories, compared to approximately 6 women (8.0%). From these percentages, although men were less likely to use any components, women were more likely to “not purchase” any food category.

For both men and women, on average, the three most frequently used components, in descending order, were calories (44.4%), serving size (36.8%), and total fat (30.7%). Men and women least frequently used % Daily Value (% DV) (6.7%) and the footnote (2.5%). Men were more likely to use, across all food categories, the



components of cholesterol (17.9%) and vitamins and minerals (15.4%) than women (10.6% and 8.9%, respectively). Alternately, women were more likely to use serving size (43.7%), calories (54.3%), and fiber (20.3%) compared to men (29.9%, 34.5%, and 13.0%, respectively). (Differences in use between genders for each of these components were greater than 5.0%. For all other components, use between men and women did differ, but the difference was no greater than 5.0%.) Across all food categories, men exclusively used cholesterol more than women, per averages, while women exclusively used calories and fiber more than men (Appendix 2).

**Age.** Use of components across all food categories was similar by age. Of the 17 components that participants could report using, those 45-49 years of age used the most components on average: 4.92 components (28.9%) per food category. Alternately, those just younger, 40-44 years old, used the fewest components on average: 2.80 components (16.5%). The remaining age groups used components at frequencies in between (Table 5). This excluded possible survey responses of “not using” any components and “not purchasing” the food categories.

**Table 5.** Average Number of Used Components by Age Range

<b>Age Range (years)</b>	<b>n (%)</b>
20-24	3.94 (23.2)
25-29	3.65 (21.5)
30-34	4.04 (23.8)
35-39	3.70 (21.8)
40-44	2.80 (16.5)
45-49	4.92 (28.9)
50-54	2.92 (17.2)
55-59	3.01 (17.7)
60-64	3.76 (22.1)

Across each food category, very few participants reported “not using” any components on the label. By average percentage, those 30-34 years old (17.8%) and those 50 and older (15.9-17.0%) most often reported “not using” any label components.

Similarly, very few participants stated “not purchasing” food categories. Those 20-24 (9.6%) and 50-54 years of age (10.9%) most often reported “not purchasing” (Table 6).

**Table 6.** Participants’ Average Disuse of Components and Non-Purchase of Food Categories by Age Range

Age Range (years)	“Not Use” n (%)	“Not Purchase” n (%)
20-24	~2 (12.9)	~2 (9.6)
25-29	~1 (6.7)	~1 (7.5)
30-34	~1 (17.8)	<1 (5.6)
35-39	<1 (11.7)	<1 (1.7)
40-44	<1 (11.4)	<1 (3.2)
45-49	<1 (6.0)	~1 (8.0)
50-54	~4 (17.0)	~2 (10.9)
55-59	~3 (16.1)	~1 (3.9)
60-64	~2 (15.9)	~1 (5.1)

<1=Less than 1 participant, on average

~=Approximate number, rounded to nearest whole person

The three most frequently used components for all ages, on average, were calories (49.7%), serving size (38.7%), and total fat (35.1%). The two least frequently used components were % Daily Value (% DV) (6.4%) and the footnote (2.1%). The youngest participants, those 20-39 years old, used calorie information more frequently, on average, than the oldest participants, those 40-64 years old: 58.1% and 42.9%, respectively.

Serving size was most often used by those 20-24 years old (51.7%) and those 35-39 years old (50.0%). Participants 45-49 years of age used sugar information more often (52.0%) than any other age group. As well, total fat was used most often by participants 30-34 (61.1%) and 35-39 years of age (53.3%). (In comparing each age group, use among participants for each of the above components had a frequency of at least 50.0%. For all other components, use did differ by age range, but the frequency was less than 50.0%) (Appendix 2). Notably, for participants between 30 to 49 years old, high frequencies may be reflected by the fact that these age groups had the fewest number of participants, which may skew data.

***Highest Education.*** Across all food categories, participants with a high school education used more label components than any college-educated participant. Of the 17 components, the six high school-educated participants used an average of 6.51 components (38.3%) per food category. Use among college-educated participants was similar: those with 0-2 years college education used 3.23 components (19.0%), those with 2-4 years education used 3.89 components (21.1%), and those with more than 4 years of education used 3.45 components (20.3%). This excluded possible survey responses of “not using” any components and “not purchasing” the food categories. Notably, as there were very few participants whose highest education was at the high school level, the high frequency of use in this group may reflect skewed data.

In each food category, a higher average percentage of participants with 0-2 years college education reported “not using” any components (~3 participants, 22.8%) compared to other education levels: high school (<1 participant, 8.8%), 2-4 years college education (~2 participants, 11.1%), and more than 4 years college education (9 participants, 12.2%).

Alternately, on average, approximately 1 participant (5.4%) with 2-4 years of education and approximately 7 participants (8.8%) with at least 4 years of education reported “not purchasing.” These participants most often did not purchase boxed meals (28.6% and 35.6%, respectively) and frozen prepared meals (19.0% and 27.4%, respectively). Per averages, less than 1 participant with each high school education (2.2%) and 0-2 years of college education (1.1%) stated “not purchasing” food categories. Participants with high school education most often did not purchase frozen

prepared meals or desserts (16.7% for both). Those with 0-2 years of college education most often did not purchase frozen prepared or boxed meals (8.3% for both).

The three most frequently used components, on average, for all education levels were, in descending order, calories (51.4%), serving size (50.5%), and servings per container (40.0%). The two least frequently used components were % Daily Value (% DV) (9.2%) and the footnote (5.2%). Excluding % DV, high school graduates used all components at a higher frequency than those with any level of college education. As very few participants were high school graduates, high frequency of use may reflex skewed data (Appendix 2).

**Body Mass Index (BMI).** Use of components in all food categories was higher, on average, among normal weight participants. Participants with normal weight used, on average, 3.86 of the 17 label components (22.7%) across all food categories. Overweight participants used 3.57 components (21.0%), and obese participants used 3.65 components (21.5%). This excluded possible survey responses of “not using” any components and “not purchasing” in the food categories.

In each food category, an average of 5 overweight participants (20.0%) and approximately 3 obese participants (16.0%) reported “not using” any label components compared to an average of approximately 5 normal weight participants (8.1%). Further, an average of 5 normal weight participants (8.6%) stated “not purchasing” food categories compared to an average of approximately 1 overweight participant (5.6%) and approximately 1 obese participant (4.4%). Per data, normal weight participants used more label components and did not purchase as many food categories – particularly

frozen prepared (30.0%) or boxed meals (33.3%) – as either overweight (20.0% for both) or obese participants (5.0% and 30.0%, respectively).

On average, the most frequently used components for all BMI ranges were, in descending order, calories (47.9%), serving size (40.1%), and servings per container (32.0%). The two least frequently used components were % Daily Value (% DV) (6.8%) and the footnote (2.7%). Those of normal weight were most likely to use sodium (35.4%) and the ingredients list (27.3%) than those who were overweight (26.9% and 21.3%, respectively) or obese (22.7% and 17.0%, respectively). Those who were obese were most likely to use calories (54.3%), servings per container (40.3%), and carbohydrates (33.3%) compared to normal weight participants (49.1%, 27.2%, and 12.7%, respectively) or overweight participants (40.3%, 28.5%, and 12.8%, respectively). Fewer obese participants looked at saturated (10.0%) and trans fats (5.7%) than normal weight (22.1% and 19.2%, respectively) or overweight participants (21.6% and 19.5%, respectively). (Differences in use of these components were greater than 5.0% when compared to use in the other two BMI ranges. For all other components, use among BMI ranges did differ, but the difference was no greater than 5.0%) (Appendix 2).

***Chronic Health Condition or Illness.*** Among participants who stated they had ever been diagnosed with a health condition or were currently diagnosed, they used an average of 4.14 components (24.4%) and 4.19 components (24.6%), respectively, per food category. This is more than participants who stated they did not ever have or did not currently have a diagnosis. These participants used an average of 3.47 components (20.4%) and 3.44 components (20.2%), respectively. As such, those with a diagnosis used more of the 17 possible components, on average, than those without a diagnosis.

This excluded possible survey responses of “not using” any components and “not purchasing” food categories.

Across each food category, an average of approximately 4 participants who had ever been diagnosed (11.0%) and approximately 4 participants with a current diagnosis (10.7%) reported “not using” any components on the label. This is less, by percentages, compared to an average of approximately 10 participants who had not ever been diagnosed (14.1%) and approximately 11 participants without a current diagnosis (13.9%).

As well, an average of approximately 2 participants who had ever been diagnosed (6.5%) and approximately 2 participants with a current diagnosis (6.9%) reported “not purchasing” food categories. This is also less, by percentages, compared to an average of approximately 5 participants who had not ever been diagnosed (7.1%) and approximately 5 participants without a current diagnosis (17.2%). Although participants without a diagnosis were more likely to “not use” label components than those with a diagnosis, they were also more likely, on average, to “not purchase” food categories, particularly for frozen prepared foods (31.1% vs 25.0%).

The most frequently used components, on average, among participants with or without a current or past diagnosis were, in descending order, calories (47.1%), serving size (40.0%), and sodium (31.3%). On average, participants who had ever been or were currently diagnosed with a health condition were more likely to use component information for servings per container (34.2% and 34.3%, respectively), sodium (33.9% and 35.2%, respectively), carbohydrates (26.1% and 27.2%, respectively), fiber (21.3% and 22.1%, respectively), sugars (33.0% and 33.9%, respectively), and the ingredients list

(33.9% and 35.0%, respectively) compared to participants without a past or present condition: servings per container (28.0% and 26.8%, respectively), sodium (28.7% and 27.5%, respectively), carbohydrates (11.9% and 11.7%, respectively), fiber (15.8% and 15.7%, respectively), sugars (23.7% and 23.5%, respectively), and the ingredients list (19.8% and 19.6%, respectively).

Alternately, more participants, on average, who reported to have never been diagnosed (19.9%) or who were not currently diagnosed (19.6%) used protein information than those who had ever had a health condition (13.0%) or were currently diagnosed (12.4%). (Differences in use of the above components were greater than 5.0%. For all other components, use did differ, but the difference was no greater than 5.0%) (Appendix 2).

**Primary Shoppers.** Of the 17 possible components participants could use, primary shoppers used, on average, 3.86 components (22.7%). This was more than participants who were not primary shoppers, who used, on average, 3.08 components (18.1%). Possible survey responses of “not using” any components and “not purchasing” in the food categories were not included. An average of approximately 4 participants who were not primary shoppers (15.6%) reported “not using” any label components compared to an average of approximately 10 primary shoppers (12.2%) who did not use them. As well, an average of approximately 6 primary shoppers (7.4%) reported “not purchasing” food categories, which was less than the average of approximately 2 non-primary shoppers (6.2%) who reported “not purchasing.” Per data, primary shoppers used more label components and did not purchase categories of food as often as non-primary shoppers.

The most frequently used components for both primary and non-primary shoppers were, in descending order, on average, calories (44.2%), serving size (36.8%), and total fat (30.2%). Primary and non-primary shoppers alike least frequently used, on average, % Daily Value (% DV) (6.7%) and the footnote (1.6%). More primary shoppers used, on average, serving size (41.2%), calories from fat (21.2%), calories (51.1%), saturated fat (20.9%), carbohydrates (19.5%), fiber (20.7%), and protein (19.1%) compared to non-primary shoppers: serving size (32.3%), calories from fat (11.9%), calories (37.3%), saturated fat (14.1%), carbohydrates (6.7%), fiber (7.7%), and protein (10.9%). Alternately, a larger average percentages of non-primary shoppers used information for vitamins and minerals (15.1%) compared to primary shoppers (9.9%). (Differences in use of these components were greater than 5.0%. For all other components, use among shoppers and non-shoppers did differ, but the difference was no greater than 5.0%) (Appendix 2).

***General Use of the Food Label.*** Participants who stated “always” using the food label reported using more of the 17 surveyed components than those who used it “most of the time,” “sometimes,” “rarely,” or “never.” A sequential drop in the average number of used components was notable as participants reported less frequent general use of the food label. Participants who “always” used the label used, on average, 4.89 components (28.7%); participants who used the label “most of the time” used 4.26 components (25.1%); participants who used the label “sometimes” used 3.63 components (21.4%); participants who “rarely” used the label used an average of 1.52 components (8.9%); and those who reported “never” using the label reported no use of components (0.0%). This



excluded possible survey responses of “not using” any components and “not purchasing” in the food categories.

As may be expected, more participants, per average percentages, who reported infrequent use of the label stated “not using” components than those who used more frequently used the label in general. Both participants (100.0%) who “never” used labels did “not use” components; an average of approximately 2 participants (22.5%) who “rarely” used the label did “not use” components; an average of approximately 7 participants (12.3%) who “sometimes” used the label did “not use” components; an average of approximately 2 participants (7.6%) who used the label “most of the time” did “not use” components; and an average of approximately 1 participant (7.6%) who “always” used the label did “not use” components.

Further, per average percentages, more participants who more frequently used the label in general did “not purchase” food categories. An average of approximately 2 participants (14.8%) who “always” used the label did “not purchase” food categories; an average of approximately 3 participants (10.1%) who used the label “most of the time” did “not purchase” food categories; an average of approximately 2 participants (4.6%) who “sometimes” used the label did “not purchase” food categories; and an average of less than 1 participant (3.0%) who “rarely” used the label did “not purchase” food categories. No participants (0.0%) who “never” used the food label reported “not purchasing” food categories. Per data, participants who reported using the label at least “sometimes” used more label components and were more likely to “not purchase” food categories than those who used the label less frequently. Half of participants (50.0%) who “always” used the label reported not purchasing frozen prepared and boxed meals,

compared to those who used the label most of the time (37.9% and 31.0%, respectively), those who “sometimes” used the label (18.2% and 14.3%, respectively), and participants who “rarely” used the label (18.2% for both).

Across all food categories, the most frequently used components among participants who used the label at least “rarely” were, on average, calories (44.8%), serving size (36.0%), and total fat (28.5%). Participants least frequently used % Daily Value (% DV) (7.9%) and the footnote (3.8%). As participants who “never” used the label did not report use of any components, no data are able to be included (Appendix 2).

### ***Part 2 – Food Categories and Food Label Components***

***Food Categories.*** The most frequently used components – 30% of the 112 participants or more – for each food category are expressed below. Additional details are noted in Table 7.

**Fruit.** The most frequently used components for the fruit category were sugars (50.9%), calories (48.2%), and serving size (33.9%).

**Vegetables.** Sodium (44.6%), calories (38.4%), serving size (33.0%) were most commonly used for the vegetable category.

**Grains.** Calories (56.3%), fiber (45.5%), serving size (42.0%), servings per container (35.7%), total carbohydrates (32.1%), and sugars (31.3%) were most frequently used in this category.

**Dairy.** The most commonly used components for dairy foods were calories (58.9%), total fat (50.0%), serving size (40.2%), protein (32.1%), and servings per container (30.4%).

**Protein.** Serving size (35.7%), calories and total fat (33.9% each), and protein (32.1%) were most frequently used in this food category.

**Beans.** Serving size (35.7%), calories (31.3%), and sodium (29.5%) were most frequently used in the beans and legumes category.

**Nuts.** The most commonly used components were calories (50.9%), serving size (40.2%), total fat (34.8%), and servings per container and protein (33.9% each) for nuts.

**Desserts.** Calories (60.7%), serving size (49.1%), sugars (42.9%), total fat (39.3%), and calories from fat (30.4%) were most frequently used when purchasing desserts.

**Snacks.** The most commonly used components for snack foods included calories (68.8%), serving size (58.0%), total fat (50.0%), sodium (48.2%), servings per container (44.6%), calories from fat (33.9%), saturated fat (34.8%), trans fat (33.0%), and sugars (32.1%).

**Frozen Prepared Meals.** Calories (48.2%), sodium (40.2%), serving size (39.3%), total fat (34.8%), and servings per container (30.4%) were most often used in this category.

**Boxed Meals.** Participants used calories (39.3%), serving size and sodium (36.6% each), and servings per container (31.3%) most frequently for boxed meals.

**Canned and Jarred Foods.** The components most often used were sodium (54.5%), calories and serving size (49.1% each), servings per container (35.7%), and total fat (34.8%).

**Fats and Oils.** Saturated fat (40.2%), trans fat (38.4%), total fat (36.6%), and calories (35.7%) were most frequently used in this category.

**Condiments.** Participants used calories (42.0%), sugars and sodium (33.9% each), total fat (32.1%), and serving size (33.0%) most often for condiments.

**Beverages.** The most frequently used components for beverages included calories (54.5%), sugars (48.2%), and serving size (32.1%).

**Food Label Components.** Use of each food label component is discussed below in relationship to the food categories. Additional details are noted in Table 7.

**Serving Size.** Among participants, use of serving size ranged from 27.7% for fats and oils to 58.0% for snacks. Besides fats and oils, at least 30% of participants stated using this component in all other food categories. Serving size had the second greatest average use (39.0%) among all food categories, behind calories.

**Servings per Container.** Similar to serving size, use of servings per container ranged from 16.1% for fats and oils to 44.6% for snacks. In 7 of the 15 food categories (grains, dairy, nuts, snacks, frozen prepared meals, boxed meals, and canned/jarred foods), an average of at least 30% of participants stated using this component when purchasing.

**Calories.** Use of calories ranged from 31.3% for beans to 68.8% for snacks. As such, in all food categories, more than 30% of participants reported using this component. Calories had the greatest average use (48.4%) among all food categories.

**Calories from Fat.** Reported use of calories from fat was relatively infrequent, with a range of 5.4% for beverages to 33.9% for snacks. Desserts (30.4%) and snacks were the only food categories where over 30% of participants reported using this component.

**Total Fat.** Use of total fat ranged from 4.5% for beverages to 50.0% for dairy and snacks. In 9 of the 15 food categories (dairy, protein, nuts, desserts, frozen prepared meals, snacks, canned/jarred foods, fats/oils, and condiments), at least 30% of participants stated using this component when purchasing. Total fat had the third greatest average use (30.5%) among all food categories.

**Saturated Fat.** Use of saturated fat ranged from 1.8% for beverages to 40.2% for fats and oils. Snacks (34.8%) and fats and oils were the only food categories where over 30% of participants reported using this component.

**Trans Fat.** Similar to saturated fat, use of trans fat ranged from 2.7% for beverages to 38.4% for fats and oils. Further, snacks (33.0%) and fats and oils were the only food categories where over 30% of participants reported using this component.

**Cholesterol.** Use of cholesterol was infrequent and ranged from 3.6% for beverages to 19.6% for fats and oils.

**Sodium.** Use of sodium ranged from 14.3% for beverages to 54.5% for canned or jarred foods. In 6 of the 15 food categories (vegetables, snacks, frozen prepared meals, boxed meals, canned/jarred foods, and condiments), at least 30% of participants stated using this component when purchasing.

**Total Carbohydrates.** Use of total carbohydrates ranged from 7.1% for fats and oils to 32.1% for grains. Grains were the only food category to reach over 30% use.

**Dietary Fiber.** Use of dietary fiber ranged from 3.6% for beverages to 45.5% for grains. Like total carbohydrates, grains were the only food category to reach over 30% use.

**Sugars.** Use of sugars ranged from 6.3% for protein to 50.9% for fruit. In 7 of the 15 food categories (fruit, grains, dairy, desserts, snacks, condiments, and beverages), at least 30% of participants stated using this component when purchasing.

**Protein.** Use of protein ranged from 1.8% for beverages to 33.9% for nuts. Along with nuts, dairy (32.1%) and protein foods (32.1%) were food categories where at least 30% of participants stated using this component.

**Vitamins and Minerals.** Use of vitamins and minerals was infrequent and ranged from 2.7% for fats and oils to 19.6% for fruit, vegetables, and dairy.

**Footnote.** Use of the footnote was infrequent and ranged from 0.9% for grains and beverages to 3.6% for dairy, protein, snacks, boxed meals, and fats and oils. The footnote had the lowest average use (2.5%) among all food categories.

**Ingredients List.** Use of the ingredients list ranged from 19.6% for beverages to 29.5% for vegetables.

**% Daily Value (% DV).** Use of % DV ranged from 3.6% for fats and oils and beverages to 10.7% for dairy. % DV had the second lowest average use (7.1%) among all food categories, besides the footnote.

**Additional Results.** Among participants, some stated not using any of the above components for each food group. More than other food categories, 23.2% of participants reported not using all of the components when considering protein foods. Other categories where participants reported not using any components were for fats and oils (22.3%) and beans and condiments (19.6% each). Alternately, only 3.6% of participants stated they would not use components for snack foods. Other categories where disuse of components was low included desserts, frozen prepared meals, and canned and jarred foods (7.1% each).

Participants were also able to state if they did not purchase foods in any of the food categories. Participants were most likely, on average, to not purchase boxed meals (29.5%), followed by frozen prepared meals (23.2%). Alternately, very few participants reported not purchasing foods among other categories, such as fruits, grains, and oils (from 1 participant) or vegetables (from 2 participants).

**Table 7.** Use of Food Label Components by Food Category

n (%)	Fruit	Vegetables	Grains	Dairy	Protein
Serving Size	38 (33.9)	37 (33.0)	47 (42.0)	45 (40.2)	40 (35.7)
Servings per Container	30 (26.8)	32 (28.6)	40 (35.7)	34 (30.4)	31 (27.7)
Calories	54 (48.2)	43 (38.4)	63 (56.3)	66 (58.9)	38 (33.9)
Calories from Fat	18 (16.1)	14 (12.5)	15 (13.4)	27 (24.1)	19 (17.0)
Total Fat	20 (17.9)	20 (17.9)	26 (23.2)	56 (50.0)	38 (33.9)
Saturated Fat	12 (10.7)	11 (9.8)	10 (8.9)	32 (28.6)	26 (23.2)
Trans Fat	12 (10.7)	10 (8.9)	11 (9.8)	23 (20.5)	13 (11.6)
Cholesterol	13 (11.6)	12 (10.7)	13 (11.6)	16 (14.3)	15 (13.4)
Sodium	24 (21.4)	50 (44.6)	27 (24.1)	20 (17.9)	19 (17.0)
Total Carbohydrates	21 (18.8)	17 (15.2)	36 (32.1)	18 (16.1)	15 (13.4)
Dietary Fiber	28 (25.0)	27 (24.1)	51 (45.5)	16 (14.3)	11 (9.8)
Sugars	57 (50.9)	22 (19.6)	35 (31.3)	32 (28.6)	7 (6.3)
Protein	8 (7.1)	14 (12.5)	21 (18.8)	36 (32.1)	36 (32.1)
Vitamins and Minerals	22 (19.6)	22 (19.6)	19 (17.0)	22 (19.6)	15 (13.4)
Footnote	2 (1.8)	2 (1.8)	1 (0.9)	4 (3.6)	4 (3.6)
Ingredients List	26 (23.2)	33 (29.5)	31 (27.7)	24 (21.4)	26 (23.2)
% Daily Value (% DV)	8 (7.1)	7 (6.3)	11 (9.8)	12 (10.7)	7 (6.3)
Do Not Use Any Components	14 (12.5)	19 (17.0)	10 (8.9)	9 (8.0)	26 (23.2)
Do Not Purchase These Foods	1 (0.9)	2 (1.8)	1 (0.9)	3 (2.7)	7 (6.3)

<b>n (%)</b>	<b>Beans</b>	<b>Nuts</b>	<b>Desserts</b>	<b>Snacks</b>	<b>Frozen Prepared Meals</b>
Serving Size	40 (35.7)	45 (40.2)	55 (49.1)	65 (58.0)	44 (39.3)
Servings per Container	28 (25.0)	38 (33.9)	33 (29.5)	50 (44.6)	34 (30.4)
Calories	35 (31.3)	57 (50.9)	68 (60.7)	77 (68.8)	54 (48.2)
Calories from Fat	12 (10.7)	26 (23.2)	34 (30.4)	38 (33.9)	24 (21.4)
Total Fat	22 (19.6)	39 (34.8)	44 (39.3)	56 (50.0)	39 (34.8)
Saturated Fat	8 (7.1)	26 (23.2)	27 (24.1)	39 (34.8)	23 (20.5)
Trans Fat	7 (6.3)	23 (20.5)	24 (21.4)	37 (33.0)	22 (19.6)
Cholesterol	10 (8.9)	17 (15.2)	17 (15.2)	19 (17.0)	18 (16.1)
Sodium	33 (29.5)	32 (28.6)	19 (17.0)	54 (48.2)	45 (40.2)
Total Carbohydrates	13 (11.6)	16 (14.3)	22 (19.6)	23 (20.5)	20 (17.9)
Dietary Fiber	28 (25.0)	22 (19.6)	12 (10.7)	24 (21.4)	23 (20.5)
Sugars	17 (15.2)	29 (25.9)	48 (42.9)	36 (32.1)	20 (17.9)
Protein	29 (25.9)	38 (33.9)	9 (8.0)	20 (17.9)	27 (24.1)
Vitamins and Minerals	15 (13.4)	11 (9.8)	7 (6.3)	13 (11.6)	5 (4.5)
Footnote	3 (2.7)	3 (2.7)	3 (2.7)	4 (3.6)	2 (1.8)
Ingredients List	28 (25.0)	32 (28.6)	30 (26.8)	30 (26.8)	23 (20.5)
% Daily Value (% DV)	10 (8.9)	7 (6.3)	6 (5.4)	11 (9.8)	8 (7.1)
Do Not Use Any Components	22 (19.6)	14 (12.5)	8 (7.1)	4 (3.6)	8 (7.1)
Do Not Purchase These Foods	10 (8.9)	4 (3.6)	11 (9.8)	4 (3.6)	26 (23.2)
<b>n (%)</b>	<b>Boxed Meals</b>	<b>Canned/Jarred</b>	<b>Fats/Oils</b>	<b>Condiments</b>	<b>Beverages</b>
Serving Size	41 (36.6)	55 (49.1)	31 (27.7)	37 (33.0)	36 (32.1)
Servings per Container	35 (31.3)	40 (35.7)	18 (16.1)	22 (19.6)	30 (26.8)
Calories	44 (39.3)	55 (49.1)	40 (35.7)	47 (42.0)	61 (54.5)
Calories from Fat	20 (17.9)	20 (17.9)	24 (21.4)	21 (18.8)	6 (5.4)
Total Fat	31 (27.7)	39 (34.8)	41 (36.6)	36 (32.1)	5 (4.5)
Saturated Fat	22 (19.6)	16 (14.3)	45 (40.2)	24 (21.4)	2 (1.8)
Trans Fat	17 (15.2)	15 (13.4)	43 (38.4)	19 (17.0)	3 (2.7)
Cholesterol	16 (14.3)	15 (13.4)	22 (19.6)	13 (11.6)	4 (3.6)
Sodium	41 (36.6)	61 (54.5)	24 (21.4)	38 (33.9)	16 (14.3)
Total Carbohydrates	16 (14.3)	19 (17.0)	8 (7.1)	17 (15.2)	15 (13.4)
Dietary Fiber	19 (17.0)	15 (13.4)	6 (5.4)	9 (8.0)	4 (3.6)
Sugars	15 (13.4)	28 (25.0)	8 (7.1)	38 (33.9)	54 (48.2)
Protein	16 (14.3)	19 (17.0)	6 (5.4)	7 (6.3)	2 (1.8)
Vitamins and Minerals	8 (7.1)	13 (11.6)	3 (2.7)	7 (6.3)	5 (4.5)
Footnote	4 (3.6)	2 (1.8)	4 (3.6)	2 (1.8)	1 (0.9)
Ingredients List	24 (21.4)	30 (26.8)	28 (25.0)	27 (24.1)	22 (19.6)
% Daily Value (% DV)	7 (6.3)	10 (8.9)	4 (3.6)	8 (7.1)	4 (3.6)
Do Not Use Any Components	11 (9.8)	8 (7.1)	25 (22.3)	22 (19.6)	19 (17.0)
Do Not Purchase These Foods	33 (29.5)	8 (7.1)	1 (0.9)	3 (2.7)	5 (4.5)

N=112



## Chapter 5

### Discussion and Conclusion

With the introduction of the Nutrition Facts Panel food label, nutrition information of the processed and packaged foods consumers buy is readily accessible. The label provides them with a tool to help determine foods' nutritional contents (Todd & Variyam, 2008), and use of the NFP has been shown, among other functions, to help consumers make purchasing decisions (Borra, 2006; Ollberding et al., 2010) and have nutritious diets (Fitzgerald et al., 2008; Ollberding et al., 2010).

Although overall use of the label and its components has dropped among consumers (IFIC, 2010; IFIC, 2011; Todd & Variyam, 2008), recent research continues to assess use of the label and/or individual components (Cook et al., 2011; IFIC, 2010; IFIC, 2011; Misra, 2007; Ollberding et al., 2010; Todd & Variyam, 2008). These studies, and other like them, frequently explore consumers' use of the NFP and components in general contexts. As such, this study and its purpose – to examine label components used by adult consumers among different food categories – have focused on a specific food-based perspective.

A discussion of the study's results is presented below relative to the study objectives.

**Objective 1.** To determine the demographic features of consumers who are most likely to use the components of the food label.

**Gender.** In this study, women reported using the label and its components more frequently than men. This is consistent with a plethora of other research on the topic (Blitstein & Evans, 2006; Drichoutis et al., 2009; Driskell, Schake, & Detter, 2008; Jasti

use was not appreciably higher or lower with younger or older participants. This matches inconsistencies in previous research that vary from suggesting that older individuals use the label more often than younger persons (Krukowski et al., 2006; Satia et al, 2005; Todd & Variyam, 2008) to the reverse that younger individuals use the label more often (McArthur et al., 2001). Additional research in this area is certainly needed to provide consistency.

As with gender, use of different components varied by age ranges as well. Of interest, those 45-49 more frequently used sugars. From age 45 to 64, rates of diabetes nearly quadruple from those 20-44 years old (National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK, 2011). Use of sugar information by this age group may reflect increased diagnosis of this condition and efforts by those in the age range to determine what foods contain sugars and carbohydrates to help control their blood glucose.

***Education.*** Those with a high school education were more likely to use components than those with any level of college education as well as use more components, on average. This differs from other research suggesting that the more education individuals had, the more likely they were to use the label (Blitstein & Evans, 2006; Drichoutis et al., 2009; Todd & Variyam, 2008). However, this difference may reflect the small number of participants in the sample who were high school graduates.

Although this group used more components, those with at least 2 years of college education were more likely to not purchase among food categories, particularly frozen prepared and boxed meals. The additional education may have provided more opportunities for nutrition education, including label reading, that informed these

consumers about nutritional differences among a variety of healthful and less healthful foods.

**Body Mass Index (BMI).** Component use was most common among those of normal BMI, with these participants using more components per food category, on average, than either overweight or obese participants. This differs from Satia et al. (2005) who noted those who were obese used the NFP and select components most often. However, Drichoutis et al. (2009) found no significant differences in use based on BMI. More research in this area is warranted. In this study, normal weight participants were most likely to use components and not purchase from food categories, particularly frozen and boxed meals. Such behaviors are healthful and may encourage a normal weight.

Obese participants were more likely to use calories than normal weight or overweight participants. If these obese participants desired to lose weight, using calories may assist in promoting weight change, although interest or success in weight change was not assessed. However, obese participants were least likely to report using saturated or trans fats. As fats are calorically-dense, limited use of these components may contribute to calorie intake and excess weight despite using calories on the label.

Further, obese participants were more likely to use carbohydrates. Obesity is associated with the development of diabetes (NIDDK, 2011). Although specific health conditions were not assessed in this study, obese participants may have had higher rates of diabetes and looked at carbohydrates in order to help control their blood glucose.

**Chronic Health Condition.** Participants who had ever been or were currently diagnosed with a health condition used more label components, on average, per food category than participants without a condition. This is similar to other research finding

increased label use among participants diagnosed with a health condition (Drichoutis et al., 2009; Lewis et al., 2009; Post et al., 2010). As may be expected, individuals with a condition need to spend more time treating or controlling their disease than those without a condition to treat. In nutrition-related conditions – such as heart disease or diabetes – diet can become part of treatment and use of a food label can assist in meeting dietary needs. Those with a diagnosis (ever or currently) were more likely to use calories, fat, sodium, carbohydrates, fiber, and sugars, all of which can be of importance in nutrition-based therapies for health conditions.

***Primary Shoppers.*** Primary shoppers used more components than non-primary shoppers. This may be expected since primary shoppers have more opportunities to be exposed to a food label than non-primary shoppers. It would be plausible, then, that these primary shoppers, who use more components, could have better quality diets based on research noting that label users consume more healthful foods than non-label users (Drichoutis et al., 2009; Fitzgerald et al., 2008; Ollberding et al., 2010; Pérez-Escamilla & Haldeman, 2002; Satia et al., 2005; Variyam, 2008). If true, encouraging non-primary shoppers to sometimes be primary shoppers could increase label use among this group and potentially improve their diet quality.

***Food Label Use.*** Participants who most frequently reported using the food label also used more components than those who least frequently used the label. As noted above with Primary Shoppers, it could be anticipated that those who frequently used of the label – and its components – may have better quality diets. Although it may be important to encourage more frequent use among individuals who rarely or never use

labels, as noted by Choinière and Lando (2010), infrequently users were not likely to become more frequent label users.

**Objective 2.** To determine which components of the food label consumers most often use when considering purchasing food categories.

**Food Categories.** Per results, consumers did use different components for the food categories. Interestingly, and rather importantly, the components often used in each food category highly matched the general nutritional composition of the foods. For example, sodium was often used for vegetables and beans. For these foods to have a food label, they would be processed in some form, often canned, frozen, or dried. Canned vegetables and beans are widely available and often high in sodium. As well, frozen vegetables and beans are available plain, but also in sauces or with added seasonings, which can add to their sodium content.

Similarly, when participants reported using fats and oils as a food category, total, saturated, and trans fats were the frequently used components. Looking at fat-related components for fats and oils may be a bit obvious to consumers, but they rarely looked at, for example, fiber and protein. Neither would be present in oils, and solid fats like butter would have negligible amounts of protein.

In a final example, participants who reported using frozen prepared or boxed meals frequently used calories and sodium components. Unlike vegetables and fats and oils, these foods are more complex because they typically have many more ingredients than vegetables or fats and oils. With those multiple ingredients, frozen prepared and boxed meals are often high in calories and sodium.

Similar comparisons can be seen among the other food categories and suggest that these consumers had a general understanding of the nutrient composition of the foods they used labels for, based on the components that were frequently used. As such, they were able to differentiate between certain foods and tailor their use of components. This further suggests that participants not only showed some nutritional knowledge of foods, but they actively and appropriately applied that knowledge to their purchases. This may be related to the high proportion of college-educated participants, who may have had previous nutrition education.

Among food categories, although all components were used to some extent, participants used more components at higher rates for foods that were complex or had the potential to be complex. That is, foods that would likely have multiple ingredients and contain higher amounts of nutrients. For comparison, in the category for snacks, participants reported frequent use of 9 of the 17 components (at least 30% of participants or more), compared to fruits and vegetables where only 3 of the 17 components had frequent use. Snack foods can be very complex and contain multiple ingredients and have high amounts of nutrients. This is compared to fruits and vegetables which, even when canned, frozen, or dried, generally contain relatively few ingredients and nutrients (although levels of nutrients, like vitamins, may be high). From this, participants appeared to use more label components among complex foods where the foods' nutritional value is not as easily ascertained as foods with fewer ingredients.

Additionally, based on participants who reported not purchasing among food categories, frozen prepared and boxed meals were least likely to be purchased. Those foods are typically high in fats and sodium and low in fiber. The FDA recommends

limiting nutrients like fats and sodium and focusing on fiber and vitamins and minerals (FDA, 2012). That consumers are less likely to purchase these foods is reflective of positive health choices, at least among those consumers. However, such positive health choices may be related to the high proportion of normal weight participants, who may make efforts to limit less healthful foods or the higher proportion of college-educated participants, who may have had previous nutrition education.

*Label Components.* As previously noted, the most frequently used components in this study were calories, serving size, and total fat, while the least frequently used were the footnote and % DV. Although use of components in this study is relative to food categories and not a general statement of use for the NFP like the other studies cited in this text, the research can be compared.

The IFIC (2003) also found calories to be the most frequently used component in their study. Total fat was the second most used component in that study, rather than the third most used as in this study. Misra (2007) determined that serving size and calories were the top two frequently used components.

Other commonalities are present. Sodium, sugars, and saturated fat were also frequently used in this study as well as in research by IFIC (2003). Like Misra (2007), serving size and calories from fat were also frequently used. Alternately, this study noted that the footnote and % DV were least frequently used, although the above research studies did not include these components. Only the FDA's Health and Diet Study noted that 16% of consumers used the % DV, although whether this was considered frequent or infrequent use was not stated (Choinière & Lando, 2010).

Graham and Jeffrey (2011) found that consumers viewed components at the top of the label (trans fat and above) over components toward the bottom (after trans fat), although servings per container, calories from fat, the footnote, and the ingredients list were not included in the study. That result was also observed in this study. Using Graham and Jeffrey's division of top and bottom components, the average consumer use of the top components (serving size, servings per container, calories, calories from fat, total fat, saturated fat, trans fat) was 28.9% compared to an average use of 16.6% for the bottom components (cholesterol, sodium, total carbohydrates, dietary fiber, sugars, protein, vitamins and minerals, the footnote, the ingredients list, and % DV).

As noted by Graham and Jeffrey (2011), the top components are also the components consumers most frequently report using. This is true of this study, where calories, serving size, and total fat – all top components – were the most frequently used. Further, the footnote, which was the lowest component on the NFP, except for the ingredients list, was the least frequently used component in this study.

### ***Limitations***

There are limitations in this study. Related to the instrument, participant responses were self-reported and based on perceptions, which may not accurately reflect their demographics or their use of the food label or its components. Further, although the study focused on use or disuse of components, it did not include how participants might use the food label or its components to influence their individual nutritional intake. That is, the study did not ask how use of components might assist participants in making diet or nutritional changes or specific food choices. This consideration may have provided



additional insight into the present-day importance of the food label as a nutritional tool among consumers.

Additionally, the instrument allowed participants to mark 'I do not purchase these foods' for any food category. This option, however, does not distinguish the reason for not purchasing the foods, such as a food allergy, a health concern, or another consideration. Another possibility is that participants may not purchase foods that contain food labels. For example, a participant who purchases fresh fruits and vegetables may not see a food label since nutrition information is not required for fresh produce. In this case of this study, only foods that require food labels, such as canned or frozen fruits and vegetables, were addressed on the instrument. Knowing the reason(s) behind not purchasing among these food categories may have helped better identify differences among non-label users.

Related to limitations in the study sample, the data and subsequent results cannot be generalized to the larger population of adults, as the sample size was too small and not nationally representative. Further, participants were not evenly distributed among demographics, with more women, varied age ranges, and a high proportion of college-educated participants, which may have skewed results. Additionally, as all data were collected electronically, the sample was limited to those participants with computer and internet access, which may have excluded other potential participants without this access.

As well, participants' Body Mass Index (BMI) rates did not match national proportions, since this sample had a higher number of normal weight participants. Notably, 7 participants did not report their weight, so their BMI could not be calculated.

These missing data may account for the higher rates of normal weight participants compared to national standards.

### ***Recommendations for Future Research***

From this study, it has become apparent that consumers used components differently based on demographics, particularly gender, weight status per BMI, and diagnosis of a chronic health condition. While use by men and women has been researched extensively and more frequent use among women is well established, the influence of component use based on BMI and health conditions is in need of more study. Noting that differences among these demographics led to use of different components, further research in this area may improve understanding of the role of consumers' health (weight and chronic conditions) in using food labels.

Although the types of chronic health conditions that participants of this study may have had were not specified, other studies have looked at general label – not component – use among a variety of health conditions (Cook et al., 2011; Drichoutis et al., 2009; IFIC, 2008; Lewis et al., 2009; Post et al., 2010; Satia et al., 2005). Seeing in the present study that those with conditions focused on different components than those without a health condition, an opportunity is present to explore how the type of health condition influences use of specific components.

### ***Recommendations for Food Label Standards***

With the food label in the form of the NFP introduced in 1994, this author recommends updating the label to better meet the needs of consumers. Although the Dietary Guidelines for Americans are updated every 5 years (Department of Health and Human Services, 2012), the last revision to the NFP was the addition of trans fat in 2006.

A primary recommendation is to remove the % Daily Value (% DV) or restate it in a more meaningful way. Studies have noted that consumers report confusion with using the % DV on the food label (Borra, 2006; IFIC, 2004; IFIC, 2008; Rothman et al., 2006). Use of % DV among participants in the present study was low, averaging 7.1%. Previous research has similarly noted that use of this component was rare (Choinière & Lando, 2010; IFIC, 2008). As well, removal or restatement of the footnote is needed. An average of 2.5% of participants in the present study reported using this component and no other studies found by this author included use of the footnote, which should prompt consideration of its importance on the label.

To help meet consumers' needs, consider Mackesy et al. (2008) who asked men and women to report the components that were *important* to them, citing fat, protein, and calories. Other research has asked consumers to manipulate the label in its current form or report how frequently they use the current NFP components. Reviews of previous literature and conducting future research can help determine the components that are important to consumers, the components that they want to see on the label, and the reasons behind those preferences. Such data could and should be used in redesigning the label to improve its use and understanding among consumers.

Per results of the present study, consumers did use difference components at different rates for the food categories. A redesigned label could include only components that have some nutritional value other than 0g, 0mg, or 0% DV. For example, labels for canned fruit in 100% juice would likely show numerical values for calories, carbohydrate, fiber, sugars, and vitamin C, among others. However, since the fruit would

not likely contain total fat, saturated fat, trans fat, cholesterol, or iron, such information would not need to be present on the label.

Rather, a statement could be printed on the label, like some current labels already do, noting that the food is “not a significant source of [*insert nutrient(s)*]. The law already allows this statement to be placed on foods where nutrients have insignificant values (Nutrition Labeling of Food, 2011). By removing those nutrients, there would be less information on the label. This would allow consumers to read through the label more quickly since there would be less to look at. Further, the product would only show the nutrients it contains, rather than both the nutrients it contains and nutrients it does not have. Simplifying the label in this way may improve use and understanding of the label and promote healthful food choices among consumers.

### ***Recommendations for Practice***

The NFP is now a common part of food packaging and a majority of consumers use the label. Among frequent label users, dietetics practitioners need to assess their clients’ understanding of the label and provide education to ensure they are able to make healthful and informed choices with it. For non-users, practitioners should encourage clients to use the label and help them find methods that motivate their use. Hands-on activities and examples during education should be used to promote practice and proficiency.

As well, practitioners need to consider, not just use and understanding of the label, but also the used components. As noted in this study, individuals use different components based on, among other factors, health status, such as BMI or presence of a chronic health condition. Determining which components are used and the reasons

behind those choices can help practitioners tailor education and assist clients in achieving nutrition-related goals.

Among practitioners involved in research, continuing to study use of the food label, particularly its components, will be important to help improve consumer use and understanding. In a similar fashion, all practitioners are needed to lobby for research in this area and support actions to update the label in ways that are helpful for consumers and present understandable nutrition information.

### ***Conclusion***

This study concludes that component use varied among different demographics as well as among different food categories. In relation to categories of food, participants showed a general understanding of the nutrients present in foods based on frequently used components. However, health concerns, such as rising rates of obesity, denote a need by dietetics practitioners to encourage education and increase effective use among non-users of the label. Additional research focusing on component use rather than use of the label as a whole will provide further insight into how consumers use the label and may lead to a redesigned and better understood label that will help consumers lead healthful lives.

### References

- Alfieri, L., & Byrd-Bredbenner, C. (2000). Assessing the performance of women on nutrition labeling tasks. *American Journal of Health Studies, 16*(3), 113-123. Retrieved from <http://www.va-ajhs.com/>
- Blitstein, J. L., & Evans, W. D. (2006). Use of nutrition facts panels among adults who make household food purchasing decisions. *Journal of Nutrition Education and Behavior, 38*(6), 360-364. doi: 10.1016/j.jneb.2006.02.009
- Block, L. G., & Peracchio, L. A. (2006). The calcium quandary: How consumers use nutrition labels. *Journal of Public Policy and Marketing, 25*(2), 188-196. doi: 10.1509/jppm.25.2.188
- Borra, S. (2006). Consumer perspectives on labels. *American Journal of Clinical Nutrition, 83*, (supp.), 1235S. Retrieved from <http://www.ajcn.org/>
- Brown, J. E. (2008). *Nutrition through the lifecycle*. Belmont, CA: Wadsworth.
- Byrd-Bredbenner, C., & Kiefer, L. (2000). The ability of elderly women to perform nutrition facts label tasks and judge nutrient content claims. *Journal of Nutrition for the Elderly, 20*(2), 29-46. Retrieved from <http://www.informaworld.com/smpp/title~content=t 792306906>
- Byrd-Bredbenner, C., Alfieri, L., & Kiefer, L. (2000). The nutrition label knowledge and usage behaviours of women in the US. *Nutrition Bulletin, 25*(4), 315-322. doi: 10.1046/j.1467-3010.2000.00070.x
- Centers for Disease Control and Prevention (CDC). (2009a). *Overweight and obesity: Causes and consequences*. Retrieved January 29, 2011 from <http://www.cdc.gov/obesity/causes/index.html>

- Centers for Disease Control and Prevention (CDC). (2009b). *Overweight and obesity: Health consequences*. Retrieved February 7, 2011 from <http://www.cdc.gov/obesity/causes/health.html>
- Centers for Disease Control and Prevention (CDC). (2010). *Vital signs: State-specific obesity prevalence among adults – United States, 2009*. (Morbidity and Mortality Weekly Report Vol. 59). Retrieved from <http://www.cdc.gov/mmwr/pdf/wk/mm59e0803.pdf>
- Centers for Disease Control and Prevention (CDC). (2012). *Cholesterol: Facts*. Retrieved June 30, 2012 from <http://www.cdc.gov/cholesterol/facts.htm>
- Choinière, C. J., & Lando, A. (2010, January). *2008 health and diet survey*. Retrieved from FDA: <http://www.fda.gov/Food/ScienceResearch/ResearchAreas/ConsumerResearch/ucm193895.htm>
- Chu, Y. H., Frongillo, E. A., Jones, S. J., & Kaye, G. L. (2009). Improving patrons' meal selections through the use of point-of-selection nutrition labels. *American Journal of Public Health, 99*(11), 2001–2005. doi: 10.2105/AJPH.2008.153205
- Cook, L.A., Burton, S., & Howelett, E. (2011). Health risk factors and their effect on consumers' use of Nutrition Facts Panels. *Journal of Consumer Affairs, 45*(3): 516–527
- Department of Health and Human Services (HHS). (2012). *Dietary Guidelines for Americans: Frequently asked questions*. Retrieved from HHS: <http://health.gov/dietaryguidelines/faq.asp>

- Drichoutis, A. C., Nayga, R. M., & Lazaridis, P. (2009). Can nutritional label use influence body weight outcomes? *Kyklos*, *62*(4), 500–525. doi: 10.1111/j.1467-6435.2009.00448.x
- Driskell, J. A., Schake, M. C., & Detter, H. A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *Journal of the American Dietetic Association*, *108*(12), 2071-2076. doi: 10.1016/j.jada.2008.09.009
- Economic Research Service (ERS). (2011). *Food CPI and expenditures: Table 36*. Retrieved from USDA: [http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/Expenditures\\_tables/table36.htm](http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/Expenditures_tables/table36.htm)
- Elbon, S. M., Johnson, M. A., Fischer, J. G., & Searcy, C. A. (2000). Demographic factors, nutrition knowledge, and health-seeking behaviors influence nutrition label reading behaviors among older American adults. *Journal of Nutrition for the Elderly*, *19*(3), 31-48. doi: 10.1300/J052v19n03\_03
- Fawkes, K., Levy, J., Terry, K., & Edelstein, S. (2010). Female college students' attitudes about body image and food labels and how they affect purchasing behavior. *Topics in Clinical Nutrition* *25*(2), 165-171. doi: 10.1097/TIN.0b013e3181db7b18
- Fitzgerald, N., Damio, G., Segura-Pérez, S., & Pérez-Escamilla, R. (2008). Nutrition knowledge, food label use, and food intake patterns among Latinas with and without type 2 diabetes. *Journal of the American Dietetic Association*, *108*(6), 960-967. doi: 10.1016/j.jada.2008.03.016



Food and Drug Administration (FDA). (2009a, October). *Background information on point of purchase labeling*. Retrieved from FDA:

<http://www.fda.gov/Food/LabelingNutrition/LabelClaims/ucm187320.htm>

Food and Drug Administration (FDA). (2009b, October). *Guidance for industry: A Food labeling guide: Nutrition labeling; questions L1 through L153*. Retrieved from FDA Guidance Documents:

<http://www.fda.gov/Food/GuidanceComplianceRegulatory>

[Information/GuidanceDocuments/FoodLabelingNutrition/FoodLabelingGuide/ucm064904.htm](http://www.fda.gov/Food/GuidanceComplianceRegulatory/Information/GuidanceDocuments/FoodLabelingNutrition/FoodLabelingGuide/ucm064904.htm)

Food and Drug Administration (FDA). (2010a). *New front-of-package labeling initiative*. Retrieved from FDA:

<http://www.fda.gov/Food/LabelingNutrition/ucm202726.htm>

Food and Drug Administration (FDA). (2010b). *New menu and vending machines labeling requirements*. Retrieved from the FDA: <http://www.fda.gov/Food/LabelingNutrition/ucm217762.htm>

Food and Drug Administration (FDA). (2012, February). *How to understand and use the Nutrition Facts label*. Retrieved from FDA:

<http://www.fda.gov/Food/ResourcesForYou/Consumers/NFLPM/ucm274593.htm>

Food and Nutrition Board. (2012). *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*. Washington, DC: The National Academies Press.

Food Labeling; Trans Fatty Acids in Nutrition Labeling; Consumer Research to Consider

Nutrient Content and Health Claims and Possible Footnote or Disclosure

Statements; Final Rule and Proposed Rule, 68 Fed. Reg. 41433 (2003) (to be codified at 21 C.F.R. pt 101)

Fulgoni, V. L., & Miller, G. D. (2006). Dietary reference intakes for food labeling.

*American Journal of Clinical Nutrition*, 83, 1215S-1216S. Retrieved from

<http://www.ajcn.org/>

Golan, E., Kuchler, F., Mitchell, L., Greene, C., & Jessup A. (2000, December).

*Economics of food labeling*. (Agricultural Economic Report No. 793). Retrieved

from Economic Research Service of the United States Department of Agriculture:

<http://www.ers.usda.gov/publications/aer793/AER793.PDF>

Graham, D.J. & Jeffrey, R.W. (2011). Location, location, location: Eye-tracking

evidence that consumers preferentially view prominently positioned nutrition

information. *Journal of American Dietetic Association*, 111(11): 1704-1711

Graham, D.J. & Jeffery, R.W. (2012). Predictors of nutrition label viewing during food

purchase decision making: an eye tracking investigation. *Public Health Nutrition*,

15(2): 189-197

Hager, M.H., Geiger, C., Hill, L.J., Martin, C., Weiner, S., & Chianchiano, D. (2009).

Usefulness of Nutrition Facts Label for persons with Chronic Kidney Disease.

*Journal of Renal Nutrition*, 19(3): 204-210

- Institute of Medicine. (2010). *Examination of front-of-package nutrition rating systems and symbols: Phrase 1 report*. Retrieved February 16, 2011 from <http://www.iom.edu/~/media/Files/Report%20Files/2010/Examination-of-Front-of-Package-Nutrition-Rating-Systems-and-Symbols-Phase-1-Report/Front%20of%20Package%202010%20Report%20Brief.pdf>
- International Food Information Council Foundation (IFIC). (2003). *Impact of trans fat label information on consumer food choices*. Retrieved January 23, 2011 from <http://www.foodinsight.org/Content/3651/2003transresearch.pdf>
- International Food Information Council Foundation (IFIC). (2004). *Food label & calorie research: Qualitative research findings*. Retrieved January 23, 2010 from [http://www.foodinsight.org/Content/3651/Calorie\\_Qualitative\\_Research.pdf](http://www.foodinsight.org/Content/3651/Calorie_Qualitative_Research.pdf)
- International Food Information Council Foundation (IFIC). (2008). *IFIC foundation food label consumer research project: Qualitative research findings*. Retrieved November 3, 2010 from <http://www.foodinsight.org/Content/6/IFIC%20Fndtn%20Food%20Label%20Research%20Project%20-%20FINAL%20Qualitative%20Report%2004.07.08.pdf>
- International Food Information Council Foundation (IFIC). (2010). *2010 food & health survey: Consumer attitudes toward food safety, nutrition, & health*. Retrieved March 1, 2011 from <http://www.foodinsight.org/Content/3651/2010FinalFullReport.pdf>

- International Food Information Council Foundation (IFIC). (2011). *2011 food & health survey: Consumer attitudes toward food safety, nutrition, & health*. Retrieved May 11, 2011 from <http://www.foodinsight.org/Content/3840/2011%20IFIC%20FDTN%20Food%20and%20Health%20Survey.pdf>
- Jasti, S., & Kovacs, S. (2010). Use of trans fat information on food labels and its determinants in a multiethnic college student population. *Journal of Nutrition Education and Behavior, 42*(5), 307-314. doi: 10.1016/j.jneb.2009.06.004
- Kolodinsky, J., Green, J., Michahelles, M., & Harvey-Berino, J. R. (2008). The use of nutritional labels by college students in a food-court setting. *Journal of American College Health, 57*(3), 297-301. doi: 10.3200/JACH.57.3.297-302
- Kretser, A. J. (2006). The new dietary reference intakes in food labeling: The food industry's perspective. *American Journal of Clinical Nutrition, 83*, (supp.), 1231S-1234S. Retrieved from <http://www.ajcn.org/>
- Krukowski, R. A., Harvey-Berino, J., Kolodinsky, J., Narsana, R. T., & Desisto, T. P. (2006). Consumers may not use or understand calorie labeling in restaurants. *Journal of the American Dietetic Association, 106*, 917-920. doi: 10.1016/j.jada.2006.03.005
- Lewis, J. E., Arheart, K. L., LeBlanc, W. G., Fleming, L. E., Lee, D. J., Davila, E. P., Cabañ-Martinez, A. J., Dietz, N. A., McCollister, K. E., Bandiera, F. C., & Clark, J. D. (2009). Food label use and awareness of nutritional information and recommendations among persons with chronic disease. *American Journal of Clinical Nutrition, 90*, 1351–1357. doi: 10.3945/ajcn.2009.27684

Mackesy, C., Bennett, L., Dissen, A., Kim, M., Kardan, N., & Policastro, P. (2008).

Male and female college students' perspective on nutrition fact labels. *Journal of the American Dietetic Association, 108*(9), (supp.), A100. Retrieved from <http://www.adajournal.org/>

Mahan, L. K. & Escott-Stump, S. (2008). *Krause's Food & Nutrition Therapy*. St. Louis: Saunders Elsevier.

Mandal, B. (2010). Use of food labels as a weight loss behavior. *Journal of Consumer Affairs, 44*(3), 516-527. doi: 10.1111/j.1745-6606.2010.01181.x

McArthur, L., Chamberlain, V., & Howard, A. B. (2001). Behaviors, attitudes, and knowledge of low-income consumers regarding nutrition labels. *Journal of Health Care for the Poor and Underserved, 12*(4), 415-428. Retrieved from [http://muse.jhu.edu/journals/journal\\_of\\_health\\_care\\_for\\_the\\_poor\\_and\\_underserved/](http://muse.jhu.edu/journals/journal_of_health_care_for_the_poor_and_underserved/)

Misra, R. (2007). Knowledge, attitudes, and label use among college students. *Journal of the American Dietetic Association, 107*(12), 2130-2134. doi: 10.1016/j.jada.2007.09.001

National Health and Nutrition Examination Survey (NHANES) 2009-2010. (2009, June). *Flexible consumer behavior survey (FCBS) module*. Retrieved from the National Center for Health Statistics of the Centers for Disease Control and Prevention: [http://www.cdc.gov/nchs/data/nhanes/nhanes\\_09\\_10/FCBS\\_f.pdf](http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/FCBS_f.pdf)

National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). (2011, February). *National diabetes statistics, 2011*. Retrieved from the National

Diabetes Information Clearinghouse (NDIC):

<http://diabetes.niddk.nih.gov/dm/pubs/statistics/>

Nayga, R. M. (2000). Nutrition knowledge, gender, and food label use. *Journal of Consumer Affairs*, 34(1), 97-112. doi: 10.1111/j.1745-6606.2000.tb00086.x

Nutrition Labeling of Food, 21 C.F.R. pt. 101.9 (2011)

Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products, 75 Fed. Reg. 82148 (2010) (to be codified at 9 C.F.R. pts. 317 and 381)

Nutrition Labeling of Single-Ingredient Products and Ground or Chopped Meat and Poultry Products; Delay of Effective Date and Correction., 76 Fed Reg. 76890 (2011) (to be codified at 9 C.F.R. pts. 317 and 381)

<http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/2005-0018D.pdf>

Ogden, C. L., & Carroll, M. D. (2010, June). *Prevalence of overweight, obesity, and extreme obesity among adults: United States, trends 1976-1980 through 2007-2008*. Retrieved from National Center for Health Statistics of the Centers for Disease Control and Prevention:

[http://www.cdc.gov/NCHS/data/hestat/obesity\\_adult\\_07\\_08/obesity\\_adult\\_07\\_08.pdf](http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf)

- Ogden, C. L., Carroll, M. D., Kit, B. K., Flegal, K. M. (2012, January). *Prevalence of obesity in the United States, 2009–2010*. Retrieved from National Center for Health Statistics of the Centers for Disease Control and Prevention:  
<http://www.cdc.gov/nchs/data/databriefs/db82.pdf>
- Ollberding, N. J., Wolf, R. L., & Contento, I. (2010). Food label use and its relation to dietary intake among US adults. *Journal of the American Dietetic Association, 110*(8), 1233-1237. doi: 10.1016/j.jada.2010.05.007
- Pérez-Escamilla, R., & Haldeman, L. (2002). Food label use modifies association of income with dietary quality. *The Journal of Nutrition, 132*, 768-772. Retrieved from <http://jn.nutrition.org/>
- Peterson, S., Poovey-Duncan, D., Bloyd-Null, D., Long-Roth, S., & Gill, L. (2010). Positive changes in perceptions and selections of healthful foods by college students after a short-term point-of-selection intervention at a dining hall. *Journal of American College Health, 58*(5), 425-431. doi: 10.1080/07448480903540457
- Post, R. E., Mainous, A. G., Diaz, V. A., Matheson, E. M., & Everett, C. J. (2010). Use of the nutrition facts label in chronic disease management: Results from the National Health and Nutrition Examination Survey. *Journal of the American Dietetic Association, 110*(4), 628-632. doi: 10.1016/j.jada.2009.12.015
- Pulos, E., & Leng, K. (2010). Evaluation of a voluntary menu-labeling program in full-service restaurants. *American Journal of Public Health, 100*(6), 1035-1039. doi:10.2105/AJPH.2009.174839

Rasberry, C. N., Chaney, B. H., Housman, J. M., Misra, R., & Miller, P. J. (2007).

Determinants of nutrition label use among college students. *American Journal of Health Education, 38*(2), 76-82

Rothman, R. L., Housam, R., Weiss, H., Davis, D., Gregory, R., Gebretsadik, T.,

Shintani, A., & Elasy, T. A. (2006). Patient understanding of food labels: The role of literacy and numeracy. *American Journal of Preventive Medicine, 31*(5), 391–398. doi: 10.1016/j.amepre.2006.07.025

Satia, J. A., Galanko, J. A., & Neuhouser, M. L. (2005). Food nutrition label use is

associated with demographic, behavioral, and psychosocial factors and dietary intake among African-Americans in North Carolina. *Journal of the American Dietetic Association, 105*(3), 392-402. doi: 10.1016/j.jada.2004.12.006

Tanaka, T., Coker, J., Gillett, A., & Seaborn, C. (2009). Examination of college

students' food label use on their selection of portion size. *Journal of the American Dietetic Association, 109*(9), (supp.), A90. Retrieved from <http://www.adajournal.org/>

Taylor, C. L., & Wilkening, V. L. (2008). How the nutrition food label was developed,

part 1: The nutrition facts panel. *Journal of the American Dietetic Association, 108*(3), 437-442. doi: 10.1016/j.jada.2007.12.010

Temple, J. L., Johnson, K., Recupero, K., & Suders, H. (2010). Nutrition labels decrease

energy intake in adults consuming lunch in the laboratory. *Journal of the American Dietetic Association, 110*(7), 1094-1097. doi: 10.1016/j.jada.2010.04.006



- Todd, J. E., & Variyam, J. N. (2008, August). *The decline in consumer use of food nutrition labels, 1995-2006*. (Economic Research Report No. 63). Retrieved from Economic Research Service of the United States Department of Agriculture: <http://www.ers.usda.gov/Publications/ERR63/ERR63.pdf>
- United States Department of Agriculture (USDA). (2006, August). *Get the facts: New food allergen labeling laws*. Retrieved from Food and Nutrition Service of the United States Department of Agriculture: <http://www.fns.usda.gov/fdd/facts/nutrition/foodallergenfactsheet.pdf>
- Variyam, J. N. (2005, April). Nutrition labeling in the food-away-from-home sector: An economic assessment. (Economic Research Report No. 4). Retrieve from the Economic Research Service of the United States Department of Agriculture: <http://www.ers.usda.gov/publications/err4/err4.pdf>
- Variyam, J. N. (2008). Do nutrition labels improve dietary outcomes? *Health Economics*, *17*, 695-708. doi: 10.1002/hec.1287
- Vierk, K. A., Koehler, K. M., Fein, S. B., & Street, D. A. (2007). Prevalence of self-reported food allergy in American adults and use of food labels. *Journal of Allergy and Clinical Immunology*, *119*(6), 1504-1510. doi: 10.1016/j.jaci.2007.03.011

## Appendix 1

### Survey Instrument “Food Label Use”

You are invited to participate in the following research study conducted by Caitlin Huth and faculty advisor Dr. Carla Honselman from the Family and Consumer Sciences Department at Eastern Illinois University.

Your participation in this study is entirely voluntary.

You have been asked to participate in this study because you are between 20 to 64 years old. (If you are 19 years old or younger or 65 years old or older, please do not participate in the study.)

The purpose of this study is to examine how you use the Nutrition Facts Panel food label in purchasing different categories of food.

If you volunteer to participate in this study, you will be asked to complete one (1) survey with twenty four (24) questions. This survey will take twenty (20) minutes or less to complete.

No foreseeable risks or discomforts are expected when completing this survey. Nor are there any expected benefits for your participation. However, based on your participation, society may better understand how consumers use food labels, which may assist in redesigning the label to improve how consumers, like yourself, use and understand the label.

Your responses to the survey questions will be anonymous. Any information that is obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law.

Your participation is voluntary. If you do not participate, you will not be penalized. If you start to participate and decide not to finish the survey, you will not be penalized.

On the next page is a picture of a sample food label. The content and numbers on the food label are not important. This food label is available for your use if you need a reminder of which specific components you are asked about in this survey.

By completing this survey, you have given consent to use your responses.

-----

I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent and discontinue my participation at any time (please check):

Agree \_\_\_\_

<b>Nutrition Facts</b>																									
Serving Size	Serving Size 16 crackers (31g)																								
Servings Per Container	Servings Per Container About 9																								
<b>Amount Per Serving</b>																									
Calories	<b>Calories</b> 140    Calories from Fat 50																								
<b>% Daily Value*</b>																									
Total Fat	<b>Total Fat</b> 6g <b>9%</b>																								
Saturated Fat	Saturated Fat 1g <b>5%</b>																								
Trans Fat	Trans Fat 0g																								
	Polyunsaturated Fat 3g																								
	Monounsaturated Fat 1g																								
Cholesterol	<b>Cholesterol</b> 0mg <b>0%</b>																								
Sodium	<b>Sodium</b> 280mg <b>12%</b>																								
	<b>Potassium</b> 70mg <b>2%</b>																								
Total Carbohydrates	<b>Total Carbohydrate</b> 21g <b>7%</b>																								
Dietary Fiber	Dietary Fiber 2g <b>9%</b>																								
Sugars	Sugars 3g																								
Protein	<b>Protein</b> 2g																								
Vitamin A 0%    •    Vitamin C 0% Calcium 2%    •    Iron 4%																									
<small>*Percent Daily Values are based on a diet of other people's secrets. Your daily values may be higher or lower depending on your calorie needs:</small>																									
<table border="1"> <thead> <tr> <th></th> <th>Calories: 2,000</th> <th>2,500</th> </tr> </thead> <tbody> <tr> <td>Total Fat</td> <td>Less than 65g</td> <td>80g</td> </tr> <tr> <td>Sat Fat</td> <td>Less than 20g</td> <td>25g</td> </tr> <tr> <td>Cholesterol</td> <td>Less than 300mg</td> <td>300mg</td> </tr> <tr> <td>Sodium</td> <td>Less than 2,400mg</td> <td>2,400mg</td> </tr> <tr> <td>Potassium</td> <td>3,500mg</td> <td>3,500mg</td> </tr> <tr> <td>Total Carbohydrate</td> <td>300g</td> <td>375g</td> </tr> <tr> <td>Dietary Fiber</td> <td>25g</td> <td>30g</td> </tr> </tbody> </table>			Calories: 2,000	2,500	Total Fat	Less than 65g	80g	Sat Fat	Less than 20g	25g	Cholesterol	Less than 300mg	300mg	Sodium	Less than 2,400mg	2,400mg	Potassium	3,500mg	3,500mg	Total Carbohydrate	300g	375g	Dietary Fiber	25g	30g
	Calories: 2,000	2,500																							
Total Fat	Less than 65g	80g																							
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Potassium	3,500mg	3,500mg																							
Total Carbohydrate	300g	375g																							
Dietary Fiber	25g	30g																							
<b>INGREDIENTS:</b> WHOLE GRAIN WHEAT FLOUR, SOYBEAN OIL, SUGAR, CORNSTARCH, MALT SYRUP (FROM BARLEY AND CORN), SALT, HIGH FRUCTOSE CORN SYRUP, MONOGLYCERIDES, LEAVENING (CALCIUM PHOSPHATE AND/OR BAKING SODA), SOY LECITHIN, VEGETABLE COLOR (ANNATTO EXTRACT, TURMERIC OLEORESIN).																									

**Part 1**

**1. Gender (check one):**      1. Male \_\_\_\_      2. Female \_\_\_\_

**2. Age (fill in):**    \_\_\_\_ years old

**3. Highest Education (check one):**

1. High school, non-graduate (or less) \_\_\_\_
2. High school, graduate (or GED equivalent) \_\_\_\_
3. College/vocational training (0-2 years) \_\_\_\_
4. College/vocational training (2-4 years) \_\_\_\_
5. College/vocational training (more than 4 years) \_\_\_\_

**4. Height (fill in or check):**    \_\_\_\_ feet \_\_\_\_ inches      Do not wish to report \_\_\_\_

**5. Weight (fill in or check):**    \_\_\_\_ pounds      Do not wish to report \_\_\_\_

**6. Has a physician *ever* diagnosed you with a chronic health condition or disease? (check one):**

1. Yes \_\_\_\_
2. No \_\_\_\_
3. Do not know \_\_\_\_

**7. Are you *currently* diagnosed with a chronic health condition or disease? (check one):**

1. Yes \_\_\_\_
2. No \_\_\_\_
3. Do not know \_\_\_\_

**8. Are you the primary or main food shopper for your household? (check one):**

1. Yes \_\_\_\_
2. No \_\_\_\_

**9. When shopping, how often do you use the Food Label, in general? (check one):**

1. Always \_\_\_\_
2. Most of the time \_\_\_\_
3. Sometimes \_\_\_\_
4. Rarely \_\_\_\_
5. Never \_\_\_\_

**Part 2**

**10. If you bought fruit (including canned, frozen, or dried), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**11. If you bought vegetables (including canned, frozen, or dried), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**12. If you bought grains (including pasta, rice, bread, or cereal), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**13. If you bought dairy foods (including milk, yogurt, or cheese), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**14. If you bought protein foods (including meat, poultry, eggs, or fish/seafood), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**15. If you bought beans or legumes (including frozen, canned, or dried), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**16. If you bought nuts (including whole nuts or nut butters (eg. peanut butter)), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**17. If you bought desserts (including ice-cream, cake mix, or packaged cookies/pastries), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_



**18. If you bought snacks (including potato chips, crackers, popcorn, or granola bars), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**19. If you bought frozen prepared meals (including frozen dinners or frozen pizzas), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**20. If you bought boxed meals (including macaroni and cheese mixes or skillet meal mixes), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**21. If you bought canned or jarred foods (including canned soup/chili or spaghetti sauce), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**22. If you bought fats or oils (including butter, margarine, or olive oil), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**23. If you bought condiments (including ketchup, jelly, or salad dressing), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

1. Serving size \_\_\_\_\_
2. Servings per Container \_\_\_\_\_
3. Calories \_\_\_\_\_
4. Calories from Fat \_\_\_\_\_
5. Total Fat \_\_\_\_\_
6. Saturated Fat \_\_\_\_\_
7. Trans Fat \_\_\_\_\_
8. Cholesterol \_\_\_\_\_
9. Sodium \_\_\_\_\_
10. Total Carbohydrates \_\_\_\_\_
11. Dietary Fiber \_\_\_\_\_
12. Sugars \_\_\_\_\_
13. Protein \_\_\_\_\_
14. Vitamins and Minerals \_\_\_\_\_
15. Footnote \_\_\_\_\_
16. Ingredients List \_\_\_\_\_
17. % Daily Value (%DV) \_\_\_\_\_
18. I do not use any of the above components \_\_\_\_\_
19. I do not purchase these foods \_\_\_\_\_

**24. If you bought beverages (including soda/pop, juice, tea, or alcohol), what component(s) of the food label do you *most often use* when deciding whether or not to purchase these foods? (check all that apply):**

- |  |                                 |                        |
|--|---------------------------------|------------------------|
| 1. Serving size _____                              | 2. Servings per Container _____ | 3. Calories _____      |
| 4. Calories from Fat _____                         | 5. Total Fat _____              | 6. Saturated Fat _____ |
| 7. Trans Fat _____                                 | 8. Cholesterol _____            | 9. Sodium _____        |
| 10. Total Carbohydrates _____                      | 11. Dietary Fiber _____         | 12. Sugars _____       |
| 13. Protein _____                                  | 14. Vitamins and Minerals _____ | 15. Footnote _____     |
| 16. Ingredients List _____                         | 17. % Daily Value (%DV) _____   |                        |
| 18. I do not use any of the above components _____ |                                 |                        |
| 19. I do not purchase these foods _____            |                                 |                        |

-----

Thank you for participating in this study. Your responses are very valuable.

If you have any questions or concerns about this research, please contact: Caitlin Huth (Principal Investigator) at [cahuth@eiu.edu](mailto:cahuth@eiu.edu) or Carla Honselman (Faculty Advisor) at 217-581-6676 or [cshonselman@eiu.edu](mailto:cshonselman@eiu.edu).

If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board  
Eastern Illinois University  
600 Lincoln Ave.  
Charleston, IL 61920  
Telephone: (217) 581-2125  
E-mail: [eiuirb@www.eiu.edu](mailto:eiuirb@www.eiu.edu)

## Appendix 2

## Use of Label Components by Food Categories among Demographic Characteristics

## Use of Components by Food Category per Gender

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use	
<b>Serving Size (%)</b>																	
M*	28.2	30.8	28.2	33.3	17.9	28.2	28.2	33.3	46.2	35.9	30.8	38.5	17.9	25.6	25.6	29.9	
F*	36.1	34.7	48.6	43.1	44.4	40.3	45.8	56.9	63.9	41.7	38.9	54.2	33.3	37.5	36.1	43.7	
<b>Servings Per Container (%)</b>																	
M*	23.1	33.3	30.8	28.2	25.6	25.6	28.2	28.2	33.3	30.8	35.9	30.8	10.3	20.5	23.1	27.2	
F*	29.2	26.4	37.5	30.6	27.8	25.0	37.5	29.2	50.0	30.6	29.2	37.5	19.4	19.4	29.2	30.6	
<b>Calories (%)</b>																	
M*	35.9	25.6	43.6	38.5	20.5	20.5	25.6	53.8	53.8	41.0	28.2	41.0	23.1	23.1	43.6	34.5	
F*	54.2	44.4	62.5	69.4	40.3	36.1	63.9	63.9	76.4	51.4	44.4	52.8	41.7	52.8	59.7	54.3	
<b>Calories from Fat (%)</b>																	
M*	15.4	12.8	10.3	15.4	15.4	7.7	12.8	30.8	30.8	23.1	15.4	17.9	28.2	15.4	0.0	16.8	
F*	15.3	12.5	13.9	27.8	16.7	11.1	27.8	29.2	34.7	19.4	18.1	16.7	16.7	20.8	6.9	19.2	
<b>Total Fat (%)</b>																	
M*	23.1	15.4	15.4	51.3	33.3	23.1	28.2	48.7	51.3	35.9	33.3	43.6	35.9	30.8	5.1	31.6	
F*	15.3	19.4	26.4	48.6	33.3	18.1	38.9	33.3	48.6	34.7	25.0	30.6	37.5	33.3	4.2	29.8	
<b>Saturated Fat (%)</b>																	
M*	15.4	10.3	7.7	38.5	20.5	2.6	20.5	33.3	38.5	25.6	25.6	12.8	46.2	20.5	2.6	21.4	
F*	8.3	9.7	9.7	23.6	23.6	9.7	25.0	19.4	33.3	18.1	16.7	15.3	36.1	22.2	1.4	18.1	
<b>Trans Fat (%)</b>																	
M*	15.4	10.3	12.8	25.6	10.3	2.6	20.5	30.8	35.9	25.6	17.9	12.8	41.0	17.9	2.6	18.8	
F*	8.3	8.3	8.3	18.1	12.5	8.3	20.8	16.7	31.9	16.7	13.9	13.9	37.5	16.7	2.8	15.6	
<b>Cholesterol (%)</b>																	
M*	17.9	15.4	12.8	15.4	17.9	12.8	17.9	23.1	23.1	25.6	23.1	20.5	17.9	17.9	7.7	17.9	
F*	8.3	8.3	11.1	13.9	11.1	6.9	13.9	11.1	13.9	11.1	9.7	9.7	20.8	8.3	1.4	10.6	
<b>Sodium (%)</b>																	
M*	17.9	38.5	15.4	12.8	15.4	28.2	20.5	15.4	46.2	51.3	41.0	56.4	20.5	33.3	17.9	28.7	
F*	23.6	48.6	29.2	20.8	18.1	30.6	33.3	18.1	48.6	34.7	34.7	54.2	22.2	34.7	12.5	30.9	
<b>Total Carbohydrates (%)</b>																	
M*	23.1	15.4	25.6	15.4	15.4	10.3	15.4	23.1	20.5	20.5	17.9	17.9	5.1	17.9	23.1	17.8	
F*	16.7	15.3	36.1	16.7	12.5	12.5	13.9	18.1	20.8	16.7	12.5	16.7	8.3	13.9	8.3	15.9	
<b>Dietary Fiber (%)</b>																	
M*	23.1	17.9	33.3	7.7	5.1	23.1	15.4	7.7	12.8	17.9	10.3	7.7	2.6	7.7	2.6	13.0	
F*	26.4	27.8	52.8	18.1	12.5	26.4	22.2	12.5	26.4	22.2	20.8	16.7	6.9	8.3	4.2	20.3	
<b>Sugars (%)</b>																	
M*	43.6	25.6	30.8	30.8	7.7	17.9	23.1	41.0	43.6	20.5	17.9	33.3	5.1	43.6	56.4	29.4	
F*	55.6	16.7	31.9	27.8	5.6	13.9	27.8	43.1	26.4	16.7	11.1	20.8	8.3	29.2	43.1	25.2	
<b>Protein (%)</b>																	
M*	5.1	10.3	10.3	20.5	30.8	20.5	28.2	2.6	15.4	25.6	15.4	17.9	2.6	5.1	2.6	14.2	
F*	8.3	13.9	23.6	38.9	31.9	29.2	37.5	11.1	19.4	23.6	13.9	16.7	6.9	6.9	1.4	18.9	
<b>Vitamins and Minerals (%)</b>																	
M*	23.1	20.5	20.5	25.6	23.1	17.9	15.4	12.8	17.9	7.7	15.4	17.9	2.6	7.7	2.6	15.4	
F*	18.1	18.1	15.3	16.7	8.3	11.1	6.9	2.8	8.3	2.8	2.8	8.3	2.8	5.6	5.6	8.9	
<b>Footnote (%)</b>																	
M*	0.0	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	5.1	2.6	2.6	2.6	
F*	2.8	1.4	0.0	4.2	4.2	2.8	2.8	2.8	4.2	1.4	4.2	1.4	2.8	1.4	0.0	2.4	
<b>Ingredients List (%)</b>																	
M*	20.5	33.3	20.5	12.8	23.1	25.6	28.2	25.6	20.5	20.5	20.5	25.6	23.1	20.5	15.4	22.4	
F*	25.0	27.8	31.9	26.4	23.6	25.0	29.2	27.8	30.6	20.8	22.2	27.8	26.4	26.4	22.2	26.2	
<b>Daily Value (%)</b>																	
M*	7.7	2.6	7.7	7.7	2.6	5.1	2.6	7.7	10.3	5.1	5.1	7.7	0.0	7.7	5.1	5.6	

F*	5.6	8.3	9.7	11.1	6.9	11.1	8.3	4.2	9.7	8.3	6.9	9.7	5.6	6.9	2.8	7.7
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M\*=Male (n=39)

F=Female (n=72)

Use of Components by Food Category per Age Range

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use
<b>Serving Size (%)</b>																
1*	25.0	43.8	56.3	68.8	62.5	75.0	56.3	62.5	62.5	50.0	37.5	62.5	37.5	43.8	31.3	51.7
2*	25.0	18.8	25.0	31.3	25.0	18.8	37.5	62.5	75.0	50.0	50.0	31.3	25.0	31.3	50.0	37.1
3^A	16.7	33.3	50.0	66.7	33.3	16.7	33.3	66.7	66.7	33.3	50.0	66.7	16.7	33.3	50.0	42.2
4°	50.0	25.0	75.0	50.0	50.0	25.0	50.0	75.0	75.0	75.0	25.0	50.0	25.0	50.0	50.0	50.0
5																
□	28.6	42.9	28.6	28.6	28.6	14.3	14.3	42.9	42.9	14.3	28.6	57.1	28.6	14.3	57.1	31.4
6 <sup>#</sup>	20.0	30.0	40.0	30.0	20.0	20.0	30.0	20.0	60.0	40.0	30.0	30.0	10.0	20.0	10.0	27.3
7*	50.0	31.8	59.1	36.4	36.4	40.9	45.5	40.9	50.0	40.9	27.3	59.1	36.4	40.9	36.4	42.1
8 <sup>§</sup>	35.3	41.2	29.4	35.3	35.3	41.2	41.2	41.2	58.8	35.3	47.1	41.2	29.4	29.4	23.5	37.6
9°	38.5	30.8	23.1	23.1	23.1	30.8	30.8	46.2	38.5	23.1	23.1	46.2	23.1	30.8	7.7	29.2
<b>Servings Per Container (%)</b>																
1*	43.8	37.5	56.3	50.0	37.5	37.5	43.8	37.5	56.3	43.8	37.5	56.3	18.8	18.8	43.8	41.3
2*	18.8	18.8	18.8	18.8	18.8	12.5	31.3	25.0	50.0	31.3	37.5	18.8	12.5	18.8	37.5	24.6
3^A	33.3	33.3	33.3	33.3	16.7	16.7	33.3	50.0	50.0	16.7	33.3	33.3	0.0	16.7	16.7	27.8
4°	25.0	25.0	50.0	0.0	0.0	0.0	0.0	25.0	25.0	25.0	25.0	0.0	0.0	0.0	0.0	13.3
5																
□	0.0	14.3	14.3	0.0	42.9	14.3	28.6	14.3	14.3	0.0	28.6	14.3	0.0	14.3	28.6	15.2
6 <sup>#</sup>	40.0	30.0	40.0	40.0	30.0	30.0	60.0	20.0	50.0	40.0	30.0	40.0	20.0	20.0	20.0	34.0
7*	22.7	40.9	36.4	36.4	22.7	31.8	36.4	31.8	40.9	31.8	27.3	45.5	27.3	27.3	27.3	32.4
8 <sup>§</sup>	29.4	29.4	29.4	35.3	41.2	35.3	29.4	29.4	47.1	29.4	41.2	29.4	17.6	17.6	29.4	31.4
9°	23.1	15.4	38.5	15.4	15.4	15.4	23.1	23.1	38.5	30.8	15.4	38.5	15.4	23.1	7.7	22.6
<b>Calories (%)</b>																
1*	50.0	43.8	75.0	75.0	43.8	43.8	68.8	56.3	68.8	43.8	43.8	50.0	43.8	37.5	50.0	52.9
2*	50.0	37.5	56.3	56.3	37.5	37.5	50.0	68.8	87.5	62.5	56.3	50.0	43.8	43.8	81.3	54.6
3^A			100.	100.				100.								
	50.0	33.3	0	0	33.3	16.7	50.0	0	83.3	66.7	50.0	83.3	33.3	66.7	83.3	63.3
4°									100.	100.						
	75.0	50.0	75.0	75.0	50.0	25.0	50.0	75.0	0	0	25.0	50.0	50.0	50.0	75.0	61.7
5																
□	42.9	42.9	57.1	57.1	28.6	28.6	28.6	57.1	57.1	57.1	42.9	42.9	42.9	28.6	42.9	43.8
6 <sup>#</sup>	60.0	60.0	60.0	60.0	40.0	30.0	60.0	30.0	60.0	30.0	30.0	60.0	50.0	60.0	60.0	50.0
7*	36.4	22.7	45.5	50.0	27.3	27.3	40.9	50.0	63.6	31.8	31.8	36.4	18.2	36.4	36.4	37.0
8 <sup>§</sup>	52.9	47.1	41.2	52.9	29.4	35.3	64.7	76.5	64.7	52.9	47.1	52.9	35.3	35.3	58.8	49.8
9°	38.5	23.1	38.5	38.5	23.1	15.4	30.8	53.8	53.8	38.5	15.4	38.5	23.1	46.2	30.8	33.8
<b>Calories from Fat (%)</b>																
1*	0.0	6.3	12.5	43.8	18.8	18.8	37.5	31.3	31.3	18.8	18.8	18.8	18.8	12.5	12.5	20.0
2*	12.5	6.3	12.5	12.5	12.5	12.5	25.0	37.5	31.3	25.0	18.8	6.3	18.8	18.8	0.0	16.7
3^A	33.3	16.7	33.3	33.3	0.0	0.0	0.0	33.3	33.3	50.0	33.3	33.3	33.3	33.3	0.0	24.4
4°	25.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	8.3
5																
□	14.3	14.3	0.0	14.3	14.3	14.3	14.3	28.6	42.9	14.3	14.3	14.3	14.3	14.3	0.0	15.2
6 <sup>#</sup>	30.0	30.0	30.0	50.0	50.0	30.0	60.0	30.0	60.0	30.0	30.0	50.0	50.0	50.0	10.0	39.3
7*	18.2	13.6	9.1	18.2	13.6	0.0	9.1	18.2	22.7	0.0	4.5	9.1	9.1	13.6	4.5	10.9
8 <sup>§</sup>	0.0	5.9	0.0	5.9	5.9	0.0	17.6	17.6	23.5	11.8	11.8	0.0	11.8	5.9	0.0	7.8
9°	30.8	23.1	23.1	30.8	23.1	15.4	23.1	46.2	46.2	46.2	30.8	38.5	38.5	30.8	7.7	30.3
<b>Total Fat (%)</b>																
1*	12.5	12.5	31.3	50.0	31.3	6.3	25.0	31.3	56.3	31.3	12.5	25.0	37.5	25.0	0.0	25.8
2*	6.3	12.5	12.5	43.8	56.3	37.5	43.8	25.0	62.5	31.3	25.0	37.5	37.5	31.3	6.3	31.3
3^A				100.				100.								
	50.0	33.3	83.3	0	50.0	16.7	50.0	0	66.7	66.7	66.7	83.3	50.0	66.7	33.3	61.1
4°									100.	100.						
	25.0	25.0	25.0	50.0	50.0	0.0	75.0	0	0	75.0	50.0	75.0	75.0	75.0	0.0	53.3
5																
□	14.3	14.3	0.0	57.1	14.3	14.3	14.3	42.9	42.9	28.6	14.3	28.6	14.3	28.6	0.0	21.9



6 <sup>#</sup>	40.0	40.0	40.0	50.0	50.0	30.0	40.0	40.0	70.0	40.0	50.0	50.0	50.0	60.0	10.0	44.0
7 <sup>+</sup>	4.5	9.1	4.5	36.4	18.2	22.7	36.4	18.2	36.4	18.2	18.2	18.2	45.5	18.2	4.5	20.6
8 <sup>s</sup>	11.8	17.6	17.6	35.3	17.6	17.6	23.5	29.4	17.6	29.4	35.3	29.4	11.8	17.6	0.0	20.8
9 <sup>u</sup>	38.5	23.1	30.8	69.2	38.5	15.4	38.5	61.5	53.8	53.8	23.1	38.5	38.5	38.5	0.0	37.4
<b>Saturated Fat (%)</b>																
1*	6.3	6.3	12.5	18.8	6.3	6.3	6.3	12.5	25.0	18.8	12.5	6.3	31.3	0.0	0.0	11.3
2'	0.0	0.0	0.0	37.5	50.0	18.8	37.5	18.8	37.5	18.8	18.8	12.5	31.3	25.0	0.0	20.4
3 <sup>^</sup>	16.7	16.7	0.0	16.7	16.7	0.0	33.3	33.3	66.7	50.0	50.0	16.7	50.0	33.3	16.7	27.8
4 <sup>o</sup>	25.0	0.0	0.0	50.0	25.0	0.0	50.0	50.0	50.0	50.0	25.0	25.0	25.0	25.0	0.0	26.7
5																
□	14.3	14.3	0.0	28.6	14.3	14.3	14.3	28.6	28.6	14.3	14.3	14.3	42.9	14.3	0.0	17.1
6 <sup>#</sup>	20.0	20.0	20.0	50.0	30.0	10.0	40.0	40.0	50.0	20.0	40.0	40.0	70.0	50.0	10.0	34.0
7 <sup>+</sup>	9.1	4.5	4.5	18.2	13.6	0.0	13.6	9.1	27.3	9.1	9.1	4.5	50.0	18.2	0.0	12.7
8 <sup>s</sup>	5.9	11.8	11.8	23.5	11.8	5.9	11.8	11.8	17.6	11.8	17.6	11.8	17.6	17.6	0.0	12.5
9 <sup>u</sup>	23.1	23.1	23.1	38.5	38.5	7.7	38.5	61.5	53.8	38.5	23.1	23.1	46.2	30.8	0.0	31.3
<b>Trans Fat (%)</b>																
1*	6.3	6.3	12.5	6.3	0.0	6.3	6.3	18.8	31.3	12.5	6.3	6.3	31.3	0.0	0.0	10.0
2'	0.0	0.0	0.0	31.3	31.3	18.8	18.8	6.3	31.3	18.8	12.5	12.5	31.3	18.8	0.0	15.4
3 <sup>^</sup>	16.7	16.7	0.0	16.7	16.7	0.0	33.3	33.3	66.7	50.0	50.0	16.7	50.0	33.3	16.7	27.8
4 <sup>o</sup>	25.0	0.0	0.0	50.0	25.0	0.0	50.0	50.0	50.0	50.0	25.0	25.0	25.0	25.0	0.0	26.7
5																
□	0.0	0.0	0.0	14.3	0.0	0.0	14.3	14.3	0.0	14.3	14.3	0.0	14.3	0.0	0.0	5.7
6 <sup>#</sup>	10.0	20.0	20.0	30.0	20.0	0.0	30.0	40.0	40.0	30.0	30.0	30.0	60.0	40.0	10.0	27.3
7 <sup>+</sup>	9.1	4.5	4.5	9.1	4.5	0.0	4.5	4.5	22.7	9.1	0.0	4.5	36.4	13.6	0.0	8.5
8 <sup>s</sup>	17.6	17.6	17.6	29.4	11.8	11.8	23.5	23.5	35.3	17.6	17.6	23.5	35.3	17.6	0.0	20.0
9 <sup>u</sup>	23.1	15.4	23.1	23.1	7.7	7.7	46.2	46.2	46.2	23.1	23.1	15.4	61.5	23.1	7.7	26.2
<b>Cholesterol (%)</b>																
1*	6.3	12.5	18.8	6.3	0.0	6.3	18.8	12.5	6.3	18.8	18.8	6.3	18.8	0.0	0.0	10.0
2'	0.0	0.0	0.0	6.3	12.5	6.3	6.3	6.3	12.5	0.0	6.3	12.5	6.3	0.0	0.0	5.0
3 <sup>^</sup>	16.7	16.7	0.0	0.0	0.0	0.0	0.0	0.0	33.3	16.7	16.7	16.7	0.0	16.7	16.7	10.0
4 <sup>o</sup>	25.0	0.0	0.0	50.0	25.0	0.0	25.0	50.0	25.0	50.0	25.0	0.0	25.0	25.0	0.0	21.7
5																
□	0.0	0.0	0.0	0.0	14.3	14.3	14.3	14.3	0.0	14.3	14.3	0.0	14.3	14.3	0.0	7.6
6 <sup>#</sup>	10.0	10.0	30.0	30.0	30.0	10.0	30.0	20.0	30.0	20.0	30.0	30.0	40.0	40.0	10.0	24.7
7 <sup>+</sup>	18.2	9.1	4.5	18.2	22.7	13.6	22.7	18.2	22.7	9.1	9.1	22.7	31.8	13.6	4.5	16.1
8 <sup>s</sup>	11.8	11.8	11.8	11.8	5.9	5.9	5.9	11.8	5.9	11.8	11.8	11.8	17.6	5.9	0.0	9.4
9 <sup>u</sup>	23.1	30.8	30.8	23.1	15.4	15.4	15.4	23.1	30.8	38.5	15.4	7.7	15.4	15.4	7.7	20.5
<b>Sodium (%)</b>																
1*	12.5	31.3	37.5	12.5	18.8	25.0	25.0	37.5	62.5	37.5	43.8	50.0	18.8	31.3	18.8	30.8
2'	25.0	68.8	25.0	18.8	25.0	43.8	25.0	12.5	50.0	56.3	43.8	62.5	25.0	56.3	18.8	37.1
3 <sup>^</sup>	16.7	33.3	0.0	0.0	0.0	33.3	33.3	0.0	33.3	66.7	33.3	83.3	16.7	16.7	16.7	25.6
4 <sup>o</sup>	25.0	100.0	50.0	25.0	25.0	50.0	25.0	25.0	50.0	75.0	75.0	75.0	50.0	75.0	0.0	48.3
5																
□	14.3	42.9	0.0	14.3	28.6	14.3	0.0	0.0	28.6	14.3	14.3	28.6	14.3	14.3	14.3	16.2
6 <sup>#</sup>	30.0	50.0	20.0	40.0	30.0	30.0	30.0	20.0	50.0	30.0	40.0	60.0	30.0	40.0	30.0	35.3
7 <sup>+</sup>	27.3	36.4	22.7	18.2	9.1	18.2	36.4	13.6	50.0	36.4	31.8	50.0	27.3	36.4	9.1	28.2
8 <sup>s</sup>	17.6	35.3	23.5	17.6	11.8	35.3	23.5	5.9	29.4	35.3	35.3	47.1	5.9	5.9	5.9	22.4
9 <sup>u</sup>	23.1	46.2	30.8	15.4	15.4	30.8	46.2	30.8	61.5	38.5	30.8	61.5	23.1	46.2	15.4	34.4
<b>Total Carbohydrates (%)</b>																
1*	6.3	0.0	37.5	6.3	6.3	6.3	0.0	6.3	0.0	18.8	6.3	6.3	0.0	0.0	0.0	6.7
2'	18.8	12.5	37.5	6.3	6.3	12.5	12.5	12.5	25.0	12.5	12.5	6.3	0.0	12.5	12.5	13.3
3 <sup>^</sup>	0.0	0.0	33.3	16.7	0.0	0.0	0.0	33.3	16.7	16.7	16.7	16.7	0.0	0.0	16.7	11.1
4 <sup>o</sup>	25.0	25.0	25.0	25.0	25.0	0.0	25.0	25.0	25.0	25.0	0.0	25.0	25.0	25.0	25.0	21.7
5																
□	42.9	28.6	57.1	42.9	14.3	14.3	28.6	42.9	57.1	42.9	42.9	42.9	14.3	57.1	28.6	37.1
6 <sup>#</sup>	40.0	40.0	40.0	40.0	40.0	30.0	40.0	30.0	40.0	30.0	30.0	40.0	30.0	40.0	30.0	36.0
7 <sup>+</sup>	9.1	9.1	22.7	9.1	13.6	4.5	9.1	13.6	13.6	9.1	4.5	13.6	0.0	9.1	13.6	10.3
8 <sup>s</sup>	23.5	23.5	29.4	17.6	11.8	17.6	23.5	29.4	17.6	23.5	23.5	23.5	11.8	17.6	17.6	20.8
9 <sup>u</sup>	23.1	15.4	23.1	15.4	15.4	15.4	7.7	15.4	23.1	7.7	7.7	7.7	7.7	7.7	0.0	12.8
<b>Dietary Fiber (%)</b>																
1*	12.5	25.0	50.0	18.8	18.8	18.8	12.5	12.5	25.0	31.3	12.5	12.5	0.0	6.3	6.3	17.5
2'	18.8	31.3	50.0	12.5	6.3	25.0	31.3	0.0	25.0	18.8	25.0	12.5	0.0	12.5	0.0	17.9
3 <sup>^</sup>	33.3	16.7	33.3	0.0	0.0	16.7	0.0	16.7	16.7	33.3	16.7	16.7	0.0	0.0	0.0	13.3
4 <sup>o</sup>	50.0	0.0	75.0	0.0	0.0	50.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3
5																
□	42.9	42.9	85.7	14.3	14.3	28.6	14.3	14.3	57.1	28.6	28.6	14.3	14.3	14.3	14.3	28.6

6 <sup>#</sup>	50.0	50.0	80.0	20.0	30.0	40.0	50.0	10.0	30.0	30.0	30.0	40.0	20.0	30.0	10.0	34.7
7 <sup>+</sup>	9.1	9.1	13.6	4.5	0.0	13.6	9.1	4.5	0.0	0.0	9.1	4.5	0.0	0.0	0.0	5.2
8 <sup>s</sup>	23.5	23.5	41.2	29.4	11.8	29.4	23.5	23.5	17.6	23.5	17.6	17.6	11.8	5.9	5.9	20.4
9 <sup>=</sup>	38.5	23.1	46.2	15.4	7.7	30.8	23.1	15.4	30.8	30.8	15.4	7.7	7.7	7.7	0.0	20.0
<b>Sugars (%)</b>																
1*	68.8	25.0	56.3	50.0	0.0	37.5	37.5	50.0	43.8	18.8	12.5	25.0	0.0	31.3	56.3	34.2
2 <sup>^</sup>	56.3	12.5	25.0	12.5	0.0	6.3	12.5	62.5	31.3	25.0	6.3	18.8	0.0	43.8	62.5	25.0
3 <sup>^</sup>															100.	
	50.0	16.7	33.3	50.0	0.0	0.0	16.7	66.7	33.3	33.3	33.3	33.3	0.0	50.0	0	34.4
4 <sup>o</sup>	75.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	75.0	13.3
5																
□	42.9	14.3	14.3	28.6	0.0	0.0	14.3	28.6	28.6	0.0	14.3	14.3	0.0	28.6	42.9	18.1
6 <sup>#</sup>	70.0	50.0	50.0	50.0	40.0	40.0	60.0	60.0	60.0	40.0	30.0	50.0	30.0	80.0	70.0	52.0
7 <sup>+</sup>	50.0	18.2	27.3	18.2	4.5	13.6	31.8	36.4	22.7	4.5	9.1	22.7	9.1	27.3	18.2	20.9
8 <sup>s</sup>	23.5	17.6	17.6	23.5	5.9	11.8	11.8	17.6	17.6	17.6	17.6	17.6	5.9	11.8	29.4	16.5
9 <sup>=</sup>	46.2	15.4	38.5	30.8	7.7	7.7	30.8	38.5	38.5	23.1	7.7	38.5	15.4	38.5	46.2	28.2
<b>Protein (%)</b>																
1*	12.5	25.0	31.3	62.5	56.3	56.3	50.0	6.3	31.3	37.5	12.5	25.0	0.0	6.3	0.0	27.5
2 <sup>^</sup>	12.5	18.8	12.5	37.5	37.5	18.8	31.3	12.5	25.0	25.0	18.8	18.8	12.5	12.5	6.3	20.0
3 <sup>^</sup>	16.7	16.7	33.3	33.3	50.0	16.7	50.0	16.7	16.7	33.3	16.7	0.0	0.0	0.0	0.0	20.0
4 <sup>o</sup>	0.0	0.0	0.0	25.0	50.0	25.0	50.0	0.0	25.0	25.0	25.0	0.0	0.0	0.0	0.0	15.0
5																
□	0.0	14.3	0.0	28.6	42.9	14.3	42.9	0.0	14.3	14.3	0.0	14.3	0.0	0.0	0.0	12.4
6 <sup>#</sup>	0.0	10.0	30.0	40.0	40.0	40.0	40.0	0.0	20.0	30.0	10.0	30.0	10.0	20.0	0.0	21.3
7 <sup>+</sup>	0.0	0.0	18.2	27.3	18.2	22.7	31.8	4.5	13.6	18.2	13.6	13.6	0.0	0.0	0.0	12.1
8 <sup>s</sup>	11.8	17.6	17.6	17.6	11.8	17.6	23.5	17.6	11.8	23.5	17.6	17.6	11.8	5.9	5.9	15.3
9 <sup>=</sup>	7.7	7.7	15.4	15.4	15.4	15.4	15.4	7.7	7.7	15.4	15.4	15.4	7.7	7.7	0.0	11.3
<b>Vitamins and Minerals (%)</b>																
1*	31.3	18.8	25.0	37.5	25.0	18.8	6.3	6.3	0.0	0.0	6.3	6.3	0.0	0.0	6.3	12.5
2 <sup>^</sup>	18.8	18.8	18.8	12.5	6.3	12.5	12.5	0.0	18.8	6.3	6.3	18.8	6.3	18.8	12.5	12.5
3 <sup>^</sup>	16.7	16.7	16.7	16.7	16.7	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0	6.7
4 <sup>o</sup>	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	5.0
5																
□	14.3	14.3	0.0	14.3	14.3	0.0	0.0	0.0	14.3	14.3	14.3	0.0	0.0	14.3	0.0	7.6
6 <sup>#</sup>	10.0	30.0	30.0	20.0	20.0	20.0	10.0	10.0	30.0	0.0	10.0	30.0	10.0	20.0	0.0	16.7
7 <sup>+</sup>	27.3	31.8	18.2	27.3	13.6	27.3	22.7	13.6	13.6	4.5	13.6	18.2	0.0	0.0	4.5	15.8
8 <sup>s</sup>	0.0	0.0	5.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
9 <sup>=</sup>	30.8	15.4	23.1	23.1	23.1	15.4	15.4	15.4	23.1	7.7	7.7	15.4	7.7	7.7	0.0	15.4
<b>Footnote (%)</b>																
1*	0.0	0.0	0.0	6.3	6.3	0.0	0.0	6.3	6.3	0.0	6.3	0.0	0.0	0.0	0.0	2.1
2 <sup>^</sup>	0.0	6.3	6.3	12.5	12.5	12.5	12.5	6.3	12.5	6.3	12.5	6.3	12.5	6.3	6.3	8.8
3 <sup>^</sup>	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
4 <sup>o</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5																
□	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 <sup>#</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 <sup>+</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 <sup>s</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.4
9 <sup>=</sup>	7.7	7.7	0.0	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	0.0	6.7
<b>Ingredients List (%)</b>																
1*	31.3	43.8	37.5	31.3	31.3	31.3	25.0	37.5	43.8	31.3	31.3	25.0	18.8	18.8	25.0	30.8
2 <sup>^</sup>	25.0	25.0	25.0	25.0	18.8	18.8	31.3	25.0	37.5	25.0	25.0	25.0	31.3	31.3	25.0	26.3
3 <sup>^</sup>	16.7	0.0	16.7	16.7	0.0	0.0	16.7	16.7	16.7	0.0	16.7	16.7	16.7	0.0	16.7	11.1
4 <sup>o</sup>	0.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
5																
□	14.3	14.3	0.0	0.0	0.0	14.3	0.0	14.3	14.3	14.3	0.0	14.3	0.0	0.0	14.3	7.6
6 <sup>#</sup>	30.0	40.0	50.0	40.0	20.0	30.0	50.0	50.0	50.0	30.0	30.0	30.0	50.0	50.0	40.0	39.3
7 <sup>+</sup>	22.7	45.5	31.8	18.2	22.7	40.9	40.9	27.3	18.2	18.2	22.7	40.9	22.7	31.8	18.2	28.2
8 <sup>s</sup>	11.8	23.5	23.5	17.6	35.3	23.5	29.4	17.6	17.6	17.6	23.5	23.5	29.4	17.6	17.6	22.0
9 <sup>=</sup>	38.5	23.1	23.1	15.4	38.5	23.1	23.1	30.8	23.1	23.1	15.4	30.8	30.8	30.8	7.7	25.1
<b>Daily Value (%)</b>																
1*	18.8	12.5	18.8	18.8	6.3	25.0	12.5	6.3	25.0	25.0	18.8	25.0	6.3	6.3	12.5	15.8
2 <sup>^</sup>	12.5	18.8	25.0	18.8	25.0	25.0	18.8	12.5	18.8	12.5	12.5	12.5	12.5	18.8	6.3	16.7
3 <sup>^</sup>	0.0	0.0	16.7	16.7	0.0	0.0	0.0	16.7	16.7	0.0	0.0	16.7	0.0	0.0	16.7	6.7
4 <sup>o</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5																
□	14.3	0.0	0.0	14.3	0.0	0.0	0.0	0.0	14.3	14.3	14.3	0.0	0.0	14.3	0.0	5.7



6 <sup>#</sup>	0.0	0.0	0.0	10.0	0.0	10.0	0.0	10.0	10.0	0.0	0.0	10.0	0.0	10.0	0.0	4.0
7 <sup>+</sup>	0.0	4.5	4.5	4.5	0.0	0.0	4.5	0.0	0.0	0.0	0.0	4.5	0.0	4.5	0.0	1.8
8 <sup>§</sup>	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
9 <sup>°</sup>	7.7	7.7	0.0	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	0.0	6.7

1<sup>\*</sup>=20-24 years old (n=16)  
 2<sup>ˆ</sup>=25-29 years old (n=16)  
 3<sup>^</sup>=30-34 years old (n=6)  
 4<sup>°</sup>=35-39 (n=4)  
 5<sup>□</sup>=40-44 (n=7)  
 6<sup>#</sup>= 45-49 (n=10)  
 7<sup>+</sup>=50-54 (n=22)  
 8<sup>§</sup>=55-59 (n=17)  
 9<sup>°</sup>=60-64 (n=13)

Use of Components by Food Category per Highest Education

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use
<b>Serving Size (%)</b>																
HS*	66.7	66.7	83.3	66.7	83.3	66.7	83.3	66.7	83.3	66.7	83.3	66.7	33.3	50.0	33.3	66.7
C <sup>-</sup>	58.3	50.0	58.3	50.0	50.0	50.0	41.7	58.3	50.0	58.3	50.0	66.7	50.0	50.0	41.7	52.2
C2 <sup>#</sup>	47.6	42.9	66.7	61.9	38.1	42.9	57.1	66.7	76.2	47.6	47.6	76.2	23.8	42.9	47.6	52.4
C4 <sup>^</sup>	23.3	24.7	28.8	30.1	28.8	28.8	31.5	41.1	52.1	31.5	27.4	37.0	24.7	26.0	26.0	30.8
<b>Servings Per Container (%)</b>																
HS*	83.3	66.7	50.0	66.7	83.3	66.7	83.3	66.7	83.3	83.3	83.3	66.7	33.3	50.0	33.3	66.7
C <sup>-</sup>	16.7	33.3	16.7	41.7	33.3	41.7	41.7	33.3	50.0	33.3	33.3	50.0	25.0	25.0	25.0	33.3
C2 <sup>#</sup>	33.3	38.1	61.9	42.9	28.6	38.1	38.1	38.1	47.6	28.6	38.1	47.6	9.5	14.3	38.1	36.2
C4 <sup>^</sup>	21.9	21.9	30.1	21.9	21.9	15.1	27.4	23.3	39.7	26.0	24.7	27.4	15.1	17.8	23.3	23.8
<b>Calories (%)</b>																
HS*	50.0	50.0	66.7	83.3	50.0	50.0	100.0	66.7	83.3	66.7	83.3	83.3	83.3	66.7	66.7	50.0
C <sup>-</sup>	50.0	41.7	50.0	41.7	25.0	25.0	41.7	50.0	58.3	50.0	50.0	58.3	25.0	50.0	50.0	50.0
C2 <sup>#</sup>	61.9	47.6	52.4	57.1	33.3	23.8	42.9	76.2	76.2	42.9	33.3	38.1	28.6	38.1	66.7	61.9
C4 <sup>^</sup>	43.8	34.2	57.5	60.3	34.2	32.9	50.7	57.5	67.1	47.9	35.6	47.9	35.6	39.7	50.7	43.8
<b>Calories from Fat (%)</b>																
HS*	33.3	33.3	33.3	50.0	33.3	33.3	33.3	33.3	50.0	50.0	50.0	50.0	50.0	50.0	0.0	38.9
C <sup>-</sup>	8.3	8.3	0.0	16.7	8.3	0.0	8.3	0.0	16.7	8.3	16.7	0.0	8.3	0.0	0.0	6.7
C2 <sup>#</sup>	23.8	14.3	19.0	19.0	14.3	14.3	23.8	28.6	38.1	14.3	9.5	14.3	19.0	4.8	9.5	17.8
C4 <sup>^</sup>	13.7	11.0	12.3	24.7	17.8	9.6	24.7	35.6	34.2	23.3	17.8	19.2	21.9	23.3	5.5	19.6
<b>Total Fat (%)</b>																
HS*	50.0	50.0	50.0	50.0	50.0	50.0	33.3	33.3	66.7	50.0	50.0	50.0	50.0	66.7	0.0	46.7
C <sup>-</sup>	16.7	16.7	8.3	41.7	16.7	25.0	16.7	8.3	25.0	8.3	25.0	25.0	33.3	8.3	8.3	18.9
C2 <sup>#</sup>	9.5	9.5	19.0	52.4	52.4	14.3	33.3	42.9	61.9	23.8	28.6	38.1	38.1	23.8	4.8	30.2
C4 <sup>^</sup>	17.8	17.8	24.7	50.7	30.1	17.8	38.4	43.8	49.3	41.1	26.0	34.2	35.6	35.6	4.1	31.1
<b>Saturated Fat (%)</b>																
HS*	50.0	50.0	33.3	33.3	33.3	33.3	50.0	16.7	50.0	33.3	50.0	33.3	50.0	33.3	0.0	36.7
C <sup>-</sup>	8.3	16.7	8.3	33.3	0.0	8.3	8.3	8.3	8.3	8.3	25.0	8.3	33.3	8.3	0.0	12.2
C2 <sup>#</sup>	4.8	0.0	4.8	14.3	14.3	4.8	9.5	14.3	28.6	4.8	4.8	4.8	42.9	4.8	0.0	10.5
C4 <sup>^</sup>	9.6	8.2	8.2	31.5	28.8	5.5	27.4	30.1	39.7	26.0	20.5	16.4	39.7	27.4	2.7	21.5
<b>Trans Fat (%)</b>																
HS*	33.3	50.0	16.7	16.7	16.7	16.7	33.3	16.7	33.3	33.3	33.3	16.7	33.3	16.7	0.0	24.4
C <sup>-</sup>	16.7	16.7	8.3	16.7	0.0	8.3	25.0	8.3	16.7	8.3	8.3	16.7	33.3	8.3	8.3	13.3
C2 <sup>#</sup>	9.5	4.8	9.5	14.3	9.5	9.5	9.5	14.3	28.6	9.5	9.5	9.5	38.1	9.5	0.0	12.4
C4 <sup>^</sup>	8.2	5.5	9.6	23.3	13.7	4.1	21.9	26.0	37.0	23.3	16.4	13.7	39.7	20.5	2.7	17.7
<b>Cholesterol (%)</b>																
HS*	16.7	16.7	33.3	33.3	33.3	33.3	33.3	16.7	33.3	16.7	33.3	33.3	50.0	33.3	0.0	27.8
C <sup>-</sup>	25.0	25.0	8.3	25.0	25.0	25.0	25.0	33.3	25.0	16.7	25.0	33.3	33.3	0.0	8.3	22.2
C2 <sup>#</sup>	9.5	4.8	9.5	4.8	4.8	4.8	4.8	9.5	23.8	9.5	9.5	14.3	9.5	4.8	0.0	8.3
C4 <sup>^</sup>	9.6	9.6	11.0	13.7	12.3	5.5	15.1	13.7	12.3	17.8	12.3	8.2	17.8	13.7	4.1	11.8
<b>Sodium (%)</b>																

HS*	33.3	50.0	33.3	50.0	33.3	33.3	50.0	16.7	50.0	50.0	50.0	83.3	33.3	50.0	16.7	42.2
C <sup>-</sup>	25.0	41.7	25.0	25.0	8.3	25.0	25.0	16.7	25.0	33.3	41.7	58.3	33.3	16.7	8.3	27.2
C2 <sup>#</sup>	23.8	42.9	28.6	23.8	23.8	42.9	33.3	28.6	57.1	38.1	28.6	57.1	28.6	28.6	19.0	33.7
C4 <sup>^</sup>	19.2	45.2	21.9	12.3	15.1	26.0	26.0	13.7	49.3	41.1	37.0	50.7	16.4	37.0	13.7	28.3
<b>Total Carbohydrates (%)</b>																
HS*	33.3	33.3	66.7	33.3	33.3	33.3	33.3	16.7	50.0	33.3	50.0	33.3	33.3	33.3	0.0	34.4
C <sup>-</sup>	16.7	25.0	16.7	16.7	8.3	16.7	8.3	16.7	8.3	16.7	16.7	16.7	16.7	8.3	8.3	14.4
C2 <sup>#</sup>	14.3	19.0	33.3	23.8	23.8	14.3	19.0	19.0	23.8	23.8	14.3	23.8	9.5	14.3	14.3	19.4
C4 <sup>^</sup>	19.2	11.0	31.5	12.3	9.6	8.2	12.3	20.5	19.2	15.1	11.0	13.7	2.7	15.1	15.1	14.4
<b>Dietary Fiber (%)</b>																
HS*	33.3	33.3	50.0	16.7	33.3	33.3	33.3	16.7	33.3	16.7	33.3	33.3	33.3	33.3	0.0	28.9
C <sup>-</sup>	33.3	33.3	33.3	33.3	8.3	25.0	25.0	25.0	8.3	16.7	16.7	16.7	16.7	8.3	8.3	20.6
C2 <sup>#</sup>	19.0	19.0	28.6	14.3	9.5	14.3	9.5	9.5	14.3	28.6	9.5	14.3	0.0	4.8	4.8	13.3
C4 <sup>^</sup>	24.7	23.3	52.1	11.0	8.2	27.4	20.5	8.2	24.7	19.2	17.8	11.0	2.7	6.8	2.7	17.4
<b>Sugars (%)</b>																
HS*	66.7	33.3	50.0	33.3	33.3	33.3	50.0	33.3	33.3	33.3	50.0	33.3	33.3	50.0	50.0	41.1
C <sup>-</sup>	16.7	8.3	25.0	16.7	0.0	0.0	16.7	33.3	16.7	8.3	8.3	8.3	8.3	0.0	16.7	12.2
C2 <sup>#</sup>	61.9	19.0	33.3	28.6	14.3	14.3	28.6	42.9	28.6	19.0	14.3	33.3	9.5	28.6	52.4	28.6
C4 <sup>^</sup>	52.1	20.5	30.1	30.1	2.7	16.4	24.7	45.2	35.6	17.8	11.0	24.7	4.1	39.7	52.1	27.1
<b>Protein (%)</b>																
HS*	16.7	16.7	66.7	66.7	66.7	50.0	66.7	16.7	33.3	33.3	33.3	50.0	33.3	33.3	0.0	38.9
C <sup>-</sup>	8.3	8.3	25.0	33.3	25.0	33.3	33.3	16.7	16.7	33.3	25.0	25.0	8.3	0.0	0.0	19.4
C2 <sup>#</sup>	9.5	19.0	19.0	38.1	38.1	19.0	33.3	14.3	28.6	28.6	14.3	23.8	4.8	9.5	4.8	20.3
C4 <sup>^</sup>	5.5	11.0	13.7	27.4	28.8	24.7	31.5	4.1	13.7	20.5	11.0	11.0	2.7	4.1	1.4	14.1
<b>Vitamins and Minerals (%)</b>																
HS*	16.7	16.7	33.3	33.3	33.3	33.3	33.3	16.7	33.3	16.7	33.3	33.3	33.3	33.3	0.0	26.7
C <sup>-</sup>	33.3	25.0	25.0	25.0	25.0	25.0	16.7	16.7	16.7	0.0	16.7	16.7	0.0	0.0	0.0	16.1
C2 <sup>#</sup>	33.3	28.6	14.3	28.6	9.5	9.5	9.5	4.8	14.3	9.5	9.5	14.3	4.8	9.5	14.3	14.3
C4 <sup>^</sup>	13.7	16.4	15.1	15.1	11.0	11.0	6.8	4.1	8.2	2.7	2.7	8.2	0.0	4.1	2.7	8.1
<b>Footnote (%)</b>																
HS*	16.7	16.7	0.0	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	0.0	14.4
C <sup>-</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C2 <sup>#</sup>	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	9.5	4.8	4.8	5.1
C4 <sup>^</sup>	0.0	0.0	0.0	2.7	2.7	1.4	1.4	1.4	2.7	0.0	2.7	0.0	1.4	0.0	0.0	1.1
<b>Ingredients List (%)</b>																
HS*	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	16.7	32.2
C <sup>-</sup>	8.3	25.0	0.0	0.0	8.3	16.7	25.0	25.0	8.3	0.0	8.3	16.7	0.0	8.3	0.0	10.0
C2 <sup>#</sup>	23.8	28.6	33.3	23.8	19.0	14.3	19.0	28.6	19.0	14.3	23.8	23.8	19.0	14.3	19.0	21.6
C4 <sup>^</sup>	24.7	30.1	30.1	23.3	26.0	28.8	31.5	26.0	31.5	24.7	21.9	28.8	30.1	28.8	23.3	27.3
<b>Daily Value (%)</b>																
HS*	16.7	16.7	0.0	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	0.0	14.4
C <sup>-</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C2 <sup>#</sup>	23.8	19.0	23.8	19.0	19.0	19.0	14.3	14.3	19.0	19.0	14.3	19.0	9.5	14.3	14.3	17.5
C4 <sup>^</sup>	2.7	2.7	8.2	9.6	2.7	6.8	4.1	2.7	8.2	4.1	4.1	6.8	1.4	5.5	1.4	4.7

HS\*=High school graduate or GED equivalent (n=6)  
 C<sup>-</sup>=College/vocational education (0-2 years) (n=12)  
 C2<sup>#</sup>=College/vocational education (2-4 years) (n=21)  
 C4<sup>^</sup>=College/vocational education (More than 4 years) (n=73)

Use of Components by Food Category per Body Mass Index (BMI)

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use
<b>Serving Size (%)</b>																
N <sup>+</sup>	33.3	30.0	43.3	45.0	36.7	36.7	36.7	43.3	55.0	31.7	36.7	48.3	26.7	31.7	31.7	37.8
OV <sup>o</sup>	32.0	32.0	40.0	40.0	32.0	40.0	40.0	60.0	56.0	48.0	44.0	56.0	28.0	40.0	28.0	41.1
OB <sup>□</sup>	40.0	45.0	40.0	30.0	35.0	30.0	45.0	50.0	75.0	55.0	35.0	40.0	30.0	30.0	40.0	41.3
<b>Servings Per Container (%)</b>																
N <sup>+</sup>	26.7	26.7	35.0	30.0	28.3	20.0	33.3	25.0	40.0	23.3	28.3	33.3	15.0	16.7	26.7	27.2



OV°	32.0	24.0	32.0	24.0	16.0	24.0	28.0	36.0	48.0	36.0	36.0	36.0	12.0	24.0	20.0	28.5
OB□	25.0	40.0	45.0	45.0	45.0	40.0	45.0	40.0	60.0	50.0	40.0	40.0	25.0	25.0	40.0	40.3
Calories (%)																
N <sup>+</sup>	46.7	43.3	60.0	61.7	35.0	35.0	50.0	58.3	68.3	45.0	41.7	51.7	38.3	46.7	55.0	49.1
OV°	48.0	20.0	44.0	60.0	32.0	24.0	48.0	60.0	60.0	40.0	32.0	32.0	20.0	32.0	52.0	40.3
OB□	55.0	50.0	65.0	50.0	35.0	30.0	55.0	75.0	85.0	70.0	45.0	60.0	45.0	35.0	60.0	54.3
Calories from Fat (%)																
N <sup>+</sup>	11.7	10.0	13.3	31.7	20.0	11.7	26.7	33.3	36.7	23.3	23.3	21.7	25.0	23.3	8.3	21.3
OV°	24.0	12.0	12.0	20.0	8.0	8.0	16.0	24.0	36.0	16.0	8.0	8.0	16.0	12.0	4.0	14.9
OB□	20.0	25.0	20.0	15.0	25.0	15.0	25.0	30.0	30.0	25.0	15.0	20.0	25.0	20.0	0.0	20.7
Total Fat (%)																
N <sup>+</sup>	16.7	18.3	28.3	51.7	33.3	18.3	38.3	41.7	56.7	35.0	30.0	35.0	41.7	40.0	6.7	32.8
OV°	28.0	24.0	28.0	52.0	24.0	16.0	40.0	44.0	40.0	36.0	28.0	32.0	32.0	24.0	4.0	30.1
OB□	15.0	15.0	10.0	50.0	50.0	30.0	25.0	35.0	45.0	40.0	30.0	40.0	30.0	25.0	0.0	29.3
Saturated Fat (%)																
N <sup>+</sup>	6.7	5.0	6.7	31.7	28.3	8.3	26.7	28.3	38.3	21.7	25.0	21.7	48.3	31.7	3.3	22.1
OV°	20.0	20.0	16.0	28.0	20.0	8.0	32.0	32.0	40.0	32.0	20.0	12.0	32.0	12.0	0.0	21.6
OB□	5.0	5.0	10.0	25.0	15.0	0.0	5.0	10.0	20.0	5.0	10.0	0.0	30.0	10.0	0.0	10.0
Trans Fat (%)																
N <sup>+</sup>	6.7	6.7	10.0	21.7	13.3	6.7	23.3	23.3	36.7	23.3	21.7	20.0	48.3	23.3	3.3	19.2
OV°	20.0	16.0	12.0	28.0	12.0	8.0	28.0	32.0	36.0	24.0	16.0	12.0	36.0	12.0	0.0	19.5
OB□	5.0	5.0	10.0	10.0	5.0	0.0	0.0	5.0	20.0	5.0	0.0	0.0	10.0	10.0	0.0	5.7
Cholesterol (%)																
N <sup>+</sup>	8.3	10.0	15.0	15.0	16.7	10.0	18.3	15.0	20.0	20.0	16.7	15.0	20.0	16.7	5.0	14.8
OV°	16.0	12.0	12.0	20.0	12.0	8.0	12.0	20.0	8.0	20.0	12.0	12.0	20.0	4.0	0.0	12.5
OB□	15.0	10.0	5.0	5.0	10.0	10.0	10.0	15.0	25.0	5.0	15.0	15.0	20.0	10.0	5.0	11.7
Sodium (%)																
N <sup>+</sup>	23.3	46.7	26.7	20.0	18.3	36.7	33.3	23.3	61.7	43.3	43.3	63.3	23.3	45.0	23.3	35.4
OV°	20.0	52.0	28.0	20.0	20.0	24.0	32.0	8.0	44.0	32.0	28.0	48.0	20.0	24.0	4.0	26.9
OB□	15.0	30.0	20.0	15.0	10.0	25.0	20.0	10.0	25.0	50.0	40.0	45.0	15.0	15.0	5.0	22.7
Total Carbohydrates (%)																
N <sup>+</sup>	16.7	10.0	28.3	13.3	8.3	8.3	10.0	15.0	16.7	13.3	11.7	11.7	5.0	11.7	10.0	12.7
OV°	16.0	12.0	24.0	12.0	12.0	12.0	12.0	16.0	8.0	16.0	12.0	16.0	8.0	4.0	12.0	12.8
OB□	35.0	30.0	55.0	30.0	30.0	20.0	30.0	40.0	50.0	35.0	30.0	35.0	10.0	40.0	30.0	33.3
Dietary Fiber (%)																
N <sup>+</sup>	30.0	30.0	51.7	11.7	8.3	31.7	21.7	10.0	25.0	21.7	21.7	15.0	5.0	6.7	5.0	19.7
OV°	24.0	16.0	48.0	20.0	12.0	24.0	24.0	16.0	16.0	20.0	12.0	16.0	8.0	8.0	0.0	17.6
OB□	20.0	20.0	35.0	20.0	15.0	15.0	10.0	10.0	25.0	20.0	10.0	10.0	5.0	15.0	5.0	15.7
Sugars (%)																
N <sup>+</sup>	56.7	21.7	30.0	26.7	3.3	10.0	20.0	48.3	36.7	15.0	11.7	25.0	5.0	40.0	58.3	27.2
OV°	52.0	12.0	32.0	24.0	8.0	20.0	28.0	36.0	24.0	16.0	16.0	24.0	16.0	28.0	36.0	24.8
OB□	30.0	25.0	35.0	40.0	15.0	25.0	40.0	40.0	40.0	30.0	20.0	30.0	5.0	30.0	40.0	29.7
Protein (%)																
N <sup>+</sup>	6.7	13.3	20.0	38.3	36.7	31.7	38.3	8.3	20.0	28.3	16.7	15.0	5.0	6.7	3.3	19.2
OV°	8.0	12.0	32.0	32.0	32.0	24.0	32.0	16.0	16.0	24.0	12.0	20.0	12.0	4.0	0.0	18.4
OB□	5.0	10.0	5.0	25.0	20.0	15.0	25.0	0.0	20.0	20.0	15.0	25.0	0.0	10.0	0.0	13.0
Vitamins and Minerals (%)																
N <sup>+</sup>	16.7	20.0	15.0	21.7	13.3	13.3	6.7	5.0	11.7	3.3	5.0	11.7	1.7	6.7	5.0	10.4
OV°	24.0	24.0	24.0	24.0	12.0	16.0	16.0	8.0	12.0	8.0	8.0	12.0	4.0	8.0	4.0	13.6
OB□	15.0	10.0	15.0	15.0	15.0	15.0	15.0	10.0	15.0	5.0	15.0	15.0	5.0	5.0	0.0	11.3
Footnote (%)																
N <sup>+</sup>	0.0	0.0	0.0	1.7	1.7	0.0	0.0	1.7	1.7	0.0	3.3	0.0	0.0	0.0	0.0	0.0
OV°	8.0	4.0	0.0	8.0	8.0	8.0	8.0	4.0	8.0	4.0	4.0	4.0	8.0	4.0	0.0	8.0
OB□	0.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	0.0
Ingredients List (%)																
N <sup>+</sup>	28.3	31.7	28.3	23.3	18.3	26.7	31.7	30.0	31.7	21.7	25.0	31.7	30.0	30.0	21.7	27.3
OV°	20.0	24.0	28.0	20.0	20.0	24.0	24.0	24.0	20.0	16.0	16.0	24.0	20.0	20.0	20.0	21.3
OB□	10.0	25.0	15.0	10.0	30.0	15.0	25.0	20.0	20.0	20.0	15.0	15.0	15.0	10.0	10.0	17.0
Daily Value (%)																
N <sup>+</sup>	10.0	6.7	11.7	15.0	6.7	11.7	6.7	5.0	11.7	10.0	8.3	11.7	3.3	8.3	3.3	8.7
OV°	4.0	4.0	12.0	12.0	8.0	8.0	8.0	8.0	12.0	4.0	4.0	8.0	8.0	8.0	4.0	7.5
OB□	5.0	5.0	5.0	0.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	5.0	5.0	4.3

N<sup>+</sup>= Normal weight (BMI 18-24) (n=60)

OV=Overweight (BMI 25-30) (n=25)  
 OB=Obese (BMI >30) (n=20)

Use of Components by Food Category per Diagnosis of Chronic Health Condition

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use
<b>Serving Size (%)</b>																
ED*	40.5	37.8	51.4	40.5	32.4	35.1	40.5	45.9	62.2	51.4	40.5	51.4	32.4	35.1	27.0	41.6
NED <sup>^</sup>	31.9	31.9	38.9	41.7	38.9	37.5	41.7	51.4	55.6	33.3	34.7	48.6	26.4	33.3	34.7	38.7
CD <sup>^</sup>	40.0	37.1	51.4	40.0	31.4	34.3	42.9	45.7	62.9	51.4	42.9	51.4	34.3	34.3	25.7	41.7
NCD <sup>o</sup>	30.3	31.6	36.8	40.8	38.2	35.5	39.5	51.3	55.3	34.2	34.2	47.4	25.0	32.9	35.5	37.9
<b>Servings Per Container (%)</b>																
ED*	35.1	32.4	48.6	35.1	35.1	24.3	32.4	32.4	45.9	40.5	43.2	35.1	21.6	24.3	27.0	34.2
NED <sup>^</sup>	23.6	27.8	30.6	29.2	25.0	26.4	36.1	29.2	43.1	25.0	26.4	37.5	13.9	18.1	27.8	28.0
CD <sup>^</sup>	34.3	31.4	45.7	34.3	34.3	25.7	34.3	34.3	48.6	40.0	42.9	34.3	22.9	22.9	28.6	34.3
NCD <sup>o</sup>	22.4	26.3	30.3	27.6	25.0	23.7	32.9	27.6	42.1	26.3	25.0	35.5	13.2	18.4	26.3	26.8
<b>Calories (%)</b>																
ED*	43.2	32.4	48.6	51.4	37.8	27.0	48.6	62.2	64.9	54.1	43.2	45.9	35.1	43.2	45.9	45.6
NED <sup>^</sup>	50.0	41.7	61.1	62.5	31.9	33.3	51.4	61.1	69.4	44.4	37.5	48.6	34.7	41.7	56.9	48.4
CD <sup>^</sup>	42.9	31.4	45.7	51.4	37.1	28.6	51.4	62.9	65.7	57.1	45.7	45.7	31.4	45.7	45.7	45.9
NCD <sup>o</sup>	50.0	42.1	60.5	63.2	32.9	32.9	50.0	60.5	69.7	44.7	35.5	50.0	38.2	39.5	59.2	48.6
<b>Calories from Fat (%)</b>																
ED*	16.2	16.2	16.2	18.9	18.9	10.8	18.9	35.1	32.4	18.9	21.6	18.9	18.9	21.6	2.7	19.1
NED <sup>^</sup>	16.7	11.1	12.5	26.4	16.7	11.1	22.2	26.4	31.9	22.2	16.7	16.7	20.8	16.7	6.9	18.3
CD <sup>^</sup>	14.3	14.3	14.3	17.1	14.3	11.4	20.0	34.3	31.4	20.0	22.9	17.1	14.3	22.9	2.9	18.1
NCD <sup>o</sup>	17.1	11.8	13.2	27.6	18.4	10.5	25.0	28.9	34.2	22.4	14.5	18.4	25.0	17.1	6.6	19.4
<b>Total Fat (%)</b>																
ED*	18.9	21.6	24.3	54.1	35.1	24.3	43.2	43.2	48.6	45.9	35.1	32.4	37.8	35.1	2.7	33.5
NED <sup>^</sup>	18.1	16.7	22.2	47.2	33.3	16.7	29.2	37.5	50.0	29.2	25.0	34.7	34.7	30.6	5.6	28.7
CD <sup>^</sup>	20.0	22.9	25.7	54.3	31.4	25.7	45.7	40.0	45.7	45.7	37.1	31.4	37.1	34.3	2.9	33.3
NCD <sup>o</sup>	17.1	15.8	22.4	48.7	35.5	17.1	28.9	39.5	51.3	30.3	23.7	36.8	36.8	31.6	5.3	29.4
<b>Saturated Fat (%)</b>																
ED*	13.5	10.8	16.2	32.4	27.0	10.8	21.6	27.0	35.1	24.3	21.6	13.5	45.9	27.0	2.7	22.0
NED <sup>^</sup>	9.7	9.7	5.6	25.0	22.2	5.6	23.6	22.2	34.7	19.4	19.4	13.9	37.5	18.1	1.4	17.9
CD <sup>^</sup>	14.3	11.4	14.3	31.4	28.6	11.4	22.9	25.7	34.3	25.7	22.9	14.3	42.9	28.6	2.9	22.1
NCD <sup>o</sup>	9.2	9.2	6.6	27.6	21.1	5.3	23.7	23.7	34.2	18.4	18.4	14.5	39.5	18.4	1.3	18.1
<b>Trans Fat (%)</b>																
ED*	13.5	10.8	16.2	18.9	10.8	10.8	21.6	21.6	35.1	21.6	16.2	10.8	43.2	18.9	2.7	18.2
NED <sup>^</sup>	9.7	8.3	6.9	20.8	12.5	4.2	20.8	20.8	31.9	19.4	15.3	13.9	36.1	15.3	2.8	15.9
CD <sup>^</sup>	14.3	11.4	14.3	17.1	11.4	11.4	22.9	20.0	37.1	22.9	17.1	11.4	40.0	20.0	2.9	18.3
NCD <sup>o</sup>	9.2	7.9	7.9	22.4	11.8	3.9	19.7	22.4	30.3	18.4	14.5	14.5	38.2	15.8	2.6	16.0
<b>Cholesterol (%)</b>																
ED*	16.2	13.5	18.9	16.2	8.1	5.4	13.5	16.2	13.5	21.6	16.2	10.8	21.6	13.5	5.4	14.1
NED <sup>^</sup>	9.7	9.7	8.3	13.9	15.3	11.1	16.7	15.3	19.4	13.9	13.9	15.3	19.4	9.7	2.8	13.0
CD <sup>^</sup>	17.1	14.3	20.0	17.1	8.6	5.7	14.3	17.1	11.4	22.9	17.1	11.4	22.9	14.3	5.7	14.7
NCD <sup>o</sup>	9.2	9.2	7.9	13.2	15.8	10.5	15.8	14.5	19.7	13.2	13.2	14.5	18.4	10.5	2.6	12.5
<b>Sodium (%)</b>																
ED*	18.9	48.6	32.4	21.6	13.5	40.5	37.8	18.9	48.6	56.8	48.6	54.1	21.6	35.1	10.8	33.9
NED <sup>^</sup>	23.6	43.1	20.8	16.7	19.4	23.6	25.0	16.7	48.6	33.3	31.9	54.2	22.2	34.7	16.7	28.7
CD <sup>^</sup>	20.0	51.4	34.3	22.9	14.3	42.9	40.0	20.0	51.4	57.1	48.6	54.3	22.9	37.1	11.4	35.2
NCD <sup>o</sup>	22.4	42.1	19.7	15.8	18.4	23.7	22.4	15.8	46.1	32.9	30.3	53.9	21.1	31.6	15.8	27.5
<b>Total Carbohydrates (%)</b>																
ED*	27.0	24.3	40.5	27.0	24.3	18.9	21.6	32.4	32.4	29.7	24.3	27.0	13.5	24.3	24.3	26.1
NED <sup>^</sup>	15.3	11.1	27.8	11.1	8.3	8.3	11.1	13.9	13.9	12.5	9.7	12.5	4.2	11.1	8.3	11.9
CD <sup>^</sup>	28.6	25.7	42.9	28.6	25.7	20.0	22.9	34.3	31.4	28.6	25.7	28.6	14.3	25.7	25.7	27.2
NCD <sup>o</sup>	14.5	10.5	27.6	10.5	7.9	7.9	10.5	13.2	15.8	13.2	9.2	11.8	3.9	10.5	7.9	11.7
<b>Dietary Fiber (%)</b>																
ED*	24.3	27.0	59.5	18.9	10.8	24.3	18.9	16.2	18.9	27.0	32.4	10.8	10.8	13.5	5.4	21.3
NED <sup>^</sup>	26.4	22.2	37.5	12.5	9.7	25.0	19.4	8.3	22.2	18.1	9.7	15.3	2.8	5.6	2.8	15.8
CD <sup>^</sup>	25.7	25.7	62.9	20.0	11.4	25.7	20.0	17.1	20.0	28.6	34.3	11.4	11.4	11.4	5.7	22.1
NCD <sup>o</sup>	25.0	23.7	38.2	11.8	9.2	25.0	19.7	7.9	22.4	17.1	9.2	14.5	2.6	6.6	2.6	15.7
<b>Sugars (%)</b>																



ED*	56.8	27.0	37.8	37.8	13.5	16.2	35.1	43.2	35.1	27.0	21.6	32.4	16.2	45.9	48.6	33.0
NED <sup>^</sup>	48.6	16.7	29.2	25.0	2.8	15.3	22.2	43.1	30.6	13.9	9.7	20.8	2.8	27.8	47.2	23.7
CD <sup>^</sup>	57.1	25.7	40.0	37.1	14.3	17.1	37.1	45.7	37.1	28.6	22.9	34.3	17.1	45.7	48.6	33.9
NCD <sup>o</sup>	48.7	17.1	27.6	25.0	2.6	14.5	21.1	42.1	30.3	13.2	9.2	21.1	2.6	28.9	48.7	23.5
<b>Protein (%)</b>																
ED*	8.1	10.8	13.5	18.9	21.6	13.5	29.7	5.4	10.8	21.6	16.2	13.5	5.4	5.4	0.0	13.0
NED <sup>^</sup>	6.9	13.9	22.2	40.3	38.9	31.9	37.5	9.7	22.2	26.4	13.9	19.4	5.6	6.9	2.8	19.9
CD <sup>^</sup>	8.6	8.6	14.3	17.1	20.0	11.4	28.6	5.7	11.4	22.9	14.3	11.4	5.7	5.7	0.0	12.4
NCD <sup>o</sup>	6.6	14.5	21.1	39.5	38.2	32.9	36.8	9.2	21.1	25.0	14.5	19.7	5.3	6.6	2.6	19.6
<b>Vitamins and Minerals (%)</b>																
ED*	16.2	10.8	13.5	16.2	13.5	10.8	10.8	8.1	10.8	8.1	10.8	10.8	5.4	5.4	0.0	10.1
NED <sup>^</sup>	22.2	23.6	18.1	19.4	13.9	13.9	9.7	4.2	9.7	2.8	5.6	9.7	1.4	5.6	6.9	11.1
CD <sup>^</sup>	14.3	8.6	11.4	14.3	11.4	11.4	11.4	8.6	11.4	8.6	8.6	11.4	5.7	5.7	0.0	9.5
NCD <sup>o</sup>	22.4	25.0	19.7	22.4	14.5	13.2	9.2	5.3	11.8	2.6	6.6	11.8	1.3	6.6	6.6	11.9
<b>Footnote (%)</b>																
ED*	2.7	5.4	2.7	5.4	5.4	5.4	5.4	5.4	5.4	5.4	8.1	5.4	8.1	5.4	2.7	5.2
NED <sup>^</sup>	1.4	0.0	0.0	2.8	2.8	1.4	1.4	1.4	2.8	0.0	1.4	0.0	1.4	0.0	0.0	1.1
CD <sup>^</sup>	2.9	5.7	2.9	5.7	5.7	5.7	5.7	5.7	5.7	5.7	8.6	5.7	8.6	5.7	2.9	5.5
NCD <sup>o</sup>	1.3	0.0	0.0	2.6	2.6	1.3	1.3	1.3	2.6	0.0	1.3	0.0	1.3	0.0	0.0	1.1
<b>Ingredients List (%)</b>																
ED*	29.7	37.8	43.2	27.0	37.8	29.7	35.1	32.4	35.1	32.4	37.8	37.8	35.1	37.8	18.9	33.9
NED <sup>^</sup>	19.4	25.0	19.4	18.1	16.7	22.2	25.0	23.6	22.2	15.3	13.9	20.8	19.4	16.7	19.4	19.8
CD <sup>^</sup>	28.6	37.1	42.9	28.6	40.0	31.4	37.1	34.3	37.1	34.3	37.1	40.0	37.1	40.0	20.0	35.0
NCD <sup>o</sup>	19.7	25.0	21.1	18.4	15.8	21.1	25.0	23.7	21.1	14.5	13.2	19.7	19.7	15.8	19.7	19.6
<b>Daily Value (%)</b>																
ED*	10.8	10.8	8.1	8.1	8.1	10.8	8.1	8.1	10.8	10.8	10.8	10.8	5.4	8.1	5.4	9.0
NED <sup>^</sup>	5.6	4.2	9.7	9.7	4.2	5.6	5.6	2.8	8.3	5.6	4.2	6.9	2.8	5.6	2.8	5.6
CD <sup>^</sup>	8.6	11.4	8.6	8.6	8.6	11.4	8.6	8.6	11.4	11.4	11.4	11.4	5.7	8.6	5.7	9.3
NCD <sup>o</sup>	6.6	3.9	10.5	11.8	5.3	7.9	5.3	3.9	9.2	5.3	3.9	7.9	2.6	6.6	2.6	6.2

ED\*=Has Ever Been Diagnosed (n=37)

NED<sup>^</sup>=Not Ever Diagnosed (n=72)

CD<sup>^</sup>=Currently Diagnosed (n=35)

NCD<sup>o</sup>=Not Currently Diagnosed (n=76)

Use of Components by Food Category among Primary Shoppers

	Fruit	Vegetables	Grains	Dairy	Protein	Beans	Nuts	Desserts	Snacks	Frozen Meals	Boxed Meals	Canned / Jarred Foods	Fats / Oils	Condiments	Beverages	Average Use
<b>Serving Size (%)</b>																
S*	35.3	34.1	45.9	42.4	38.8	35.3	42.4	55.3	61.2	41.2	38.8	50.6	28.2	32.9	35.3	41.2
NS <sup>^</sup>	29.6	29.6	29.6	33.3	25.9	37.0	33.3	29.6	48.1	33.3	29.6	44.4	25.9	33.3	22.2	32.3
<b>Servings Per Container (%)</b>																
S*	28.2	29.4	36.5	30.6	29.4	24.7	35.3	31.8	45.9	31.8	31.8	37.6	17.6	20.0	24.7	30.4
NS <sup>^</sup>	22.2	25.9	33.3	29.6	22.2	25.9	29.6	22.2	40.7	25.9	29.6	29.6	11.1	18.5	33.3	26.7
<b>Calories (%)</b>																
S*	52.9	45.9	58.8	62.4	38.8	36.5	55.3	58.8	72.9	49.4	40.0	51.8	42.4	44.7	55.3	51.1
NS <sup>^</sup>	33.3	14.8	48.1	48.1	18.5	14.8	37.0	66.7	55.6	44.4	37.0	40.7	14.8	33.3	51.9	37.3
<b>Calories from Fat (%)</b>																
S*	18.8	15.3	15.3	27.1	20.0	12.9	27.1	31.8	35.3	23.5	20.0	22.4	22.4	22.4	3.5	21.2
NS <sup>^</sup>	7.4	3.7	7.4	14.8	7.4	3.7	11.1	25.9	29.6	14.8	11.1	3.7	18.5	7.4	11.1	11.9
<b>Total Fat (%)</b>																
S*	18.8	18.8	23.5	50.6	35.3	20.0	32.9	37.6	49.4	34.1	28.2	37.6	37.6	32.9	3.5	30.7
NS <sup>^</sup>	14.8	14.8	22.2	48.1	29.6	18.5	40.7	44.4	51.9	37.0	25.9	25.9	33.3	29.6	7.4	29.6
<b>Saturated Fat (%)</b>																
S*	12.9	12.9	10.6	30.6	27.1	9.4	25.9	23.5	36.5	21.2	20.0	16.5	42.4	22.4	1.2	20.9
NS <sup>^</sup>	3.7	0.0	3.7	22.2	11.1	0.0	14.8	25.9	29.6	18.5	18.5	7.4	33.3	18.5	3.7	14.1
<b>Trans Fat (%)</b>																
S*	11.8	10.6	10.6	22.4	14.1	7.1	23.5	20.0	34.1	20.0	16.5	14.1	40.0	16.5	2.4	17.6
NS <sup>^</sup>	7.4	3.7	7.4	14.8	3.7	3.7	11.1	25.9	29.6	18.5	11.1	11.1	33.3	18.5	3.7	13.6
<b>Cholesterol (%)</b>																
S*	9.4	7.1	10.6	15.3	11.8	7.1	15.3	12.9	16.5	16.5	14.1	12.9	18.8	11.8	1.2	12.1







<b>S°</b>	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.2
<b>R<sup>+</sup></b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>N□</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Ingredients List (%)</b>																
<b>A*</b>	42.9	50.0	50.0	42.9	50.0	57.1	50.0	35.7	35.7	21.4	28.6	42.9	57.1	50.0	28.6	42.9
<b>M<sup>+</sup></b>	24.1	34.5	41.4	31.0	20.7	31.0	37.9	20.7	31.0	27.6	24.1	34.5	31.0	24.1	27.6	29.4
<b>S°</b>	23.2	28.6	21.4	14.3	21.4	17.9	23.2	32.1	26.8	19.6	21.4	23.2	17.9	21.4	16.1	21.9
<b>R<sup>+</sup></b>	0.0	0.0	0.0	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	7.3
<b>N□</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Daily Value (%)</b>																
<b>A*</b>	7.1	21.4	14.3	21.4	14.3	14.3	21.4	7.1	14.3	7.1	7.1	14.3	14.3	21.4	0.0	13.3
<b>M<sup>+</sup></b>	13.8	10.3	20.7	20.7	17.2	20.7	10.3	13.8	17.2	13.8	13.8	17.2	6.9	13.8	6.9	14.5
<b>S°</b>	5.4	1.8	3.6	5.4	0.0	3.6	1.8	1.8	7.1	5.4	3.6	5.4	0.0	1.8	3.6	3.3
<b>R<sup>+</sup></b>	0.0	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
<b>N□</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

A\*=Always Use Label (n=14)

M<sup>+</sup>=Most of the Time Use Label (n=29)

S°=Sometimes Use Label (n=56)

R<sup>+</sup>=Rarely Use Label (n=11)

N□=Never Use Label (n=2)