A "default option" while online grocery shopping to enhance nutrition within a food insecure population

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A “DEFAULT OPTION” WHILE ONLINE GROCERY SHOPPING TO ENHANCE NUTRITION WITHIN A FOOD INSECURE POPULATION

By

Jaime A. Coffino

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Abstract

There is a need for sustainable interventions that improve diet-related health within the food insecure community. We examined if use of a “default” prefilled online grocery shopping cart, compared to nutrition education, would result in the purchase of healthier food items. Fifty participants ($M$ age = 46.4 ± 12.46 years; $M$ body mass index = 28.59 ± 6.48 kg/m$^2$; 74.0% male) were randomized to: (1) read a brochure containing nutrition information ($n = 23$) or (2) be presented with a “default” prefilled online shopping cart containing groceries that meet nutritional guidelines to which they could freely make changes before completing their grocery purchase ($n = 27$). Compared to education, the default condition resulted in a significant increase in the purchases of servings of whole grain ($p < .001, \eta_p^2 = .38$), fruit ($p < .001, \eta_p^2 = .37$) and vegetables ($p < .001, \eta_p^2 = .25$), daily fiber ($p < .001, \eta_p^2 = .23$), and a decrease in average daily calories ($p < .001, \eta_p^2 = .25$), daily grams of fat ($p < .001, \eta_p^2 = .48$), saturated fat ($p < .001, \eta_p^2 = .47$), and daily sodium ($p < .001, \eta_p^2 = .26$) and cholesterol content ($p < .001, \eta_p^2 = .29$). This study suggests that a default approach may help improve food choice behaviors in food insecure individuals with significant financial constraints. The default intervention is a non-monetary nudge towards healthy and economical food choices that is sustainable and broadly scalable via online platforms.

Keywords: obesity, default option, choice architecture, food insecurity
Introduction

Obesity is a public health crisis in the United States, with recent prevalence rate estimates as high as 36.5% in adults and 17.0% in youth (Ogden, Carroll, Fryar, & Flegal, 2015). Obesity is associated with an increased risk of negative health outcomes, such as type 2 diabetes mellitus, hypertension, coronary artery disease, cancer, and liver disease (Kopelman, 2007; Hu, 2003). With these health risks, medical care costs related to obesity in the United States have reached an estimated $315.8 billion annually (2010 values; Cawley, Meyerhoefer, Biener, Hammer, & Wintfeld, 2015). In light of high obesity rates and extensive medical costs, public health researchers, policy makers, and healthcare professionals must join forces to combat this multifaceted health problem.

Food insecurity (i.e., reduced quality, variety, or desirability of diet; Ratcliffe & McKernan, 2011; Franklin et al., 2012) affects 15.6 million households and 41.2 million individuals within the United States (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2017). Low-income populations are often victims of the “hunger-obesity paradox” as they suffer from high rates of food insecurity and an elevated risk of obesity and associated adverse health outcomes (Dietz, 1995). Food insecure individuals commonly lack resources to obtain nutritious food and resort to high calorie, palatable foods (Dhurandhar, 2016). These high calorie and palatable foods are generally more convenient and less expensive to purchase.

In many instances, people with low income do not have access to reliable transportation, which limits their access to food outlets that provide healthier options (Cotterill & Franklin, 1995). Specifically, there is often a lack of physical access to grocery stores in low-income communities, resulting in reliance on fast-food restaurants or small corner stores that typically do not provide fresh produce (Walker, Keane, & Burke, 2010). One study found that the proximity
to a supermarket increases fruit and vegetable consumption and results in better diet quality among low-income households (Rose & Richards, 2004). Additionally, the presence of supermarkets is associated with a lower prevalence of obesity and overweight (Morland, Roux, & Wing, 2006).

Individuals with food insecurity can apply for assistance through the United States Department of Agriculture (USDA) Supplemental Nutrition Assistance Program (SNAP) if their gross income is ≤130% of the federal poverty level. SNAP aims to provide participants with access to affordable and nutritious food; however, experts describe barriers, such as the cost of nutritious foods and the limited amount of SNAP benefits, to accessing healthy food among this population (Leung et al., 2013). Specifically, women participating in SNAP are the most vulnerable to weight gain while participating in the program (Townsend, Peerson, Love, Achterberg, & Murphy, 2001; Gibson, 2006; Chen, Yen, & Eastwood, 2005).

The SNAP program implemented SNAP education (SNAP-Ed) to promote diet-related health and educate participants about nutrition and grocery shopping on a restrictive budget. The limited research on SNAP-Ed tends to show positive short- and medium-term effects with the acquisition of new knowledge, but it is unknown whether this knowledge is maintained in the long-term (Koszewski, Sehi, Behrends, & Tuttle, 2011). One study found that SNAP produces medium-term positive behavior change; however, many of the questions used to assess behavior change in this study were not directly related to diet-related health or nutrition knowledge (e.g. “how often do you use community food resources like a food pantry or soup kitchen?”; “how often do you compare prices before you buy food?”) (Koszewski et al., 2011). Furthermore, studies assessing SNAP-Ed’s impact on behavior change typically do not objectively measure
behavior change, but instead rely on self-report questionnaire data, which is subject to substantial bias (Koszewski et al., 2011; Wardlaw & Baker, 2012).

As an alternative to SNAP-Ed, SNAP has implemented the Healthy Incentives Pilot with the goal of increasing fruit and vegetable consumption among participants (Olsho, Klerman, Wilde, & Bartlett, 2016). One study found that a 30% price reduction increases consumption of fruits and vegetables by approximately 20% among SNAP participants (Klerman, Bartlett, Wilde, & Olsho, 2014). However, with the large number of participants enrolled in the SNAP program, incentives would cost the government a plethora of money, rendering this approach unsustainable as a widely used intervention. Experts also suggest restricting the purchase of unhealthy food and sugar-sweetened beverages with SNAP benefits (Leung et al., 2013); however, this tactic stigmatizes a group that may already feel marginalized as a result of their socioeconomic status. Therefore, with these limitations new interventions should be considered to increase diet-related health in SNAP participants.

The default option is a strategy used in behavioral economics research to improve decision-making and encourage health-promoting behaviors (Thaler & Sunstein, 1975). The default option is often described as preserving an individual’s choice to make decisions while nudging or steering them in a positive direction (Thaler & Sunstein, 1975). The default option has been used effectively to influence peoples’ decisions regarding vaccinations, retirement plans, and organ donation (Chapman, Li, Colby, & Yoon, 2010; Madrian & Shea, 2001; Johnson & Goldstein, 2003).

The default option is increasingly becoming a more common intervention approach to promote healthy decision-making and has recently been researched in the context of food. For example, the availability of a default lunch option was previously shown to increase the
likelihood that participants chose a low-calorie healthy sandwich (Downs, Loewenstein, & Wisdom, 2009). One study found that 47.9% and 66.3% of restaurant-goers chose healthy sides and beverages, respectively, when that was their default option, which ultimately reduced calories, fat, and sodium content for children’s meal sides and beverages (Peters et. al, 2016). Food purchased for preparation and consumption at home continues to impact healthy food consumption (Befort et al., 2006) – thus there is a need to examine efficacy of the default option beyond a single meal and specifically in the context of grocery purchases.

A prior proof-of-principle study by Coffino and Hormes (invited revision) provided initial evidence that the use of a “default” prefilled online grocery shopping cart effectively enhanced food choice behaviors within the financial constraints of SNAP. In this study, undergraduate students were told to select “nutritious, affordable, and tasty groceries for a week” online with a budget of $48.50 (i.e., maximum weekly SNAP benefits for a single adult in New York). After completing a baseline grocery shopping task, they were then randomized to (1) receive a nutrition education brochure adapted from SNAP materials, (2) be presented with a prefilled “default” online grocery cart in which they were free to make changes, or (3) receive a $10 incentive if they selected groceries that met basic macro- and micronutrients (Coffino & Hormes, invited revision). The “default” cart, compared to the education condition, resulted in a significant increase in budget allocated towards fruits, and a decrease in average daily calories, saturated fat, and sodium content of foods selected. This was the first study to test whether a default option can increase the selection of healthful groceries while online grocery shopping. With the increasing availability of grocery shopping via online platforms, this intervention approach has the potential to be broadly disseminable.
The aim of this present study was to compare the effects of nutrition education based on current SNAP-Ed programming and a default option on the nutritional quality of online food purchases in a food insecure population within the financial constraints of typical SNAP benefits. It was hypothesized that the availability of an online prefilled “default” grocery shopping cart, compared to receiving nutrition education, would result in significantly healthier food purchases.

**Methods**

The local Institutional Review Board reviewed and approved all methods used in the present study. Participants were informed of the nature and purpose of the research, consented prior to completion of questionnaires and the experimental task, and were debriefed at the completion of the experiment.

**Participants**

Participants (n = 50; see Table 1 for demographics) were recruited from three food pantries in an urban area in upstate New York. Inclusion criteria were as follows: (1) single-person household, (2) age 18 or older, (3) fluent in written and spoken English, (4) able to provide informed consent, (5) none of the following dietary restrictions: vegetarian/vegan, gluten-free, lactose intolerance, or egg allergy, (6) no current or past eating disorder diagnosis, (7) relying on aid from a local food pantry, and (8) not currently receiving SNAP benefits. Inclusion criteria were designed to minimize between-subject variability in factors that could influence food purchases in the experimental task.

Upon arrival to the food pantry, participants were asked if they were interested in participating in a research study involving food-decision making while online grocery shopping. Interested and eligible participants were then consented and asked to complete a baseline survey on a tablet via the secure online server SurveyMonkey. Baseline measures captured information
about participants’ demographics, eating behaviors, dietary preferences, existing nutrition knowledge, grocery shopping frequency, budgeting, and meal planning as well as questions assessing their mental health. To assess for factors that could potentially influence behavior in the experimental task, participants completed the Depression Anxiety Stress Scales (DASS-21; Henry & Crawford, 2005), quantifying depressed (Cronbach’s $\alpha = .94$), anxious ($\alpha = .86$), and stressed mood states ($\alpha = .82$); the Barratt Impulsiveness Scale (BIS-11; Spinella, 2007), measuring attentional ($\alpha = .72$), motor ($\alpha = .73$), and non-planning impulsivity ($\alpha = .67$); and the Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982), measuring binge eating severity ($\alpha = .89$). They also completed the Dutch Eating Behavior Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986), a measure of emotional ($\alpha = .96$), external ($\alpha = .83$), and restrained eating styles ($\alpha = .90$); the Power of Food Scale (PFS; Lowe et. al, 2009), a measure of responsiveness to the food environment with a specific focus on the availability ($\alpha = .81$), presence ($\alpha = .89$), and taste ($\alpha = .84$) of food; the SCOFF (Morgan, Reid, & Lacey, 1999), a screening measure for eating disorders ($\alpha = .34$); the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982), a measure to identify abnormal eating behaviors ($\alpha = .83$); and the Food Neophobia Scale (FNS; Pliner & Hobden, 1992), an assessment of the willingness to try novel foods ($\alpha = .81$). The survey also included the U.S. Household Food Security Survey (National Center for Health Statistics, 2008), a measure to assess low food security within the United States ($\alpha = .37$); the Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995), a measure to assess the ability to alternate between thoughts and actions ($\alpha = .71$), and the Newest Vital Sign (Weiss et. al, 2005), a measure of nutrition literacy ($\alpha = .73$).

**Grocery Shopping Task**

After completing the baseline survey, participants were randomized to one of two groups:
(Group 1) Education: Participants \( n = 23 \) were instructed to read a brief nutrition educational brochure (see Table 2 for examples) adapted from materials from SNAP’s Education and Outreach program or (Group 2) Default option: Participants \( n = 27 \) were presented with a prefilled online grocery shopping cart containing a variety of groceries that meet nutritional requirements based on gender and age and told that they are free to delete, add, exchange, or keep all items in their cart prior to finalizing their purchase. Participants were randomized with an equal probability of allocation to the education or default condition via a computer-generated randomization table.

Participants were instructed to purchase approximately $48.50 in “nutritious, affordable, and tasty foods” for the week using a local grocery store’s online shopping site. This budget was predetermined to be equivalent of 25% of the maximum monthly allowance for a single participant in SNAP in New York State. They were further given instructions to (1) spend within $5 dollars of $48.50, and (2) exclude any non-food or drink items (e.g. toilet paper, toothbrushes). Upon completion of grocery shopping, a research assistant saved the content of the online grocery shopping cart for analysis.

**Thrifty Food Plan Calculator**

The Thrifty Food Plan Calculator (TFPC) is a nutritional tool that allows users to enter the cost of food items purchased and place these items into categories (e.g. whole grain pasta and rice; low cost poultry). This tool provides comprehensive information on the caloric and macro- and micronutrient content of the foods purchased based on participant gender and age. The TFPC utilizes USDA nutrition and consumption data and was created by the Tufts University Gerald J. and Dorothy Friedman School of Nutrition Science and Policy. The TFPC was used in this study to calculate the nutritional outcomes of groceries purchased by participants. Analyses
presented here focused on examining group-differences in indicators of nutritional quality of foods purchased that are linked to diet- and weight-related health outcomes such as whole grain servings, fruit and vegetable servings, average daily calories, fat, saturated fat, fiber, and cholesterol and sodium content. We chose not to focus on other nutritional outcomes generated by the TFPC that are not as directly related to diet- and weight-related health, such as milk servings, meat and beans servings, carbohydrates, protein, calcium, folate, vitamin A, vitamin C, vitamin B6, vitamin B12, potassium, iron, and added sugars.

**Statistical Analyses**

Statistical analyses were conducted using SPSS version 25. Effect sizes in the proof-of-principle study ranged from small to large, with most in the medium to large range (Coffino & Hormes, invited revision). A priori power analyses, calculated using G*Power, indicated minimum sample sizes of 102 and 42 for adequate power (.80) to detect medium and large effect sizes in a one-tailed independent samples t-test (Faul, Erdfelder, Buchner, & Lang, 2009). Given that only 50 participants were recruited in the present study, there are some concerns about statistical power, and findings should be interpreted with some caution. However, it is important to note that this study was designed as a feasibility study rather than with the aim of being a fully-powered randomized control trial.

Participant responses from the baseline questionnaire and data from the experimental task were merged into a single database for analysis. If participants selected items that could not fit into any categories on the TFPC [e.g., spices (n = 1)] those items were not entered into the TFPC.

Normality of the dependent variables was assessed using ± 2 as a cutoff for skewness and kurtosis (George & Mallery, 2003). In the education condition, skewness was ± 2 for all nutrition
outcomes besides whole grain servings (2.28). Kurtosis values were ± 2 for all nutrition outcomes besides whole grain servings (4.27) and average daily calories (2.22). In the default condition, skewness was ± 2 for all nutrition outcomes. Kurtosis values were ± 2 for all nutrition outcomes besides daily fat grams (4.15), saturated fat grams (3.48), and sodium content (5.68).

To address concerns about normality, outliers were considered using the z-score cutoff of 3.29; however, none of the nutrition outcomes reached this cutoff.

Group differences in demographics and responses to self-report questionnaires were examined using chi-square, independent samples t-tests, and multivariate analyses of co-variance (MANCOVA) for those measures containing multiple subscales. Nutritional quality of food purchases was quantified using the TFPC to generate data on whole grains selected, average daily calories, fat and saturated fat, servings of fruits and vegetables, estimated fiber intake, and average daily sodium and cholesterol content. Differences between the education and default group in the primary outcomes of interest were analyzed with an ANCOVA or independent samples t-test. Due to between group differences that could potentially influence results, the DASS depression subscale, the DEBQ restrained eating subscale, and the DEBQ emotional eating subscale were included as covariates in all analyses, but subsequently removed if found to be non-significant. For outcomes without significant covariates, independent samples t-tests were used. To account for multiple group comparisons and concerns about Type I error, a Bonferroni correction was applied when evaluating group differences in nutrition outcomes.

**Results**

**Demographics**

Participants were on average forty-six years old ($M = 46.4$, $SD = 12.46$, range: 20 – 70 years) and 74.0% were male. There was a wide range of Body Mass Indexes (BMIs; $M = 28.59$, 2020-03-01T00:00:00.000Z)
$SD = 6.48$, range: $15.96 – 46.94$), and $30.0\%$ were overweight ($n = 15$), and $34.0\%$ were obese ($n = 17$). There were no significant differences between the education and default group in mean age ($p = .56$), gender ($p = .53$), or BMI ($p = .63$). Participants self-identified (in overlapping percentages) as white ($44\%, n = 22$), black ($44\%, n = 22$), Asian ($2\%, n = 1$), and Hispanic/Latino ($18\%, n = 9$) (see Table 1 for demographic information).

There were no significant differences between the default and education condition in employment status ($p = .46$), reported frequency of grocery shopping ($p = .76$), cooking their own meals ($p = .15$), average weekly grocery budget ($p = .70$), frequency of eating out ($p = .69$), days per week participating in either vigorous physical activity, moderate physical activity, or walking ($p = .92; p = .68; p = .90$, respectively; items taken from the International Physical Activity Questionnaire; Craig et al., 2003), or level of nutrition literacy ($p = .95$). There were also no significant between-group differences in scores on the stress and anxiety subscales of the DASS-21, Barratt Impulsiveness Scale, Binge Eating Scale, Cognitive Flexibility Scale, Eating Attitudes Test, the external eating subscale of the Dutch Eating Behavior Questionnaire, Power of Food Scale, Food Neophobia Scale, Food Insecurity Questionnaire, or SCOFF (all $p > .05$) (see Table 1).

There were significant group differences on the depression subscale of the DASS-21, and the restrained and emotional eating subscales of the DEBQ ($p = .05, p = .03, p = .02$, respectively). The depression subscale of DASS-21 was included as a significant covariate in between-group comparisons of fruit servings, average daily calories, and daily fat grams. The restrained eating subscale of the DEBQ was included as a significant covariate in between-group comparisons of fruit servings and daily saturated fat grams, and the emotional eating subscale of the DEBQ was included as a significant covariate in between-group comparisons of average
daily calories.

**Nutrition Data**

Nearly all participants (92.6%, n = 25) in the default condition made changes to their default shopping cart. An independent samples t-test or ANCOVA determined that there were significant differences between the default and education condition in servings of whole grains ($M_{\text{Diff}} = 4.91 \pm .90$, $p < .001$), fruit ($M_{\text{Diff}} = 1.54 \pm .53$, $p < .001$) and vegetable servings ($M_{\text{Diff}} = 2.96 \pm .75$, $p < .001$), average daily calories ($M_{\text{Diff}} = -825.16 \pm 331.84$, $p < .001$), daily grams of fat ($M_{\text{Diff}} = 71.48 \pm 14.36$, $p < .001$), daily grams of saturated fat ($M_{\text{Diff}} = -33.77 \pm 5.53$, $p < .001$), daily grams of fiber ($M_{\text{Diff}} = 18.30 \pm 4.79$, $p < .001$), and daily milligrams of sodium ($M_{\text{Diff}} = -1689.08 \pm 424.10$, $p < .001$) and cholesterol ($M_{\text{Diff}} = -490.24 \pm 114.84$, $p < .001$). Applying a Bonferroni-corrected significance level of $p < .006$, between-group differences in all nutrition outcomes assessed were statistically significant (see Table 3 for descriptives and statistics).

**Discussion**

To the best of our knowledge, the effectiveness of a default option in enhancing dietary quality has not been examined in a food-insecure population or through an online platform. This study applied concepts from behavioral economics to test strategies for improving food choice behavior in low-income populations using an online platform. When it comes to diet-related health, low-income populations suffer high rates of food insecurity, an elevated risk of obesity, and associated adverse health outcomes.

The default intervention is a non-monetary nudge towards healthy and economical food choices that is sustainable and can be broadly scaled with the use of an online platform. This study found that the use of an online prefilled grocery shopping cart, compared to receiving nutrition education, nudged people toward healthier purchases of foods higher in whole grains,
fruit and vegetable servings, and daily fiber, and lower in average daily calories, and sodium and cholesterol content. Nearly all participants in the default condition made changes to their default shopping cart, which suggests that they are not simply accepting the prefilled shopping cart as is; rather, that this healthy template may prime people into making more healthful food decisions. Several states are in the process of piloting online grocery shopping for SNAP participants, suggesting that this intervention can be applied in a real-world setting and positively impact as many as 42 million people residing in the United States.

The accessibility of the internet has profoundly changed consumer behavior in recent years, and many everyday purchases including grocery shopping are now completed online. Online grocery shopping is exponentially increasing, with experts suggesting that by 2025, online grocery shopping could reach $100 billion in annual consumer sales (“Grocery is the next big”, 2017). Many grocery stores now offer the option to purchase foods online for home delivery and use of these services is expected to increase significantly in the coming years (Bell, 2015). Utilizing this online platform may be an important intervention strategy specifically for people in low income communities who do not have access to reliable transportation. In fact, transportation and store accessibility are major determinants of shopping frequency in low-income women (Wigg & Smith, 2009). SNAP can take advantage of this online platform to facilitate healthier food choices in this population with the potential to reduce the impact food deserts (i.e. areas with limited access to grocery stores) have on the health of low-income communities.

There are several limitations to the present research that must be noted. Our sample consisted of primarily male participants; however, women continue to do the majority of grocery shopping and food preparation in the household (Kemmer, 2000; Vaughan, Cohen, Ghosh-Dastidar,
In the present study, there were a greater percentage of male participants due to the single household eligibility criterion. Many of the women who inquired about participating in the study did not meet this criterion. The demographic information and measures, including weight and height, in the baseline survey were self-reported. However, previous research has shown that there is no significant difference between self-reported and objectively measured weight (White, Masheb, & Grilo, 2010). Although the TFPC allows us to analyze the nutrition data in an objective manner relative to food cost, the food categories are broad (e.g. low cost fish vs. low cost lean fish) and determining which food items belong to which category can be subjective. This study aims to encourage healthy eating by influencing grocery shopping decisions; however, people also consume food outside of the home and this impacts weight and overall health status.

The current study is innovative in showcasing the efficacy of a default menu in an online platform. Future research should focus on longitudinally testing the use of a default menu to track whether the default option maintains its positive effects over time. Additionally, it would be beneficial to examine more objective measures associated with poor health (e.g. weight and A1c levels in diabetes mellitus) to better determine if these healthier food purchases result in better health outcomes. The default intervention has the potential to benefit diverse populations beyond those living with food insecurity or receiving SNAP. We plan to pilot its use in patients with comorbid type II diabetes mellitus and obesity and extend the intervention to additional clinical samples in the future.
References


Rose, D., & Richards, R. (2004). Food store access and household fruit and vegetable use among participants in the US Food Stamp Program. *Public health nutrition, 7*(8), 1081-1088.


### Table 1

**Baseline Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Total Sample (n = 50)</th>
<th>Education (n = 23)</th>
<th>Default (n = 27)</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M (SD)</strong></td>
<td><strong>M (SD)</strong></td>
<td><strong>M (SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>46.40 (12.46)</td>
<td>47.65 (11.56)</td>
<td>45.33 (13.30)</td>
<td>( t(48) = .65, p = .52, d = .19 )</td>
</tr>
<tr>
<td>BMI (kg/m(^2))</td>
<td>28.59 (6.48)</td>
<td>28.10 (5.44)</td>
<td>29.01 (7.34)</td>
<td>( t(48) = -.49, p = .63, d = .14 )</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>75.5% (n = 37)</td>
<td>73.9% (n = 17)</td>
<td>76.9% (n = 20)</td>
<td>( \chi^2 = .06, p = 1.00, \varphi = .81 )</td>
</tr>
<tr>
<td>Non-white</td>
<td>64% (n = 32)</td>
<td>60.9% (n = 14)</td>
<td>66.7% (n = 18)</td>
<td>( \chi^2 = .18, p = .77, \varphi = .67 )</td>
</tr>
<tr>
<td>DASS: Depression*</td>
<td>4.93 (5.55)</td>
<td>6.67 (6.80)</td>
<td>3.35 (3.55)</td>
<td>( F(1, 42) = 4.23, p = .05, \eta_p^2 = .09 )</td>
</tr>
<tr>
<td>DASS: Anxiety</td>
<td>4.86 (4.78)</td>
<td>5.00 (5.67)</td>
<td>4.74 (3.93)</td>
<td>( F(1, 42) = .03, p = .86, \eta_p^2 = .001 )</td>
</tr>
<tr>
<td>DASS: Stress</td>
<td>6.07 (4.44)</td>
<td>6.19 (5.20)</td>
<td>5.96 (3.74)</td>
<td>( F(1, 42) = .03, p = .86, \eta_p^2 = .001 )</td>
</tr>
<tr>
<td>BIS: Attentional Impulsiveness</td>
<td>1.97 (.54)</td>
<td>1.96 (.50)</td>
<td>1.98 (.58)</td>
<td>( F(1, 40) = .01, p = .92, \eta_p^2 = .00 )</td>
</tr>
<tr>
<td>BIS: Motor Impulsiveness</td>
<td>2.11 (.49)</td>
<td>2.11 (.53)</td>
<td>2.11 (.45)</td>
<td>( F(1, 40) = .001, p = .98, \eta_p^2 = .00 )</td>
</tr>
<tr>
<td>BIS: Nonplanning Impulsiveness</td>
<td>2.47 (.46)</td>
<td>2.58 (.34)</td>
<td>2.36 (.54)</td>
<td>( F(1, 40) = 2.44, p = .13, \eta_p^2 = .06 )</td>
</tr>
<tr>
<td>Binge Eating Scale</td>
<td>8.87 (8.39)</td>
<td>9.96 (9.65)</td>
<td>7.83 (7.04)</td>
<td>( t(45) = .87, p = .39, d = .25 )</td>
</tr>
<tr>
<td>Cognitive Flexibility Scale</td>
<td>50.26 (7.13)</td>
<td>49.70 (7.11)</td>
<td>50.79 (7.25)</td>
<td>( t(45) = -.52, p = .60, d = .15 )</td>
</tr>
<tr>
<td>Scale</td>
<td>Mean (SD) 1</td>
<td>Mean (SD) 2</td>
<td>t (df)</td>
<td>p</td>
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<tr>
<td>--------------------------------------</td>
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</tr>
<tr>
<td>Eating Attitudes Test</td>
<td>.28 (.30)</td>
<td>.32 (.36)</td>
<td>.25 (.24)</td>
<td>t (43) = .86, p = .40, d = .23</td>
</tr>
<tr>
<td>DEBQ: Emotional Eating</td>
<td>2.20 (1.01)</td>
<td>2.56 (1.09)</td>
<td>1.87 (.84)</td>
<td>F (1, 42) = 5.64, p = .02, η² = .12</td>
</tr>
<tr>
<td>DEBQ: External Eating</td>
<td>2.93 (.68)</td>
<td>3.09 (.58)</td>
<td>2.79 (.75)</td>
<td>F (1, 42) = 2.10, p = .16, η² = .05</td>
</tr>
<tr>
<td>DEBQ: Restrained Eating</td>
<td>2.15 (.78)</td>
<td>2.42 (.81)</td>
<td>1.91 (.69)</td>
<td>F (1, 42) = 5.01, p = .03, η² = .11</td>
</tr>
<tr>
<td>PFS: Food Available</td>
<td>2.14 (.91)</td>
<td>2.18 (.95)</td>
<td>2.09 (.90)</td>
<td>F (1, 42) = .11, p = .75, η² = .003</td>
</tr>
<tr>
<td>PFS: Food Present</td>
<td>2.73 (1.17)</td>
<td>2.64 (.95)</td>
<td>2.83 (1.36)</td>
<td>F (1, 42) = .30, p = .59, η² = .01</td>
</tr>
<tr>
<td>PFS: Food Tasted</td>
<td>2.75 (1.00)</td>
<td>2.78 (.96)</td>
<td>2.71 (1.06)</td>
<td>F (1, 42) = .06, p = .81, η² = .001</td>
</tr>
<tr>
<td>Food Neophobia Scale</td>
<td>45.62 (12.79)</td>
<td>45.14 (10.98)</td>
<td>46.04 (14.41)</td>
<td>t (43) = -.23, p = .82, d = .07</td>
</tr>
<tr>
<td>Food Insecurity Questionnaire</td>
<td>5.28 (.96)</td>
<td>5.71 (.76)</td>
<td>5.00 (1.00)</td>
<td>t (16) = 1.61, p = .13, d = .80</td>
</tr>
<tr>
<td>SCOFF Questionnaire</td>
<td>4.36 (.87)</td>
<td>4.35 (.99)</td>
<td>4.37 (.79)</td>
<td>t (45) = -.08, p = .94, d = .02</td>
</tr>
</tbody>
</table>

Note: *indicates p < .05
Table 2

*Education Brochure- Topic Areas*

<table>
<thead>
<tr>
<th>Title</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Small changes can make a large difference</td>
<td>“Instead of adding salt to foods for flavor, season foods with herbs, spices, chiles, lime or lemon juice, and vinegar”</td>
</tr>
<tr>
<td>2. Tips for healthier choices</td>
<td>“If you usually buy sour cream, try these: Plain fat-free or low-fat Greek yogurt or fat-free sour cream”</td>
</tr>
<tr>
<td>3. 10 tips of healthy meals</td>
<td>“Include whole grains”</td>
</tr>
<tr>
<td>4. GO, SLOW, and WHOA foods</td>
<td>“WHOA foods (once in a while foods) include whole milk, full-fat American, cheddar, Colby, Swiss or cream cheese; whole milk yogurt”</td>
</tr>
</tbody>
</table>
### Table 3

**Nutrition Outcomes**

<table>
<thead>
<tr>
<th></th>
<th>Total Sample</th>
<th>Education</th>
<th>Default</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>(n = 50)</em></td>
<td><em>(n = 23)</em></td>
<td><em>(n = 27)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Whole grains (servings)</strong></td>
<td>3.45 (3.99)</td>
<td>.80 (1.66)</td>
<td>5.71 (4.01)</td>
<td><em>t</em> (-35.80) = -5.80, <em>p</em> &lt; .001, <em>d</em> = 1.60</td>
</tr>
<tr>
<td><strong>Fruits (servings)</strong></td>
<td>1.85 (1.88)</td>
<td>1.04 (1.75)</td>
<td>2.54 (1.72)</td>
<td><em>F</em> (1, 42) = 8.24, <em>p</em> &lt; .001, <em>η_p^2</em> = .37</td>
</tr>
<tr>
<td><strong>Vegetables (servings)</strong></td>
<td>4.55 (3.01)</td>
<td>2.95 (2.90)</td>
<td>5.91 (2.42)</td>
<td><em>t</em> (48) = -3.95, <em>p</em> &lt; .001, <em>d</em> = 1.11</td>
</tr>
<tr>
<td><strong>Average daily calories</strong></td>
<td>3267.30 (1190.98)</td>
<td>3741.70 (1516.30)</td>
<td>2863.19 (599.24)</td>
<td><em>F</em> (1, 43) = 6.46, <em>p</em> = .001, <em>η_p^2</em> = .31</td>
</tr>
<tr>
<td><strong>Fat (daily g)</strong></td>
<td>138.48 (63.76)</td>
<td>182.87 (54.16)</td>
<td>100.67 (44.18)</td>
<td><em>F</em> (1, 46) = 21.01, <em>p</em> &lt; .001, <em>η_p^2</em> = .48</td>
</tr>
<tr>
<td><strong>Saturated fat (daily g)</strong></td>
<td>42.94 (23.01)</td>
<td>58.78 (21.07)</td>
<td>29.44 (14.52)</td>
<td><em>F</em> (1, 43) = 18.73, <em>p</em> &lt; .001, <em>η_p^2</em> = .47</td>
</tr>
<tr>
<td><strong>Sodium (daily mg)</strong></td>
<td>4349.94 (1678.66)</td>
<td>5262.04 (1664.80)</td>
<td>3572.96 (1265.96)</td>
<td><em>t</em> (40.66) = 3.98, <em>p</em> &lt; .001, <em>d</em> = 1.14</td>
</tr>
<tr>
<td><strong>Cholesterol (daily mg)</strong></td>
<td>740.66 (460.52)</td>
<td>1005.39 (466.12)</td>
<td>515.15 (317.87)</td>
<td><em>t</em> (48) = 4.40, <em>p</em> &lt; .001, <em>d</em> = 1.13</td>
</tr>
<tr>
<td><strong>Fiber (daily mg)</strong></td>
<td>33.43 (19.09)</td>
<td>23.55 (19.46)</td>
<td>41.84 (14.37)</td>
<td><em>t</em> (48) = -3.82, <em>p</em> &lt; .001, <em>d</em> = 1.07</td>
</tr>
</tbody>
</table>

Note: *indicates *p* < .006, aDASS-21-depression subscale included as a covariate, bDEBQ-restrained eating subscale included as a covariate, cDEBQ-emotional eating subscale included as a covariate, dSignificant Levene’s test at *p* < .05