TESTING A SELF-AFFIRMATION INTERVENTION TO IMPROVE HEALTHY EATING BEHAVIOR IN MOTHERS OF ELEMENTARY SCHOOL CHILDREN

A Dissertation

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by

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Abstract

by

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Despite the value of healthy eating, many Americans engage in poor eating, including eating much more than the recommended daily intake of sodium, and less than the recommended daily amounts of fruits, vegetables, and whole grains. Public education increases knowledge about health, yet often fails to motivate healthier behavior. Many people persist in unhealthy habits despite knowledge of healthy lifestyle choices. Clearly, mere dissemination of information has not solved this public health crisis. However, health information combined with targeted application of psychological principles surrounding behavior change holds much promise for improving health. An emergent approach for an eating intervention grounded in theories of behavior change derives from self-affirmation theory. Self-affirmation theory suggests that threatening health-related information is processed defensively (i.e., ignored or rationalized away) as
a means of maintaining the integrity of an individual’s self-worth. Self-affirmation interventions work by bolstering the individual’s self-worth in a personally relevant domain prior to exposure to a threatening stimulus. This allows the individual to attend to the threatening information while maintaining their global self-worth and integrity. The current study aims to apply a self-affirmation intervention to a community sample of mothers of elementary school children in order to improve their healthy eating behaviors and the food they purchase for the home environment.
This dissertation is dedicated to my family.
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Finally, thank you to my parents for your unyielding love and support. And thank you to Benjamin, for your sacrifices and for coming with me on this journey.
1.1 Overview of Nutrition and Intervention

Healthy eating and nutrition is an important step in preventing morbidity and early mortality. Indeed, the Centers for Disease Control assert that the some of the top five causes of early mortality (i.e., heart disease, cancer, chronic respiratory disease, stroke, and accidental injury) can be avoided or prevented by making healthy food choices (Simon, 2014). However, research on food consumption in the United States shows that citizens are consuming more salt, sugar, saturated fat, and refined grains than is recommended to maintain proper health, while at the same time consuming fewer fruits, vegetables, whole grains, and healthy oils (President’s Council on Fitness, Sports & Nutrition, 2017). This highlights a need for effective interventions targeting proper nutrition and healthy eating. But research shows that informational interventions, those that might call the individual to action by providing information linking specific behaviors to negative health outcomes, are not effective in promoting behavior change. Indeed, when confronted with threatening messages, individuals tend to reject those messages, explain away their importance, or ignore them altogether (Croyle, Sun, &Hart, 1997; Liberman & Chaiken, 1992). What’s worse, individuals for whom the threatening message is most personally relevant (i.e., those at highest risk for developing the negative health outcomes associated with a behavior) are those most likely to reject a threatening
health-related message (Liberman & Chaiken, 1992). This poses a challenge for researchers interested in promoting behavior change when those most likely in need of intervention refuse to listen to the message.

One intervention strategy that has been suggested to overcome defensive processing of threatening health-related messages lies in self-affirmation theory (Reed & Aspinwall, 1998; Sherman, Nelson, & Steele, 2000; Steele, 1988). Self-affirmation theory suggests that defensive processing occurs when information is perceived as threatening to an individual’s global self-worth. The threatening information is defensively processed as a means of maintaining that global self-worth. Further, self-affirmation theory posits that defensive processing can be reduced by bolstering the self in another relevant arena. Thus, self-affirmation interventions work by drawing the individual’s attention to another self-relevant domain, allowing the self to maintain a sense of global self-worth while the individual attends to the contents of the threatening message.

1.2 Overview of Self-affirmation Theory

In an earlier writing on the subject, Steele (1988) posited self-affirmation theory, in part, as a means of explaining the mechanisms through which phenomena such as cognitive dissonance actually occur. He suggested that the psychological discomfort dissonance theorists proposed as the catalyst for attitude change was actually better explained by a self-system that explains the world and ourselves within that world. The purpose of this self-system is to maintain and regulate our self-conceptions and view of ourselves as good, competent people who can exert control and predict outcomes of our
behavior. According to Steele, participants in the forced-choice procedures utilized in cognitive dissonance research experienced a threat to their self-integrity when their behavior (i.e., writing a letter to support a position not aligned with their views) was inconsistent with their beliefs. It was not the inconsistency itself that was threatening, but instead what the inconsistency meant for their feelings of self-worth. He further argued that the threat could be minimized not by eliminating the inconsistency, as in the change in beliefs reported by participants experience cognitive dissonance, but by bolstering participants’ self in some other relevant domain. Indeed, through a series of studies, Steele showed that participants who underwent the forced-choice paradigm made no changes in their attitudes after writing a letter in support of a viewpoint they oppose if they were also given an opportunity to bolster their feelings of self-adequacy by responding to a questionnaire about their values. After their self was bolstered, the inconsistency between their behavior and their beliefs remained unchanged.

Steele (1988) put forth three propositions to describe how self-affirmation functions and the mechanisms through which it operates. First, he proposed that the self-system is motivated to maintain global integrity, and that cognitions that threaten the integrity of the self motivate the self to re-establish that global integrity. Integrity of the self, here, is defined as the extent to which a person is good and behaves in keeping with the cultural norms of their society (Sherman & Cohen, 1999). Next, he argued the motive to maintain global integrity can be satisfied either by reducing the threat or by affirming other valued self-images. These two routes to maintain global integrity allow for flexibility in how threatening cognitions or stimuli are confronted or dealt with. For instance, individuals may subconsciously attend to messages that allow them to maintain
that integrity (i.e., messages that align with already held ideals or behaviors) and respond defensively to messages that threaten integrity (i.e., messages that suggest their behaviors are not good or appropriate). Defensive processing of threatening messages takes the form of rationalizing the message in a way that is congruent with already held beliefs in order to diminish the threat and restore integrity of the self. According to theorists, threatening messages about negative health outcomes pose a threat because not only do they suggest threats to an individual’s physical well-being, but also imply an inadequacy of integrity or competence of the individual (Epton, Harris, Kane, & von Koningsbruggen, 2015). For instance, a smoker presented with information regarding the negative health outcomes associated with smoking will feel not only that their behavior may have negative ramifications on their health, but also that their behavior itself is being judged negatively, and in such a way that they are viewed as inadequate.

Defensive processing is not the only way to maintain integrity in response to a threatening message. Threats can be ameliorated by emphasizing a different important aspect of the self. This suggests that an individual who engages in an unhealthy behavior may be able to maintain integrity by focusing instead on another relevant facet of their identity (Sherman & Cohen, 2006). Furthermore, this affirming function of the self allows threatening messages to be attended to without engaging in defensive processing, because the self’s integrity is maintained through its emphasis on an alternate aspect of the individual’s identity (Sherman & Cohen, 2006). Steele’s (1988) final proposition regarding the mechanisms and function of self-affirmation states that the route to maintaining global self-integrity is determined by the availability or accessibility of adaptations to the threat. That is, it is less likely that an individual will engage in
defensive processing of threatening information if alternative methods of bolstering global self-integrity are present. This last aspect of self-affirmation theory suggests the use of self-affirmation techniques as an effective means of eliciting behavior change. Directing an individual’s focus toward affirming an alternate aspect of their identity may consequently allow them to attend to threatening messages, thus resulting in a change in behavior. Indeed, many researchers have found self-affirmation interventions to be an effective way of reducing behaviors that place individuals at risk for negative health outcomes (Epton & Harris, 2008; Harris, Mayle, Mabbott, & Napper, 2007; Sherman, Nelson, & Steele, 2000).

There are at least two types of self-affirmation interventions that have been utilized. In the first, participants receiving the intervention are given a list of traits or attributes and asked to rank them from first to least important. They select their top-ranked trait and discuss why it is important, and write about a specific time when that trait proved useful (Bucchianeri & Corning, 2012; Sherman, Nelson, & Steele, 2000). Another version of self-affirmation interventions involves a kindness questionnaire (Epton & Harris, 2008). Participants respond “yes” or “no” to 10 statements about kind behaviors (i.e., “Have you ever put the needs of another ahead of your own?”). Then participants are instructed to select five statements they responded yes to and write about a specific time when they engaged in that behavior. In the first type of intervention, participants are being affirmed on a self-selected trait, while in this style of self-affirmation intervention participants’ beliefs that they are a kind person are affirmed. After being affirmed, participants receive a presentation (e.g., a pamphlet, newsletter,
presentation, or video) about the dangers of engaging in a specific behavior, and ways in which they can change that behavior.

1.3 Self-affirmation Interventions in Health-related Domains

Research has demonstrated that self-affirmation interventions are successful in reducing problematic or unhealthy behaviors such as smoking, risky sexual behavior, excessive caffeine consumption, and unhealthy eating (Armitage, Harris, Hepton, & Napper, 2008; Harris, Mayle, Mabbott, & Napper, 2007; Sherman, Nelson, & Steele, 2000). Sherman and colleagues conducted two tests of a self-affirmation intervention with two different risky health behaviors. In their first study, they attempted to target women’s caffeine consumption by linking it with fibrocystic disease, a fairly common condition that was at one point believed to cause breast cancer. Self-reported coffee drinkers and non-coffee drinkers were randomly assigned to partake in either a self-affirmation procedure or a neutral procedure. After reading a brief newsletter article written by the investigators detailing fibrocystic disease and the links between it and both caffeine and breast cancer, participants assigned to the self-affirmation condition were given a values task meant to affirm them on a self-selected value that they ranked as most important earlier in the study. Those in the neutral condition were given a similar values task targeting the value they ranked as least important. The researchers found that amongst the coffee drinkers, those who were self-affirmed were more accepting of the message that fibrocystic disease was a serious health risk. Furthermore, self-affirmed coffee drinkers reported greater intentions to consume less caffeine in the future, compared to coffee drinkers who completed the neutral task. In a second study, the researchers targeted risky sexual
behavior among college students. Potential participants responded to a pretest question asking if they had ever engaged in sexual activities in their lifetime. Only those who responded in the affirmative were recruited. Participants also responded to questions assessing their perceived risk for HIV, and whether or not they were concerned they had been exposed to the virus. Then, eligible participants were randomly assigned to either a self-affirmation procedure or a neutral task. Self-affirmed participants wrote an essay on a self-relevant value, describing why it was important and a specific time when the valued trait was useful for them. Participants who completed the neutral task were asked to write a similar essay on a neutral trait, describing why it might be important to someone. Afterwards, all participants watched a short video comprised of interviews with young adults who were diagnosed with HIV/AIDS. The video detailed the struggles these individuals faced upon diagnosis, and targeted behavioral changes necessary to limit risk. As in the previous study, participants were then asked about their attitudes toward the video content and their behavioral intentions to engage in safer sex practices. The researchers also included a behavioral component to this study’s outcomes by providing participants with the opportunity to take pamphlets about safer sex practices and purchase condoms as they left the study. Researchers recorded whether or not participants took a pamphlet, and whether or not they purchased condoms. The number of condoms purchased was also recorded. The researchers found that self-affirmed participants changed their perceptions of their risk status from pre-test to post-test, while non-affirmed participants did not. This suggests that unlike the self-affirmed participants, non-affirmed participants still processed the contents of the video defensively. Furthermore, the researchers found evidence that the self-affirmation
procedure worked to influence behavior. Self-affirmed participants were more likely to purchase condoms compared to non-affirmed participants, and were more likely to take the free AIDS brochures provided. Collectively, the results of these studies showed that self-affirmation interventions have the potential to work amongst those who are most in need of them. That is, self-affirmation interventions worked to change the attitudes and even behaviors of those at the highest risk for health problems associated with the targeted behavior. Furthermore, unlike previous studies of self-affirmation interventions, Sherman and colleagues were able to show that self-affirmation interventions can influence behavior directly, not merely behavioral intentions.

In a similar study, Armitage and colleagues (2008) conducted a self-affirmation intervention to increase message acceptance and intentions to quit smoking among smokers in a community sample. Participants in the self-affirmation intervention responded to a brief 10-item kindness questionnaire and provided specific examples of times when they engaged in kind behavior. Participants in the control condition responded to 10 neutral yes-no statements and were asked to write about their opinion in instances when they responded “yes.” Armitage and colleagues found that participants in the self-affirmation intervention showed higher acceptance of the anti-smoking message, higher intentions to quit smoking, and were more likely to take a leaflet about smoking cessation and ways to get help. Furthermore, the researchers found that the effects of self-affirmation on the three outcomes were moderated by participants’ risk status, as measured by the number of cigarettes they reported smoking each day. Participants in the self-affirmation condition were more accepting of the anti-smoking message and showed greater intentions to quit, regardless of their risk status. However, in the control
condition, participants’ message acceptance and intentions to quit were dependent on their risk status, with low-risk participants reporting higher message acceptance and intentions to quit than high-risk participants. Participants’ risk status did not moderate the effects of condition (i.e., self-affirmation vs. control) on the behavioral outcome. Finally, the researchers tested a mediation model that showed that the effects of condition on the participants’ behavior were attenuated by behavioral intentions and message acceptance. In this model, condition significantly predicted acceptance of the anti-smoking message, which in turn predicted intentions to change behavior. Intentions to change behavior significantly predicted whether or not participants took the leaflet at the end of the study. This mediational chain is important as it provides evidence for mechanisms through which self-affirmation interventions can influence behavior change. Though Armitage and colleagues did not show that the self-affirmation intervention reduced smoking behavior directly, they did show the potential for self-affirmation interventions to be used to change behavior.

1.4 Use of Self-affirmation Interventions in the Eating Domain

Self-affirmation interventions have been successful in changing attitudes and behaviors in the domains of body image and eating as well, with some research supporting Steele’s initial proposition that affirmation is a natural, subconscious response to perceived threat (Bergstrom, Neighbors, & Malheim, 2009; Bucchianeri & Corning, 2012). Bergstrom, Neighbors, and Malheim (2009) randomly assigned a group of college women to either an exposure or non-exposure group. The exposure group viewed images of thin-ideal models from advertisements in fashion magazines, while the non-exposure...
group viewed advertisements for electronics, automobiles, etc. Advertisements viewed in
the non-exposure condition depicted no people and made no reference to food or fashion,
so as not to elicit any sort of threatening response related to body image or eating. After
viewing the advertisements, participants responded to a series of questionnaires,
including one assessing body image disturbance, and one measure of the perceived
importance of various self-relevant domains (i.e., body image and appearance, family
roles, academic performance, and financial security). The researchers had two main
hypotheses: that participants with an above-sample-average BMI who viewed the thin-
ideal advertisements would report the non-appearance-related domains as more
personally important compared to smaller women and all participants who did not view
the thin-ideal advertisements. Further, they hypothesized that, regardless of BMI,
participants with low self-esteem who viewed the thin-ideal advertisements would rate
the non-appearance-related domains as more personally important compared to
individuals with higher self-esteem and participants who did not view the thin-ideal
advertisements.

Bergstrom and colleagues (2009) found that participants in the thin-ideal exposure
condition with higher BMIs experienced more weight concern after viewing the
advertisements compared to all other groups. Furthermore, they found support for their
first hypothesis. In a hierarchical regression analysis, a significant interaction between
exposure (i.e., thin-ideal exposure or non-exposure) and BMI showed that as BMI
increased, the reported personal importance of non-appearance-related domains
increased, but only for participants in the thin-ideal exposure condition. In other words,
when participants perceived their self-worth was threatened by exposure to the thin-ideal
they subconsciously worked to self-affirm by shifting their focus to non-appearance-related domains of self-worth. A second hierarchical regression analysis showed support for their second hypothesis. A significant interaction between exposure and self-esteem showed that, in the thin-ideal exposure group, reported importance of non-appearance-related domains decreased as self-esteem increased. This suggests that participants with low self-esteem engaged in self-affirmation behaviors to re-establish feelings of self-worth after exposure to a perceived threat.

Building on evidence that individuals turn to self-affirmation when exposed to thin-ideal images, Bucchianeri and Corning (2012) tested a self-affirmation intervention to reduce body dissatisfaction among college women. They randomly assigned a group of college women to receive either a brief self-affirmation intervention or to complete a neutral task. Participants in the self-affirmation condition first ranked a list of non-appearance-based traits from most to least important. They then selected the trait selected as most important and wrote for 5 minutes about why it was important and a specific time it was useful to them. Participants in the control condition also ranked traits from most to least important, but were instead asked to choose their least important trait and write about why it might be useful to the average college student. Following completion of either the self-affirmation or control task, participants read a newsletter created by the researchers to appear as though it came from a publication ostensibly named “Women’s Health Watch.” The newsletter itself defined body dissatisfaction, discussed the links between body dissatisfaction and disordered eating, and described the health risks stemming from engaging in harsh criticism of the body. After reading the newsletter, participants responded to a questionnaire packet assessing their current level of body
dissatisfaction, attitudes towards the newsletter’s content, and intentions to engage in harsh self-criticism of the body in the future. The researchers found support for the use of self-affirmation interventions in reducing body dissatisfaction. Participants in the self-affirmation condition showed greater acceptance of the newsletter’s contents compared to control (i.e., non-affirmed) participants. Furthermore, they showed greater intentions to be less body critical in the future, and reported reduced body dissatisfaction compared to the non-affirmed group. This study provided preliminary evidence that self-affirmation interventions, though brief, can be effective even in changing individuals’ highly-entrenched attitudes related to body image and eating.

Self-affirmation interventions have also been effective in increasing University participants’ fruit and vegetable consumption in a 1-week and 2-month follow-up (Epton & Harris, 2008; Harris et al., 2014), and in decreasing participants’ BMI over a 2.5 month period (Logel & Cohen, 2012). Epton and Harris (2008) investigated the effectiveness of a self-affirmation intervention utilizing a kindness questionnaire to increase fruit and vegetable consumption among a group of female college students. They were also interested in testing the intervention’s effectiveness in increasing participants’ feelings of self-efficacy that they could achieve recommended amount of fruit and vegetable consumption each day, and participants’ levels of response efficacy—the belief that the targeted behavior (i.e., consuming more fruits and vegetables) would lead to the positive health benefits the researchers described. At the start of the study, researchers determined participants’ prior fruit and vegetable consumption by asking them to list everything they had consumed the previous day. Fruits and vegetables were then tallied, and participants were asked the extent to which the previous day was indicative of their
typical eating habits. Upon completing either the kindness questionnaire or a similar control task, participants watched a brief video detailing the importance of five-a-day fruit and vegetable consumption, how to prevent chronic diseases, and ways to increase fruit and vegetable consumption. Participants then filled out a brief questionnaire detailing their intentions to consume more fruits and vegetables, feelings of self-efficacy regarding fruit and vegetable consumption, and their beliefs that increased fruit and vegetable consumption was important for better health (i.e., response efficacy). Researchers then trained participants on how to keep a food diary over the next seven days. Such training included how to log fruit and vegetable consumption, and how to determine serving size. The researchers found that participants who completed the self-affirmation intervention reported greater consumption of fruits and vegetables compared to those in the control condition, even after controlling for baseline levels of fruit and vegetable consumption. A nonsignificant condition (self-affirmation or control) by time interaction indicated that the effect of the intervention was consistent across the 7-day period following administration of the intervention. Furthermore, self-affirmed participants reported higher self-efficacy, suggesting that after completing the self-affirmation intervention, participants were more likely to believe they were capable of consuming the recommended number of servings of fruits and vegetables each day compared to control participants. The researchers were also interested in determining whether or not the effect of condition on fruit and vegetable consumption was mediated by its effects on self-efficacy and response efficacy. Indeed, in mediational analyses, they found that after accounting for the indirect effects of condition on fruit and vegetable consumption through self-efficacy and response efficacy, the direct path from condition
to fruit and vegetable consumption was no longer significant. This suggests that the self-affirmation intervention led to behavior change by changing individuals’ attitudes about fruits and vegetable consumption and its relation to positive health outcomes.

The use of self-affirmation interventions in the domain of healthy eating shows promise, but there is need for further research. For instance, both Epton and Harris (2008) and Harris and colleagues (2014) targeted fruit and vegetable consumption specifically in their interventions, but this overlooks other important ways in which individuals can engage in healthy eating, such as watching portion sizes, reading nutrition labels, and making healthier choices at fast food restaurants. It is important to determine the extent to which self-affirmation interventions can be useful in influencing a range of healthy eating behaviors. Furthermore, much of the past work linking self-affirmation interventions to attitudinal and behavioral changes in eating behavior has been done with University samples of convenience, whether this includes college students exclusively (Epton & Harris, 2008) or University researchers, including graduate and undergraduate students (Harris et al., 2014). This suggests a need to determine the success of self-affirmation interventions as a strategy in more diverse populations. The United States Department of Agriculture found that approximately 25 million Americans live in areas where it is difficult to gain access to healthy food, and that on average, individuals in these areas spend more time traveling to acquire food. This suggests that the difficulties in motivating individuals in the community to engage in healthy eating behaviors may stem from other difficulties besides a lack of knowledge of healthy eating. However, research indicates that access alone does not explain the often inadequate dietary habits of individuals with limited access once they gain access to healthy foods (Handbury,
Rahkovsky, & Schnell, 2016), suggesting that developing tools to confront individuals’ attitudes and beliefs regarding healthy eating may be effective in motivating behavior change.

1.5 The Current Study

Thus, the purpose of the current study is to investigate the effectiveness of a self-affirmation intervention targeting healthy eating behavior and food buying in a community sample of mothers of preschool and elementary aged children. We targeted this population specifically because research has shown that mothers’ attitudes about healthy eating predicts the home food environment, and childrens’ perceptions of their mothers’ attitudes predicts childrens’ eating behavior (Boutelle, Birkeland, Hannan, Story, & Neumark-Sztainer, 2007). Furthermore, from a contextualist perspective, this avenue of intervention makes sense as interventions aimed at changing the context in which development occurs are a theoretically impactful way of changing the course of development (Lerner, 1986). Changes in the home environment related not only to the food purchased for the home, but also how parents interact with food, can influence the development of childrens’ habits and behaviors towards food. Indeed, research on the impact of family and home context on development of childrens’ eating habits shows us that the family context has the potential to guide children to make better choices regarding food and exercise (Moore, Wilkie, & Desrochers, 2017). Thus, intervening to help mothers make better food choices may also serve to improve the home food environment. We hypothesize that a) mothers who complete the self-affirmation intervention will have more positive attitudes toward healthy eating following a brief
video detailing the costs of unhealthy eating and the benefits of more healthy behavior compared to mothers in a control condition. b) self-affirmed mothers will report greater intentions to engage in more healthy eating behaviors over a two-week period compared to controls, and c) self-affirmed mothers will report greater consumption of healthy foods over a two-week follow-up period as measured by a brief food diary and home food inventory. In an effort to replicate past findings, we also hypothesize that the effects of condition (self-affirmed vs. control) on healthy food consumption will be mediated by attitudes toward healthy eating and intentions to engage in healthy eating behaviors (Armitage, Harris, Hepton, & Napper, 2008).
2.1 Participants

Participants were mothers of elementary and early middle school-aged children who were recruited via direct mail from a local school district. Participants received a letter inviting them to participate in a study about healthy eating. In the letter, potential participants were instructed to contact our offices if they were interested in participating in a new program aimed at helping mothers make better food choices for the home. Of the initial 2940 letters, 87 potential participants contacted our offices expressing interest. Interested participants were eligible if they responded to the question “How important is eating healthy to you?” with at least a “3- somewhat important” on a 1 (not at all important) to 6 (extremely important) scale. All respondents met this criterion. Of the 87 who initially contacted our offices, 36 failed to set up a time to participate, leaving us with a final sample of 51. Table 2.1 provides demographic information about the sample. After providing informed consent, participants received $25 in the form of a gift card at the initial time point and again at the 2-week follow-up.
2.2 Procedure

Two trained laboratory assistants conducted all parts of the study in the participants’ home. Upon providing informed consent, participants completed a 24-hour food diary (see below). For the food diary, participants were instructed to report everything they had consumed in the last 24 hours, and be as detailed as possible.

<table>
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<th>Characteristic</th>
<th>n</th>
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<th>Mean (SD)</th>
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<th>Max</th>
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<tr>
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<td>GED or equivalent</td>
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<td>2%</td>
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<tr>
<td>Some College</td>
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<td>17.6%</td>
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<td>Multi-ethnic</td>
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<tr>
<td>With Partner</td>
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<tr>
<td>Single</td>
<td>18</td>
<td>36.7%</td>
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Investigators asked follow-up questions to ascertain amounts of food consumed, along with any fruits, vegetables, or condiments that were not included in the initial food diary. Next, participants responded to a home food inventory. The home food inventory consisted of a checklist of various foods, organized by categories (i.e., fruits, vegetables, meats, dairy, etc.). Participants were instructed to look through their food storage areas, such as the refrigerator and pantry, and check “yes” to all foods present, regardless of quantity (see below for more information regarding the home food inventory). Participants completed this task on their own, but laboratory assistants were there in order to answer specific questions about categorizing individual items in the home.

Upon completion of the home food inventory, participants responded to either the self-affirmation intervention packet or the control packet, depending on how they were randomly assigned. Random assignment was carried out by utilization of a computerized random number generator. The self-affirmation intervention followed a similar format to previous studies (Epton & Harris, 2008) in that we used a kindness questionnaire to self-affirm participants on their own kindness. Participants in the self-affirmation condition responded “yes” or “no” to 10 questions about instances of kindness (i.e., “Have you ever been considerate of another’s feelings?”). Then, they chose 5 statements they responded “yes” to and wrote about a specific instance when they engaged in that behavior. Participants in the control condition completed a similar task wherein they responded “yes or “no” to 10 neutral statements (i.e., “I think that sneakers are the most comfortable type of shoe to wear.”). They were then prompted to choose five statements and write briefly supporting their opinion. Both the kindness questionnaire and the equivalent
control questionnaire were assessed for reading level and piloted by a group of researchers familiar with the community.

Next, participants watched a brief video about healthy eating. The video was designed both to describe the relationship between eating habits and health and to provide participants with small changes they could make to improve their eating habits. The video first went into detail about how unhealthy eating impacts various aspects of physical and mental health. For instance, the video provided details about how fatty foods, like fast food, can lead to higher cholesterol, which increases risk for heart disease. Other health information included in the video revolved around salty foods and high blood pressure, unhealthy foods and acne, heartburn, and unhealthy eating’s effects on the risks for sleep disorders. The second half of the video provided a series of tips and helpful advice to include more healthy eating behaviors in everyday life. It included tips on using various parts of the hand to estimate portion size, adding fruits and vegetables to foods you already eat, provided healthier alternatives for popular fast food restaurants, and addressed the myth that fast food is always cheaper to purchase than healthy food. Information for the video was compiled by a team of researchers and undergraduate research assistants from pages on the Center for Disease Control website (2017), the United States Department of Agriculture (n.d.), and the book Eat This, Not That (Zinczenko & Goulding, 2007). Information contained in the video regarding portion size was obtained from a health and nutrition blog (Berardi, 2015).

After the video, participants responded to a packet of measures regarding their attitudes toward the content of the video, their intentions to engage in healthy eating behavior and utilize the information from the video, their current mood and self-esteem,
and a manipulation check (see information below regarding specific measures included in the packet). The manipulation check was composed of three questions regarding what the video was about, what happens when you eat unhealthy food, and the personal relevance of the content of the video.

At the end of the session, researchers recorded the participant’s height and weight, and reminded the participant of the 2-week follow-up. Approximately two weeks later, participants completed the follow-up session, which involved completing a second 24-hour food diary, home food inventory, and a modified version of the questionnaire packet. The follow-up questionnaire packet asked participants to rate how successful they were in eating healthy over the 2-week period, as well as asked about their attitudes toward healthy eating, and their intentions to eat healthy in the future. Participants were debriefed on the true purpose of the study and paid $25 for their participation in the follow up.

2.3 Measures

2.3.1 24-Hour Food Diary

The 24-hour food diary was created by the researchers in order for participants to recall all food and non-water beverages consumed in the previous 24 hours. Participants were prompted to think about food and drinks consumed in the past 24 hours, create and fill in a quick list of food and drinks consumed at each time of day on a chart. Once that was completed, the researcher asked follow-up questions regarding serving size, condiments, and presence of fruits and vegetables. For instance, if a participant wrote
that they had a hamburger for dinner, the researcher would ask for approximate size of the hamburger patty, what condiments were on the hamburger, and if there were any vegetables included. Researchers also probed participants to remember any drinks consumed at each meal. Participants completed the food diary prior to the intervention at time 1 and again at the 2-week follow-up. Similar food diaries have been valid in their ability to estimate fruit and vegetable consumption (Resnicow et al., 2000).

Similar 24-hour diet recalls have been commonly used to describe behavior, but we used it as an outcome variable. As such, we devised a coding system based around healthy eating habits recommended in the video stimulus. Trained research assistants coded each diet recall in three different ways. First, they counted the total number of fruits and vegetables consumed, whether they be a full serving or not. Second, they counted the number of times whole grains were consumed. Finally, they counted the number of home-cooked, as opposed to fast-food meals consumed. To ensure the accuracy of the coding system, each diet recall was scored twice by two separate lab assistants and scores were compared for accuracy. In the instance of a discrepancy, the principal investigator chose the score that best reflected their judgement of the diet recall. The scores for these three questions were then summed to provide a total healthy eating score for the diet recall.

2.3.2 Home Food Inventory

The Home Food Inventory (HFI; Fulkerson, Nelson, Lytle, Moe, Heitzler, & Pasch, 2008) was used to assess access to food in the home. The HFI is a checklist consisting of 16 categories of food and beverages (i.e., cheese, dairy, butter/oils, salad
dressing, condiments, vegetables, fruits, processed meats, meat and other protein, frozen
desserts, microwavable frozen foods, bread, prepared desserts, chips and other snack
foods, beverages, and candy). For each item, participants are instructed to check “yes” if
the item is present in the home, in any quantity, and “no” if it is not. For fruits and
vegetables, participants are also asked to check off whether the item is fresh, frozen,
canned, or dried, and may check all that apply. The inventory also has two subsections
that deal with ease of access of food on counters and the refrigerator. For these
subsections, participants are asked to look around their counter and mark foods that are
visible, and to open up their refrigerator and mark foods that can be seen without moving
other items around. Finally, the HFI also contains questions related to whole grain and
sugar content of dry cereal, and prepackaged snack-size foods. Participants are asked to
read the nutrition labels on the sides of their cereal boxes and respond to three questions:
how many cereals are labeled “whole grain” or have at least three grams of fiber per
serving? how many cereals indicate on the nutrition label that they have less than 6 grams
of sugar per serving?, and how many cereals indicate on the nutrition label that they have
6 or more grams of sugar per serving?

The HFI has shown strong criterion and construct validity (Fulkerson et al.,
2008). Fulkerson and colleagues showed that, in a sample of 51 individuals from the
community, participant/rater agreement for each category was strong (k range = .61 to
.83), indicating that the method of asking participants to complete the checklist on their
own is valid. In a second sample, construct validity was assessed by analyzing the
correlations between categories in the HFI and similar food categories from the Diet
History Questionnaire (DHQ; National Cancer Institute). All of the correlations between
the HFI categories and similar food categories from the DHQ were positive and significant.

The HFI was administered prior to the intervention at time 1, and again at the 2-week follow-up. At both time points, participants were instructed to complete the checklist on their own, with the researcher present to answer questions as they arose. The home food inventory took approximately 20 minutes to complete.

The coding scheme for the HFI is straightforward. Items from each category are summed to provide a total score for that category. Categories which include both regular and reduced fat options can be separated into those sub-categories (i.e., regular and reduced fat dairy). A total healthy eating score can then be created by summing each healthy food category (i.e., fruits, vegetables, reduced-fat dairy).

In their study, Fulkerson and colleagues (2008) initially created total scores for the fruit and vegetable categories solely by summing the number of items the participants checked “yes” to, ignoring the various forms (i.e., fresh, canned, frozen, or dried) recorded on the checklist. Because the informational video included advice to increase fruit and vegetable intake by purchasing these items frozen or canned, we implemented a new coding system for these categories in which a total score for the fruit and vegetable subcategories was created by summing every form of each item participants recorded. For example, if a participant responded “yes” to strawberries and checked both fresh and frozen, that would count as 2 items instead of 1. Thus, the total scores for the fruit and vegetable subcategories were utilizing more of the information provided by the participants and also were more reflective of behavioral changes we hoped participants would implement.
2.3.3 Healthy Eating Attitudes

A brief questionnaire was created to assess the extent to which participants agreed with healthy eating messages expressed in the video. This questionnaire was administered following the intervention at time 1, and again at the 2-week follow-up. The questionnaire is comprised of 11 statements, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Example items include “Eating unhealthy foods can have long term negative effects like high blood pressure and diabetes.” and “Fruits and veggies can be easily incorporated into my daily meals.” Responses were summed to create a total score, with total scores ranging from 11 to 55. Similar questionnaires have commonly been used to assess message acceptance and attitudes in previous self-affirmation studies (Armitage et al., 2008; Bucchianeri & Corning, 2012). In the current study, Cronbach’s α = .69 and .77 at the immediate post-test and 2-week follow-up, respectively.

2.3.4 Intentions to Engage in Healthy Eating

A brief questionnaire was created to assess participants’ intentions to engage in healthy eating. This questionnaire was administered following the intervention at time 1, and again at the 2-week follow-up. The questionnaire consists of six items, with responses ranging from 1 (not at all) to 7 (very much). Each item assesses the participant’s intentions to engage in a healthy eating behavior discussed in the video. An example item is “To what extent do you think you actually will pay attention to the
nutritional value (i.e., carbs, fats, sugars, proteins) of the foods you buy in the store?” At the 2-week follow-up, participants responded to a modified version of this questionnaire which asked them to reflect back and assess whether or not they actually did make the behavioral changes. An example question from the 2-week follow-up was “Since we last saw you, to what extent do you think you actually did pay attention to the nutritional value (i.e., carbs, fats, sugars proteins) of the foods you bought in the store?” At both time points, a total score was created for each participant by summing response to the six questions, with total scores ranging from 6 to 42. Similar questionnaires have been utilized to measure behavioral intentions in past research (Bucchianeri & Corning, 2012; Epton & Harris, 2008). In the current study, Cronbach’s α = .89 and .80 at the immediate post-test and 2-week follow-up, respectively.

2.3.5 Body Mass Index

Body mass index (BMI) for each participant was calculated from the height and weight measures collected during the first visit. The measurements were conducted by female members of the research team in the participant’s home. Weight was assessed with a high-quality, portable digital scale, and height was assessed with a tape measure. To minimize potential discomfort, and to avoid sensitizing participants to issues of weight and body image, weight and height were assessed only once during the visit.
2.3.6 Mood

We followed procedures similar to those used in past studies to measure mood immediately following the intervention (e.g., Sherman, Nelson, & Steele, 2000). In particular, following the manipulation, participants responded to the question, “How would you describe your mood right now?” using a scale ranging from 1 (extremely bad mood) to 9 (extremely good mood). Participants responded to this question at time one immediately following the intervention and again at the two-week follow-up. Responses to this item were used to control for potential effects of the intervention on mood.

2.3.7 Self-esteem

We followed procedures similar to those used in past studies to measure self-esteem immediately following the intervention (e.g., Sherman, Nelson, & Steele, 2000). In particular, following the manipulation, participants responded to the question, “How do you feel about yourself right now?” using a scale ranging from 1 (extremely negatively) to 9 (extremely positively). Participants respond to this question at time one immediately following the intervention and again at the two-week follow-up. Responses to this item were used to control for potential effects of the intervention on self-esteem.
3.1 Hypothesis a

Our first hypothesis was that mothers in the self-affirmation condition would report more positive attitudes toward healthy eating compared to the mothers in the control condition, both at immediate post-test and again at the 2-week follow-up. This hypothesis was tested with a repeated measures ANCOVA. For this analysis, condition (self-affirmation or control) was treated as a between-subjects factor with time as a within-subjects factor. Attitudes toward healthy eating at both the immediate follow-up and the 2-week follow-up were entered as the outcome variable. Because one common argument against the effectiveness of self-affirmation interventions is that the effects reported in previous studies are the result of self-affirmation on mood and self-esteem, ANCOVA was used to control for potential group differences in mood and self-esteem in this and all analyses.
Table 3.1 provides the means and standard deviations for both groups at both the immediate follow-up and the 2-week follow-up. At the immediate follow-up, the groups reported similarly high attitudes toward healthy eating, indicating that both groups reacted positively to the messages contained in the video. The two groups continued to report high positive attitudes toward healthy eating at the 2-week follow-up, though the control group did show a slight decline.

Results of the repeated measures ANCOVA indicate no significant main effects of time, $F(1, 41) = 0.04, p = .85$, partial $\eta^2 = .001$, which suggests that across the groups, attitudes toward healthy eating did not change as a function of time. The main effect of condition was also not significant, $F(1, 41) = 1.66, p = .20$, partial $\eta^2 = .04$, suggesting
that collapsed across time, there was no difference between groups. Furthermore, there was no significant time by condition interaction, $F(1, 41) = 2.27$, $p = .14$, partial $\eta^2 = .05$, suggesting that changes in attitudes toward healthy eating over time did not differ as a function of group. The repeated measures ANCOVA indicated a significant effect of both mood, $F(1, 41) = 8.26$, $p < .01$, partial $\eta^2 = .17$, and self-esteem, $F(1, 41) = 4.27$, $p = .04$, partial $\eta^2 = .09$ on attitudes toward healthy eating.

Overall, hypothesis a was not supported. Attitudes toward healthy eating did not significantly differ as a function of group. Furthermore, the nonsignificant time by group interaction indicated that changes in attitudes toward healthy eating over time did not differ between the groups.

3.2 Hypothesis b

Our second hypothesis was that self-affirmed mothers would report greater intentions to engage in healthy eating immediately following the intervention and that they would indicate greater follow-through with their intentions at the two-week follow-up compared to mothers in the control condition. Because participants were given different prompts at the two follow-ups (i.e., to look ahead at the immediate post-test and to reflect back at the 2-week follow-up) hypothesis b was tested with two separate ANCOVA analyses—one for each time point. In the first ANCOVA, focusing on group differences immediately following the intervention, intentions to engage in healthy eating immediately following the intervention was used as the dependent variable and mood and self-esteem scores taken immediately following the intervention were used as control variables. A second ANCOVA was conducted focusing on the two-week follow-up
which asked participants to reflect on how well they followed through with their intentions to engage in healthy eating. In this analysis, reflection on intentions to engage in healthy eating was used as the outcome and we controlled for self-reported mood and self-esteem scores reported at the immediate post-test.

Table 3.1 provides the groups’ means and standard deviations for both immediate post-test intentions to engage in healthy eating and the reflection on intentions to engage in healthy eating at the 2-week follow-up. The groups reported similar intentions to engage in healthy eating at the immediate follow-up with the control group reporting higher mean intentions. When asked to reflect back on their intentions to engage in healthy eating behaviors at the 2-week follow-up, the self-affirmed group reported higher follow-through with their intentions compared to the control group.

The results of the first ANCOVA focusing on immediate post-test intentions to engage in healthy eating as the outcome show that after controlling for mood and self-esteem, the effect of condition was not significant, $F(1, 47) = 0.08, p = .79$, partial $\eta^2 = .002$. Contrary to our hypothesis, this indicates that the self-affirmed group did not show greater intentions to engage in healthy eating at the immediate post-test.

Results were similar in the second ANCOVA focusing on reflections on intentions to engage in healthy eating. After controlling for mood and self-esteem, there was no significant effect of condition on reflections on engaging in healthy eating, $F(1, 41) = 0.70, p = .33$, partial $\eta^2 = .02$. This suggests that, when asked to reflect on how well they followed through with their intentions to engage in healthy eating, the self-affirmed group did not report higher adherence to their intentions.
3.3 Hypothesis c

Our third hypothesis was that mothers in the self-affirmed condition would report greater consumption of healthy foods compared to mothers in the control condition. Consumption of healthy foods was measured using total scores from the home food inventories and 24-hour diet recalls completed at pre-test and again at the 2-week follow-up. Two ANCOVA analyses were conducted to test this hypothesis. In the first ANCOVA, total scores from the HFI completed at the 2-week follow-up were used as the outcome variable, with pre-test HFI scores, mood, and self-esteem being controlled. Results of the ANCOVA show that after controlling for mood, self-esteem, and pre-test HFI score, the effects of condition on HFI scores at the 2-week follow-up were not significant, $F(1, 40) = 0.11, p = .74$, partial $\eta^2 = .001$, indicating that the self-affirmed participants did not significantly differ from non-affirmed participants in their home food purchasing over the 2-week period.

The second ANCOVA was conducted using total healthy eating scores from the 24-hour diet recall taken at 2-week follow-up as the outcome, with pre-test healthy eating scores used as a control, along with mood and self-esteem scores taken at the immediate post-test. Results of the ANCOVA show that after controlling for mood, self-esteem, and pre-test healthy eating scores, the effects of condition on healthy eating scores at the 2-week follow-up were not significant, $F(1, 45) = 0.53, p = .47$, partial $\eta^2 = .013$. This suggests that self-affirmed participants did not report engaging in more healthy eating, as measured by the 24-hour diet recall, compared to non-affirmed participants.
3.4 Hypothesis d

Our final hypothesis was that the effects of condition on healthy eating behaviors, as measured by the HFI and 24-hour diet recall, would be mediated by group differences in behavioral intentions to engage in healthy eating behavior. To test this hypothesis, we used an SEM approach (Gunzler, Chen, Wu, & Zhang, 2013). We used Lavaan, a free package in the R studio library (Rosseel, 2012). This package allows us to test the significance of direct and indirect paths simultaneously.

Figure 3.1. Path diagram for hypothesis d. The dashed lines indicate direct effects of condition on behavioral measures (i.e., home food inventory and 24-hour diet recall). *** $p<.001$, ** $p < .01$

Figure 3.1 shows the modeled path diagram along with path estimates. The estimated model was a saturated model with all paths estimated along with covariances between predictor and control variables (i.e., HFI and diet recall total scores at pre-test),
mediator and control variables, and outcome variables. Intentions to engage in healthy eating at the immediate follow-up significantly predicted home food inventory total scores at the 2-week follow-up, $z = 2.64, p < .01$, but did not significantly predict diet recall total scores at the 2-week follow-up, $z = 1.81, p = .07$. The mediational path from condition to home food inventory total scores at the 2-week follow-up was not significant, estimate = -.07, $z = -0.10, p = .92$. Similarly, the mediational path from condition to 24-hour diet recall total scores at the 2-week follow-up was not significant, estimate = -0.02, $z = -.10, p = .92$. Overall, this indicates that our hypothesized mediation model was not supported.
CHAPTER 4:
DISCUSSION

We hypothesized a significant effect of the self-affirmation condition, such that self-affirmed participants would show greater positive attitudes toward the content of the threatening message and greater intentions to engage in healthy eating. Our findings do not support either hypothesis. The self-affirmed group showed no significant difference in their positive attitudes toward healthy eating compared to the control group, nor did they show significantly greater intentions to change their eating behavior. Second, we hypothesized that self-affirmed participants would show greater change in eating habits, as indicated by changes in their home food inventory and reported intake on the 24-hour diet recall. This hypothesis was also not supported by our data which showed no differences in change in eating habits between groups on either measure. Finally, based on previous findings, we attempted to replicate a finding wherein self-affirmation’s effects on behavior were mediated by differences in intentions to change behavior (Armitage, Harris, Hepton, & Napper, 2008). Though we did find a significant effect of intentions to engage in healthy eating on eating habits at the 2-week follow-up as measured by the home food inventory, we did not find a significant effect of condition on intentions to engage in healthy eating, nor was our hypothesized mediation supported. Overall, we did not find evidence supporting self-affirmation as an effective intervention strategy to improve healthy eating behaviors among mothers of school-aged children.
These findings run counter to previous evidence of the success of self-affirmation interventions in improving healthy eating behavior (Epton & Harris, 2008; Harris et al., 2014; Logel & Cohen, 2012). Indeed, previous studies investigating the effects of self-affirmation interventions on fruit and vegetable consumption have shown that self-affirmation effectively increases participants’ self-reported fruit and vegetable consumption over a week-long period. Furthermore, Logel and Cohen (2012) found evidence that, compared to controls, participants who underwent a self-affirmation procedure showed greater reduction in BMI over a 2.5-month period, indicating that the self-affirmation intervention successfully influenced participants’ healthy eating behaviors. Previous research has again supported the tested mediational path suggesting that self-affirmation interventions influence behavior by increasing individuals’ intentions to change behavior (Epton & Harris, 2008).

It is important to note that in the above mentioned studies, samples were drawn primarily from populations of college and university students and employees. In the current study, we sought to replicate findings from previous studies and expand those studies to a population potentially at greater risk of experiencing the negative health outcomes associated with lack of nutrition—mothers in the community. It is possible that the methods of self-affirmation that have been used to-date are not appropriate for use in non-academic populations. For instance, the majority of our participants reported a high school diploma or equivalent as their highest earned degree. This could suggest that a self-affirmation task that primarily involves writing may not be the best method if these participants are not inclined toward or confident in writing. If the purpose of the writing task (i.e., to self-affirm, in the experimental condition) was overshadowed by concern
over the quality of the writing, that may have a neutralizing effect on the intervention. In other words, if the writing portion of the self-affirmation technique caused concern for some participants, then those participants may not have been self-affirmed as a result. Though the majority of self-affirmation research has focused primarily on college students, one study testing self-affirmation effects among university employees included employees of all levels, and found that the self-affirmation intervention, which included a writing component, was successful in producing changes in attitude and health-related behavior (Harris, et al., 2014). This suggests that it was not, in fact, the mode through which participants were prompted to self-affirm that explains the current null findings, but future research could investigate various methods of self-affirming participants in order to better understand which methods are most effective in more diverse populations.

The current study was also unique in that data was collected during home visits. There were two primary reasons to conduct this study in-home. First, we wanted to ensure that mothers would not be burdened by having to travel to the lab, which for some may have required finding transportation or babysitters. Second, the in-home visits allowed us to more accurately assess food in the home, as a researcher was present to assist while participants filled out the checklist and participants were able to see the food in their kitchen, as opposed to completing the checklist from memory. However, there were drawbacks to the in-home visits. For instance, participants were much more prone to distraction in the home environment. This was especially true when the in-home sessions occurred after school hours when children were home. Thus, we cannot rule out that distractions during the in-home visit did not influence our findings. If participants were unable to focus either on the self-affirmation intervention or the content of the
video, then the effects of the intervention would be diminished. It is important to note, however, that participants in both groups could have been prone to distraction during the research sessions, and thus we should not be concerned that environment alone explains the current findings.

Another potential limitation of the current study involves the home food inventory as an outcome variable. For the purposes of the current study, we focused on subcategories of the home food inventory that we anticipated would be most affected by the intervention (i.e., vegetables, fruits, and reduced-fat dairy items). However, this presents a very limited picture of how the kitchen of a health-conscious family may look, and also presents a limited picture of the informational content of the video. For example, in one part of the informational portion of the intervention, participants learned about the importance of home-cooking as a healthier alternative to fast food and even learned about easy ways to incorporate healthy food into meals they may already make. In homes that heavily rely on fast food, having more varieties of food present in the home may be a sign of better health. Further, much of the recommendations from public health advocates focus on the importance of balanced meals, such that combinations of food in a meal may matter more than quantity of food in the home. Future research could investigate better ways to assess home food inventories for healthfulness, potentially through use of an assessment that goes beyond simply quantifying healthy eating by the number of healthy items and instead assesses the fuller picture.

Regarding the home food inventory, it should also be noted that much of the difficulty in determining how best to use it as an assessment for healthy eating comes from ambiguities surrounding which foods are healthy and which are not. For instance,
research is still inconclusive as to the extent to which reduced-fat dairy and other items provide any health benefits above and beyond their non-reduced counterparts (Wansink & Chandon, 2006). However, we included reduced-fat dairy items in the total score for the home food inventory because content in the informational video instructed participants on how to read nutrition labels to make healthy food choices. This advice included choosing items lower in fat and sugar, so participants may have chosen reduced-fat options to adhere to that advice.

The timeframe between visits may also have influenced some null findings, particularly as they relate to the home food inventory. We chose a 2-week timeframe in part to provide an opportunity for participants to have time to shop for groceries. The 2-week timeframe would allow participants who get paid weekly and bi-weekly the opportunity to shop. However, we cannot be certain that participants who rely on public assistance or child support to cover food expenses would have had the opportunity to go grocery shopping during the 2-week window. In fact, we cannot be certain that even participants who were financially able to purchase groceries in the 2-week timeframe did so. Indeed, the high correlation observed between the home food inventory at pre-test and at the 2-week follow-up could suggest that either participants re-purchased the same foods, or had not yet replaced food from the first visit with new. It is possible we may have found differences between the two groups in their food purchases with a larger window between visits or an additional follow-up.

Interestingly, nonsignificant differences between the self-affirmed and control group on measures of attitude and intention could be the result of the overall high levels of these variables reported by both groups, both at the immediate post-test and the 2-
week follow-up. This could suggest that the information in the video was not threatening to the participants, and thus both groups were able to attend to the content of the video. However, we should be hesitant to accept this interpretation, as half of the video’s content revolved around the serious health consequences associated with lack of nutrition—consequences that could result in death. Research has shown that drawing awareness to a participant’s mortality is a very effective method of inducing feelings of threat (Pyszczynski, Greenberg, Koole, & Solomon, 2010; Greenberg, Solomon, & Arndt, 2008). Alternatively, it could be that because participants were informed of the content of the study (i.e., they were informed in the recruitment letter that we were studying healthy eating behaviors) that only those already interested in changing their behaviors showed interest in participating. This also seems unlikely, as again, the control group, but not the self-affirmed group would have engaged in defensive processing of the threatening message (Steele, 1988). Instead, it could be that the self-affirmed group may sustain their high positive attitudes and intentions to engage in healthy behavior for a longer period of time than the control group. Future studies could investigate this possibility with additional follow-ups.

Further methodological considerations should be noted. For instance, we touched briefly on the extensive factors besides motivation that may limit an individual’s ability to eat a proper nutritious diet, such as access to food, time constraints, transportation, and even cooking ability. It could be that although our participants were indeed interested in changing their eating behaviors, these other constraints interfered with their ability to make behavior changes. Future research could investigate the extent to which self-affirmation interventions may be strengthened to overcome these limitations.
Furthermore, it is important to note that the current study was underpowered given the observed effect sizes (Cohen, 1992). This suggests we may have found significant effects with a larger sample size.

Finally, self-affirmation interventions have been shown to be effective in changing healthy eating behaviors especially in combination with an implementation intention plan (Harris, et al., 2014). Harris and colleagues found that, overall, a self-affirmation intervention successfully increased participants’ fruit and vegetable consumption at a 1-week follow-up and a 3-month follow-up. At the 1-week follow-up, they found that self-affirmed individuals who were also asked to complete a series of intention implementation statements related to specific fruit and vegetable consumption behaviors showed even greater improvements in their fruit and vegetable consumption than individuals who only received the self-affirmation intervention. These intention implementation statements took the form of if-then statements requiring participants to come up with a specific plan for circumstances that may prove challenging for sticking to a commitment to eat more fruits and vegetables. For instance, participants could create an if-then statement that read “If I go out to dinner with friends, then I will eat a banana when I get home.” A similar procedure could prove beneficial in conjunction with the intervention in the current study if participants were asked to form intention implementation plans in relation to the content they watched in the video. Especially considering the larger scope of behaviors the informational video targeted, an opportunity to write out specific goals related to the video’s content would have served the purpose of cementing the video’s content, and providing specific behavioral changes participants could implement.
Though we have already highlighted some important areas for further research, in regards to measuring the healthfulness of food in the home, combining self-affirmation interventions with intention implementation goals, and testing alternative methods of affirming the self in more diverse populations, it is important to note additional areas of future research. First, more research is needed to ascertain whether or not self-affirmation interventions are effective in changing health-related behavior in at-risk populations. The current study was one of a very limited number of studies assessing self-affirmation strategies in a non-university population. Addressing this issue is vital both to understanding what interventions are most effective in at-risk populations, but also in understanding how best to implement self-affirmation interventions in the population.

Additionally, future research could expand upon the utility of self-affirmation interventions by considering how they may work in conjunction with other interventions. The effectiveness of self-affirmation in conjunction with intention implementation goals was already discussed as one means of combining self-affirmation with additional strategies, but there are other ways in which self-affirmation could be utilized to change healthy eating behavior. For instance, the United States Office of Disease Prevention and Health Promotion (2018) has developed a community workshop series titled “Eat Healthy, Be Active,” which is an information-based 5-part workshop series meant to improve feelings of efficacy to make healthy lifestyle changes, cook healthy meals, and engage in physical activity. A self-affirmation intervention could easily be implemented at the beginning of each workshop session in order to make participants less resistant to the information contained in the workshop.
Additionally, self-affirmation interventions could easily be utilized in tech-based interventions wherein participants are sent reminders to complete a self-affirmation activity at regular intervals, along with receiving information regarding a health-related behavior. Because self-affirmation techniques are quite easy to implement, it could be useful to determine how effective they are when participants are self-guided in their implementation. Further, an intervention that allows participants to self-affirm at multiple time points, such as would be possible with a phone application, could show greater long-term effects than a single self-affirmation intervention.

Finally, though, we targeted mothers of elementary-aged children, we did not directly measure child behavior. Though we believe the home food inventory provides some glimpse into what children in these homes were eating, future research could investigate whether any changes in childrens’ attitudes and behaviors are observed through use of this intervention with mothers.

Self-affirmation interventions are a low-cost, efficient means of eliciting behavior change that have already been shown to be effective in several health-related domains, including eating and nutrition. Though the current study did not show significant effects of self-affirmation in improving participants’ healthy eating behaviors, we believe it highlights important avenues for future research and the importance of expanding tests of self-affirmation interventions to more representative samples of the population.


Harris, P. R., Brearley, I., Sheeran, P., Barker, M., Klein, W. M. P., Creswell, J. D., ... & Bond, R. (2014). Combining self-affirmation with implementation intentions to promote fruit and vegetable consumption. *Health Psychology, 33*, 729-736. doi: 10.1037/hea0000065


45


I would like you to think about the food and drinks that you had in the past 24 hours. First, I’m going to ask you to give me just a quick list of what you ate and then we will come back to those foods again in order to find out more about them (like how much you ate, what the ingredients were and how the food was prepared). Right now it is about _____o’clock, so think about what you have eaten since _____ o’clock yesterday.

*Fill in the chart below, starting from 24 hours before the current time and then progressing through the day to the current time. Probe for whether they ate anything (or drank during anything with calories) during each of the different times of day.*

<table>
<thead>
<tr>
<th>Before breakfast</th>
<th>Breaskfast</th>
<th>Morning snack</th>
<th>Lunch</th>
<th>Afternoon snack</th>
<th>Dinner</th>
<th>After-dinner snack</th>
<th>Midnight snack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Go back through the list of foods that the mother mentioned and ask follow-up questions about the amount of fruits and vegetables. Use a common reference point, if possible, if mother is having difficulty estimating the amount (fist-size, a spoonful, etc.). Make sure to probe concerning foods that might contain fruits and vegetables (in soup, on sandwiches, etc.).

<table>
<thead>
<tr>
<th>a. Description of the Food Item</th>
<th>b. Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
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</table>
APPENDIX B:

SELF-AFFIRMATION CONDITION PACKET

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The Kindness Questionnaire

Instructions: Please read each question below. Circle "Yes" if you have ever done what the question asks, and circle "No" if you have not.

1. Have you ever forgiven someone when they have hurt you?
   Yes   No

2. Have you ever been considerate of another person’s feelings?
   Yes   No

3. Have you ever been concerned with the happiness of another person?
   Yes   No

4. Have you ever put someone else’s interests before your own?
   Yes   No

5. Have you ever been generous and selfless to another person?
   Yes   No

6. Have you ever helped meet the needs of another person?
   Yes   No

7. Have you ever been careful to avoid hurting someone’s feelings?
   Yes   No

8. Have you ever felt satisfied when you have helped another person?
   Yes   No

9. Have you ever gone out of your way to help a friend?
   Yes   No

10. Have you ever found ways to help someone who was less fortunate than yourself?
    Yes   No

---
The Kindness Questionnaire

Now please look at the questions to which you answered “Yes,” and choose five of them. Below and on the next page, we ask you to write a few lines about the five you chose. To do this, write the question number in the small blank, and then write out a specific example of a time when you engaged in that behavior.

# ______

# ______

# ______

# ______

# ______
APPENDIX C:

CONTROL CONDITION PACKET

"What I Think"

Instructions: Please read each question below. Circle “Yes” if you agree and circle “No” if you do not.

1. I think it feels good to laugh.
   Yes  No

2. I think it would be nice to have a park in my neighborhood.
   Yes  No

3. I think that sunny weather makes the day more pleasant.
   Yes  No

4. I think that the best smelling trees in the world are pine trees.
   Yes  No

5. I think watching TV is a good way to relax.
   Yes  No

6. I think that decorations help to brighten the home.
   Yes  No

7. I think it is important to have computer skills.
   Yes  No

8. I think the beach is a great place to go on vacation.
   Yes  No

9. I think that sneakers are the most comfortable type of shoe to wear.
   Yes  No

10. I think that it’s good to buy clothes on sale.
    Yes  No
“What I Think”

Now please look at the questions to which you answered “Yes,” and choose five of them. Below and on the next page, we ask you to write a few lines about the five you chose. To do this, write the question number in the small blank, and then write out in specific terms what makes you think what you think (for example, maybe you have a specific example or memory that shapes your opinion).

# ______

# ______
APPENDIX D:

IMMEDIATE POST-TEST MEASURE PACKET

**What Do You Think?**

Please read the questions below and circle the number that best matches what you think.

1) How much do **you** disagree or agree that eating unhealthy foods can be bad for your health?

   1. strongly disagree  
   2. moderately disagree  
   3. somewhat disagree  
   4. neutral  
   5. somewhat agree  
   6. moderately agree  
   7. strongly agree

2) How much do **you** feel that information (such as in the *Costs of Unhealthy Eating* video) about the risks of unhealthy eating applies to you?

   1. not at all  
   2.  
   3.  
   4.  
   5.  
   6.  
   7. very much so

3) How at risk are **you**, personally, for the health problems associated with eating junk food and very few fruits and vegetables?

   1. very low risk  
   2.  
   3.  
   4.  
   5.  
   6.  
   7. very high risk

4) How important do **you** think it is that people become more aware of what and how they eat?

   1. not at all important  
   2.  
   3.  
   4.  
   5.  
   6.  
   7. extremely important
### What Do You Think Right Now?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Disagree nor Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, I have a feeling I eat more calories daily than I should.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I’m concerned about my eating habits because of how they affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I wish I did a better job of taking care of my health through better eating choices.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Right now, how much do you agree with each of these statements?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Junk food may be convenient, but eating too much of it can be unhealthy for my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Eating junk foods can leave me feeling tired throughout the day.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Eating unhealthy foods can have long term negative effects like high blood pressure and diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Eating unhealthy foods can lead to short term problems with sleep, digestion, or bad moods.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. It is important to pay attention to portion size (the amount of food I eat).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Eating plenty of fruits and vegetables is important to take care of my healthy body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The nutritional content (e.g., fats, sugars, proteins) of what I eat has a direct impact on my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. It is important for me to be more aware of what is in the foods I eat.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
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</tr>
<tr>
<td>9</td>
<td>Healthier foods are more expensive than fast food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Fruits and veggies can be easily incorporated into my daily meals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>It is possible to make healthier choices at fast food restaurants.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Looking Ahead.....

1. To what extent do you think you, personally, should try to make healthier food choices?
   
   1 not at all  2  3  4  5  6  7 very much

2. To what extent do you think you actually will try to make healthier food choices?
   
   1 not at all  2  3  4  5  6  7 very much

3. To what extent do you think you, personally, should limit eating junk foods?
   
   1 not at all  2  3  4  5  6  7 very much

4. To what extent do you think you actually will limit eating junk foods?
   
   1 not at all  2  3  4  5  6  7 very much

5. To what extent do you think you, personally, should swap certain foods for healthier options?
   
   1 not at all  2  3  4  5  6  7 very much

6. To what extent do you think you actually will swap certain foods for healthier options?
   
   1 not at all  2  3  4  5  6  7 very much

(continues on next page)
Looking Ahead...

7. To what extent do you think you, personally, **should** pay attention to the nutritional value (i.e., carbs, fats, sugars, proteins) of the foods you buy in the store?

   1  2  3  4  5  6  7
   not at all  very much

8. To what extent do you think you **actually will** pay attention to the nutritional value (i.e., carbs, fats, sugars, proteins) of the foods you buy in the store?

   1  2  3  4  5  6  7
   not at all  very much

9. To what extent do you think you **should** try to buy healthier foods for your home?

   1  2  3  4  5  6  7
   not at all  very much

10. To what extent do you think you **actually will** buy healthier foods for your home?

    1  2  3  4  5  6  7
    not at all  very much

11. To what extent do you think you **should** try to make healthier choices at restaurants?

    1  2  3  4  5  6  7
    not at all  very much

12. To what extent do you think you **actually will** try to make healthier choices at restaurants?

    1  2  3  4  5  6  7
    not at all  very much
About You

1. How do you feel about yourself right now?

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<thead>
<tr>
<th></th>
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<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<tbody>
<tr>
<td></td>
<td>extremely negatively</td>
<td>neutral</td>
<td>positively</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How would you describe your mood right now?

<table>
<thead>
<tr>
<th></th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extremely bad mood</td>
<td>neutral</td>
<td>good mood</td>
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</tbody>
</table>

About the Costs of Unhealthy Eating video

1) Regarding the video, The Costs of Unhealthy Eating, you watched, what was it about?

1. It is difficult to add healthy food into your diet.
2. Healthy eating is very expensive.
3. Unhealthy eating can cause a number of problems for everyone.
4. Fast food keeps you full longer than fruits and vegetables.

2) According to the Costs of Unhealthy Eating video, what happens when people eat junk foods?

1. They eat less than they normally would.
2. Their health (short term and long term) becomes poor.
3. They feel happy.
4. They make healthier food choices than they otherwise would.

3) For you, how personally important to you is the topic that was presented in the Costs of Unhealthy Eating video?

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<th>4</th>
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<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>very much so</td>
<td></td>
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</tbody>
</table>
APPENDIX E:
TWO-WEEK FOLLOW-UP MEASURE PACKET

What Do You Think?

Please read the questions below and circle the number that best matches what you think.

1) How much do you disagree or agree that eating unhealthy foods can be bad for your health?
   - 1 strongly disagree
   - 2 moderately disagree
   - 3 somewhat disagree
   - 4 neutral
   - 5 somewhat agree
   - 6 moderately agree
   - 7 strongly agree

2) How much do you feel that information (such as in the Costs of Unhealthy Eating video) about the risks of unhealthy eating applies to you?
   - 1 not at all
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7 very much so

3) How at risk are you, personally, for the health problems associated with eating junk food and very few fruits and vegetables?
   - 1 very low risk
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7 very high risk

4) How important do you think it is that people become more aware of what and how they eat?
   - 1 not at all important
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7 extremely important
## What Do You Think Right Now?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Disagree nor Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td><strong>1.</strong> Overall, I have a feeling I eat more calories daily than I should.</td>
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<td>2</td>
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<td><strong>2.</strong> I’m concerned about my eating habits because of how they affect my health.</td>
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<td>5</td>
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<tr>
<td><strong>3.</strong> I wish I did a better job of taking care of my health through better eating choices.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
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</table>
Right now, how much do you agree with each of these statements?

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<tr>
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<tbody>
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<td>5. It is important to pay attention to portion size (the amount of food I eat).</td>
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<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Thinking about since we last saw you.....

1. To what extent did you think you, personally, should try to make healthier food choices?

   1  2  3  4  5  6  7  
   not at all  very much

2. To what extent do you think you actually did try to make healthier food choices?

   1  2  3  4  5  6  7  
   not at all  very much

3. To what extent did you think you, personally, should limit eating junk foods?

   1  2  3  4  5  6  7  
   not at all  very much

4. To what extent do you think you actually did limit eating junk foods?

   1  2  3  4  5  6  7  
   not at all  very much

5. To what extent did you think you, personally, should swap certain foods for healthier options?

   1  2  3  4  5  6  7  
   not at all  very much

6. To what extent do you think you actually did swap certain foods for healthier options?

   1  2  3  4  5  6  7  
   not at all  very much

(continues on next page)
Since we last saw you...

7. To what extent did you think you, personally, **should** pay attention to the nutritional value (i.e., carbs, fats, sugars, proteins) of the foods you buy in the store?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
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<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>not at all</td>
<td>very much</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

8. To what extent do you think you **actually did** pay attention to the nutritional value (i.e., carbs, fats, sugars, proteins) of the foods you buy in the store?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>very much</td>
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</tbody>
</table>

9. To what extent did you think you **should** try to buy healthier foods for your home?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
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<td>very much</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. To what extent do you think you **actually did** buy healthier foods for your home?

    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
    |---|---|---|---|---|---|---|
    | not at all | very much |

11. To what extent did you think you **should** try to make healthier choices at restaurants?

    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
    |---|---|---|---|---|---|---|
    | not at all | very much |

12. To what extent do you think you **actually did** try to make healthier choices at restaurants?

    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
    |---|---|---|---|---|---|---|
    | not at all | very much |
About You

1. How do you feel about yourself right now?

1  2  3  4  5  6  7  8  9
extremely negatively neutral extremely positively

2. How would you describe your mood right now?

1  2  3  4  5  6  7  8  9
extremely bad mood neutral extremely good mood