MINDFUL EATING: WILLINGNESS TO SAMPLE AND ENJOYMENT OF SAMPLED FOOD IN OLDER ADULTS

By Kim H. Han

The present study examined the role of mindful eating and willingness to sample food and enjoyment of the sampled food among older adults. Participants were older adults (age $\geq$ 55) with no known food allergies. Participants were randomly assigned to one of three experimental conditions: a mindful raisin-eating task (n = 26), a nonmindful raisin-eating (control) task (n = 25), and a no-task baseline condition (n = 25). Following the experimental manipulation, all participants rated their expected liking of different foods, were offered anchovies to sample, and rated their actual enjoyment of the sampled anchovies. Results indicated no statistically significant differences between the mindful raisin-eating and nonmindful raisin-eating control group on expected liking of different foods, $F(1, 49) = 0.17$, $p = .68$, willingness to sample anchovies, $\chi^2 (2) = 0.34$, $p = .84$, or the enjoyment of sampled anchovies, $F(2, 37) = 0.93$, $p = .41$. The failure to replicate previous findings may be due to a lack of statistical power to detect meaningful differences, particularly in the expected liking of previously disliked foods, due to the small sample size (N = 76). It may also be that the attitudes and behaviors of older adults are more ingrained or reflexive due to a longer lifetime of rehearsal compared with young adults, and thus a one-time mindfulness experience may be less impactful in altering attitudes and behaviors in older adults compared to young adults.

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by

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To Jane and Autumn, the most amazing gifts of the Universe, with my eternal love for them....

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Introduction

Promoting optimal health and maintaining quality of life in people at different developmental stages is an important issue for the well-being of a society as a whole. Among many factors that contribute to optimal health, food is essential for maintaining basic biological functions and for preventing and healing diseases. Khalsa (2003) reported numerous cases of patients unexpectedly recovering from seemingly formidable illnesses when conventional treatment was combined with using food as a form of medicine, particularly with an emphasis on eating the food mindfully.

As people age, they experience a decline in physical functioning due to changes in biological regulatory systems, including neuroendocrine, cardiovascular, and immune systems (Gruenewald & Seeman, 2010). For example, both subjective and objective measures of sensory functioning decrease as individuals age (Schumm et al., 2009). Life-long environmental stresses on the body and a decline in biological functions can cause various health issues in older adults and compromise their quality of life. Therefore, an adequate and balanced nutritional intake through diverse food consumption may be far more crucial to optimal health in an older population than in a younger population.

Mindfulness and Its Benefits

Since its concept was integrated into Western psychology, mindfulness has been described and defined in various ways (Bishop et al., 2004; Brown, Ryan, & Creswell, 2007; Shapiro, Carlson, Astin, & Freedman, 2006). In general, most researchers define

mindfulness as “awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145). The willingness and ability to experience nuances in life without preconceived judgments or expectations is theorized to be essential for a high quality of life (Langer, 2009). Another definition offered by Langer (2009) is that mindfulness is a flexible state of mind, being open to new experiences while actively processing novel distinctions. In contrast, mindlessness follows rules and routines governed by a rigid mindset oblivious to new information or contextual changes, blocking access to different perspectives that could lead to alternative understanding and viewing of experiences. Similarly, Baer (2009) describes mindfulness as “Close observation of all experiences that arise, with an attitude of acceptance, openness, and willingness and without impulsive attempts to change or escape them, even if they are unpleasant or unwanted...contrasted with states of mind in which behavior occurs automatically or mindlessly because attention is focused elsewhere” (p. 15).

Coffey, Hartman, and Fredrickson (2010) found that individual variations in nonjudgmental acceptance of one’s own experience in a non-clinical sample were positively related with the ability to regulate negative emotions, which plays an important role for mental health. The extant literature has indicated that mindfulness is negatively associated with depression, anxiety, neuroticism, and psychological distress (Brown & Ryan, 2003; Jain et al., 2007) and positively associated with physical and psychological well-being (Brown et al., 2007). Therapies that incorporate mindfulness, such as Mindfulness Based Stress Reduction (MBSR) and Dialectical Behavior Therapy (DBT),

have been shown to be effective in treating psychological disorders such as depression, social anxiety, and borderline personality disorder (Ivanovski & Malhi, 2007).

In addition, a growing number of neuroimaging studies have provided some evidence for neural correlates of mindfulness. Results from a study using functional magnetic imaging (fMRI) (Creswell, Way, Eisenberger, & Lieberman, 2007) showed a strong positive correlation between the activation of prefrontal cortex (PFC) and dispositional mindfulness and a negative correlation between amygdala responses and dispositional mindfulness during an affect labeling task (matching facial expressions to appropriate affect words). Amygdala activation is associated with processing fear and aggression, whereas PFC is known to control the amygdala activity during distressful events (Bear, Connors, & Paradiso, 2007). Creswell and his colleagues (2007) theorized that high mindfulness may be associated with more efficient inhibition of amygdala responses by PFC during affect labeling and thus may enhance physical well-being by reducing negative affect. Similarly, high mindfulness is associated with lower baseline amygdala activity, which in turn is related to fewer depressive symptoms, suggesting a potential mechanism by which mindfulness-based interventions may reduce the risk for depression or depression relapse (Way, Creswell, Eisenberger, & Lieberman, 2010).

Mindfulness and Eating

As an increasing number of mindfulness research programs have provided evidence for the positive effects of mindfulness in physical and psychological well-being, its application to eating has attracted growing interests from both the public and scientific

communities (Bays, 2009; Miller, Kristeller, Headings, Nagaraja, & Miser, 2012). In a recent study with adults (35 – 65 years of age) diagnosed with diabetes for at least 1 year, Miller and colleagues (2012) found that a 3-month intervention consisting of mindful eating could significantly lower weight, waist circumference, body mass index, and hemoglobin A1c. Furthermore, Bays (2009) posited that becoming aware of our own conditioned and mindless behavior around food through mindful eating is the key to developing healthier eating habits, promoting higher enjoyment of food, and enhancing overall quality of life.

While all food is crucial for sustaining life and maintaining overall health, our selection of food and biases against certain foods are constantly being conditioned from the moment of birth (Bays, 2009). Such conditioning is largely influenced by environmental factors including family background, media, peer group, and culture. These experiences shape idiosyncratic eating behaviors, which over time become habitual and may even take on an automatic or mindless quality. Furthermore, even a single positive or negative eating experience can sometimes convince us to seek out or avoid certain foods in the future. For instance, a person might dislike all fish after trying only one type (e.g., anchovies on a pizza) on one occasion or conclude that eating sushi is disgusting without ever trying it just because a friend had a negative experience with it.

Another aspect of mindless eating is that people make the vast majority of their food-related decisions without being fully aware of the decision-making process. Wansink and Sobal (2007) found that when asked to estimate the number of food-related decisions made in a typical day, people reported making 14 food-related decisions on

average. However, when the foods were divided into three separate categories of meals, snacks, and beverages, and the questions about food-related decisions were more specific in terms of when, where, what, and how much, an aggregate index showed that the average person made 227 food-related decisions. These findings indicate that people usually do not pay attention to or are unaware of the context or decision-making processes surrounding food consumption, especially for consuming snacks and beverages between larger meals (Wansink & Sobal, 2007).

A behavioral practice similar to employing mindfulness during eating such as slowing down the speed of eating (e.g., eating for 29 rather than 8 minutes) by taking smaller bites, putting down the fork between bites, and increasing the number of chews per bite tends to increase food palatability (Andrade, Greene, & Melanson, 2008). In a study in which the attention and awareness aspects of eating were investigated by manipulating levels of distraction while participants were sampling foods (i.e., the amount of attention paid to information regarding sampled foods), participants in higher levels of distraction (e.g., memorizing an eight-digit number), akin to mindlessness, reported higher liking of a familiar and typically enjoyed, less healthy food such as milk chocolate rather than soy chocolate. However, low levels of distraction (e.g., memorizing a two-digit number), akin to mindfulness, resulted in higher liking and enjoyment of the healthier food (soy chocolate over milk chocolate) (Shiv & Nowlis, 2004). Results from another study showed that paying attention to verbal information in the form of objective information (e.g., product name and descriptions of ingredients) generally increased

liking of foods regardless of familiarity with the food (Tuorila, Meiselman, Bell, Cardello, & Johnson, 1994).

In a recent study, Hong, Lishner, Han, and Huss (2011) found that college students who engaged in a short mindful raisin-eating exercise reported higher expected liking of foods compared with nonmindful raisin-eating, particularly in terms of foods that were initially disliked or rated as aversive such as sardines. A follow up study by Hong, Lishner, and Han (in press) found that, even though a mindful raisin-eating practice did not necessarily increase participants' willingness to try offered foods (prune, wasabi pea, and anchovy), mindful raisin-eating resulted in higher enjoyment of foods that were sampled compared with either nonmindful raisin-eating or no raisin-eating. Findings from these two studies suggest that mindful eating practices may promote more enjoyment of previously disliked or avoided foods, potentially leading to healthier eating behaviors (e.g., eating variety of foods), which is ultimately crucial for promoting optimal health and a higher quality of life.

Older Adults and Food Experience

Schiffman (1997) found that beginning around the age of 60, older adults experience sensory decline in the ability to taste and smell stimuli, which may contribute to less enjoyment of food in older adults compared with younger adults (Valias & Nitzke, 1998). Results of several studies suggested that older adults have decreased sensitivity to taste and olfactory stimuli compared to the younger individuals (Kremer, Bult, Mojet, & Kroeze, 2007; Mojet, Heidema, & Christ-Hazelhof, 2004; Schiffman, Hornack, & Reilly,

1979) and thus need greater concentration of the stimuli to recognize or discriminate intensity of flavor (Kaneda et al., 2000; Nordin, Razani, Markison, & Murphy, 2003). Schiffman (1997) found that this sensory decline in taste and smell could impact the selection and consumption of food by older adults (e.g., not eating as much or only eating certain foods) and resulted in poor or unbalanced nutrient intake, ultimately compromising their physical and cognitive functions and decreasing their quality of life. Normally, palatability of a food decreases after consuming a large quantity of the food (i.e., sensory-specific satiety), which promotes variability in food selection during a meal (Rolls, 1986). Due to the age-related smell and taste losses, older adults experience less sensory-specific satiety, resulting in less dietary variety, and thus higher risk for undernutrition (Hollis & Henry, 2007; Murphy, 2008; Rolls & McDermott, 1991).

Strategies to compensate for perceptual losses and to promote adequate nutritional intake in older adults have been investigated, but the outcomes tend to be inconsistent. Some research studies showed that flavor enhancers increased food intake and satisfaction ratings and improved palatability and acceptance of food (Laureati, Pagliarini, & Calcinoni, 2008; Schiffman, 2000). Other studies showed that using flavor enhancers (e.g., monosodium glutamate or celery powder) did not lead to an increase in liking ratings or consumption of tomato soup (Essed, Kleikers, van Staveren, Kok, & Graaf, 2009) or liking ratings of custard desserts in older adults (Kremer et al., 2007). Essed and his colleagues (2009), however, pointed out that the reason for no significant increase in liking ratings or consumption of tomato soup by older adults in their study might have been due to lower concentration of the flavor enhancers (e.g., 0.12%), compared with the

ones used by other studies (e.g., 0.3-1.0%), in that the older adults were not able to detect difference between the flavor-enhanced and non-enhanced soup. Furthermore, Kremer et al. (2007) found that older adults who lived alone reported, in general, less liking of the custard desserts than did older adults who lived with two or more people, suggesting an influence of social facilitation in food consumption and enjoyment of the consumed food as well.

To date, no study has examined the potential benefits of mindful eating in an older adult population. The goal of the present study was to extend the two Hong et al. (2011; in press) studies to an older adult population to examine whether engagement in a mindful raisin-eating practice would increase expected food liking, willingness to try a novel or generally disliked food (anchovy), and subsequent enjoyment ratings of the sampled anchovy in older adults. First, it was hypothesized that mindful eating of a focus food (raisin), compared to nonmindful eating of raisins, would be associated with higher ratings of expected liking of food generally in an older adult population. Second, it was predicted that participants in the mindful raisin-eating condition, compared with the nonmindful raisin-eating control condition, would be more willing to sample anchovy. Third, it was predicted that participants who sampled the anchovy in the mindful raisin-eating condition, compared with the nonmindful raisin-eating control condition, would report higher enjoyment of the sampled anchovy.

Method

Participants

Adults at least 55 years of age were recruited from the University of Wisconsin Oshkosh as well as from church congregations, social clubs, and community centers in the Appleton, Oshkosh, and Ripon areas. Recruitment announcements were made in the form of newsletters, e-mails, short presentations to different community facilities, or newspaper ads. Seventy-seven older adults (51 females, 26 males) volunteered to participate in the study. Participants did not receive compensation for their participation. All participants reported no known food allergies. One female participant was excluded from analyses due to age disqualification (i.e., participant reported age 41on demographic form). The ages of the remaining seventy-six participants ranged from 55 to 91 years old (M = 67.33, SD = 8.65). All but two individuals were Caucasian (97.4%); most were married (57.9%) and lived with family or relatives (67.1%).

Procedures

Participants were informed during the consent procedure that their participation would be entirely voluntary and they were free to withdraw from the study at any point during the session for any reason without an explanation to the researcher. The researcher reviewed the consent form (Appendix A) with participants prior to starting the study. After signing the consent form, participants were randomly assigned, using randomized blocks, to one of three conditions—mindful raisin-eating, nonmindful raisin-eating

control, or no-task baseline condition. Each session contained 1-2 participants and lasted 45-60 minutes. The sessions occurred in labs at University of Wisconsin Oshkosh or private rooms in the church facilities or community centers. When two participants were scheduled simultaneously, but an additional room was not available at church facilities or community centers, a portable room divider was placed between the two participants so that they cannot view each other while performing experimental tasks, completing questionnaires, or sampling anchovies. They were also instructed to refrain from making comments or talking to each other during the session. The two CDs used for the mindful raisin-eating and nonmindful raisin-eating control conditions were the same as the ones from Hong et al.'s (2011) study.

Participants in the mindful raisin-eating condition listened to the mindful raisin-eating exercise CD, a shortened version of Kabat-Zinn's (2006) mindful raisin-eating exercise. The exercise was originally developed by Kabat-Zinn and used in the MBSR program as part of mindfulness training (Kabat-Zinn, 2003). In the CD, the narrator instructed participants to nonjudgmentally pay attention to and become fully aware of different aspects of a raisin by experiencing the raisin with all senses (e.g., seeing, touching, smelling, hearing, and tasting). This version was shortened from 17 minutes to 12 minutes primarily by shortening the pauses between the instructions and the long pause at the end of the exercise. The basic elements of Kabat-Zinn's mindfulness exercise were retained in the shortened version (i.e., directing participants to deliberately and open-heartedly engage in eating a raisin). In the nonmindful raisin-eating control condition, participants listened to a recording of the history of box making and the use of

boxes in transporting and storing foods, which then naturally segued to tasting raisins as a sample food packaged and transported in boxes. Participants in the nonmindful raisin-eating control condition were directed to eat the raisin but were not given mindfulness instructions. Except for the content of the CDs (Appendix B and Appendix C), the mindful raisin-eating and nonmindful raisin-eating control condition CDs were recorded by the same person and were similar in length, pace, and tone.

In order to keep the researcher blind to the participants' task condition the mindful raisin-eating condition and the nonmindful raisin-eating control condition CDs were randomly marked with numbers 1 or 2 by a person not affiliated with the study. In addition, there was a delay of 60 seconds on both CDs, thus allowing the researcher to leave the room before the CD began. Participants were told to follow the instructions as closely as possible, not talk to each other throughout the task, and remain in their seats when they were finished until the researcher returned. They were also instructed not to discuss the content of the task with the researcher.

In the mindful raisin-eating and nonmindful raisin-eating control conditions, when the researcher returned to the room at the end of 12 minutes, participants then completed a liking ratings form in which food and nonfood (filler) items, such as pets and hobbies, were presented in random order. They were instructed to rate each food and nonfood item on a 7-point scale (1 = *extremely negative*; 4 = *neutral*; 7 = *extremely positive*). Descriptions of different items were provided on the back of the ratings form (Appendix D), and participants were directed to look up any item if needed.

Next, each participant was led into a separate room and given a small box containing 4 small dried anchovies. They were told to follow the instructions attached to the box, after which the researcher left the room. The instructions (Appendix E) directed the participant to open the box and indicated that they should feel free to sample the available food (anchovies). Following this, participants completed a set of questionnaires that included: (1) an enjoyment rating form for the sampled anchovy, (2) the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), (3) the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and (4) a demographic form (Appendices F, G, H, & I, respectively).

Participants in the no-task baseline condition followed the same procedure as in the two raisin-eating conditions, except that they did not listen to a CD or eat raisins. Instead, after the consent procedure, they completed the food-liking ratings form, sampled the anchovy, and completed questionnaires.

On the enjoyment rating form (Appendix F), participants were asked whether they tried the anchovy (i.e., actually put it in the mouth or licked it and tasted it). If they tried it, they were asked to write the number of anchovies left in the container. Participants were then directed to rate the degree of enjoyment of sampling the anchovy on the 7-point scale (1 = *extremely negative*; 4 = *neutral*; 7 = *extremely positive*). At the end of each session, the researcher counted the number of anchovies left to ensure accurate counting by the participant. If any discrepancy were found, the researcher wrote the number counted in parentheses with the researcher's initials.

To control for any effect of past anchovy-eating experiences on the enjoyment rating, participants were asked to categorize their anchovy-eating history into one of four categories: never, a few (1-2), some (3-9), and a lot (10+). To prevent inadvertently influencing participant responses, the anchovy-eating history question was included at the end of the study. Because the anchovy-sampling history variable was introduced after data collection had begun, responses from eight participants were unavailable. Preliminary analyses indicated no differences between those with the inclusion of the anchovy-eating history question and those without the question in age (M = 67.46, SD = 8.72; M = 67.33, SD = 8.65, respectively), $t(142) = 0.09$, $p = .93$; years of education (M = 15.06, SD = 2.79; M = 15.21, SD = 2.83), $t(142) = 0.32$, $p = .75$; and percentages of participants who were married (57.4%; 57.9%), χ^2 (1) = 0.01, $p = .95$, female (72.1%; 65.8%), χ^2 (1) = 0.66, $p = .42$, or Caucasian (97.1%; 97.4%), χ^2 (1) = 0.01, $p = .91$. Final analyses, therefore, were conducted including all 76 participants.

Measures

The *MAAS* was used to measure dispositional mindfulness ($\alpha = .81$). The MAAS consists of 15 items that assess attention and awareness with every day events and experiences. Participants rate each item on a 6-point scale (1 = *almost always*; 6 = *almost never*) (Brown & Ryan, 2003). Examples of statements are: “I could be experiencing some emotion and not be conscious of it until sometime later,”; “I find myself preoccupied with the future or the past,”; “I snack without being aware that I’m eating.”

Scoring involves calculating a mean score of the 15 items, and higher scores indicate greater dispositional mindfulness.

The *PANAS* was used to evaluate the mood states of participants (α = .90 for PA subscale; α = .78 for NA subscale). Participants rate each item on a 5-point scale (1 = *very slightly or not at all*; 5 = *extremely*) (Watson et al., 1988). Examples of PA descriptors are "interested," "excited," "enthusiastic," "proud," and "inspired." Examples of NA are "distressed," "upset," "irritable," "ashamed," and "nervous." A Positive Affect (PA) subscale and a Negative Affect (NA) subscale can be calculated by summing the 10 items in each subscale for a score range of 10-50.

Following completion of the questionnaires, participants were provided with a debriefing (Appendix J) consistent with other psychology studies to: (1) assess suspicion rates and (2) ensure that participants did not experience distress at the end of the study. The researcher then thanked them for participating in the study.

Results

Preliminary Analyses

The results of analyses of demographic variables and scores on the MAAS and PANAS are displayed in Table 1. No significant differences were found by experimental condition on any of the demographic variables or PANAS scores. A one-way ANOVA revealed significant differences among the 3 experimental groups on the MAAS scores, $F(2, 73) = 6.10$, $p = .004$, $\eta^2 = .14$. Independent sample *t*-tests revealed that the mindful raisin-eating group reported significantly lower dispositional mindfulness ($M = 4.00$, $SD = 0.57$) than the nonmindful raisin-eating control group ($M = 4.42$, $SD = 0.59$), $t(49) = -2.61$, $p < .05$, $d = -0.72$, and the no-task baseline group ($M = 4.50$, $SD = 0.49$), $t(49) = -3.34$, $p < .01$, $d = -0.94$. However, the nonmindful raisin-eating control group did not differ from the no-task baseline group, $t(49) = -0.50$, $p = .62$, $d = -0.15$.

Post-Task Ratings of Food Liking

No significant differences were detected between the mindful raisin-eating and nonmindful raisin-eating control groups for each food item, all *t* values ≤ 1.71 , *p* values $> .09$ (Table 2). As in the original Hong et al. (2011) study, food liking ratings made by participants in the no-task baseline condition were used to create three categories of initial baseline food liking: liked foods; neutral foods; and disliked foods. A one-sample *t*-test was conducted to compare mean ratings for each food against the neutral value of *4* on the 7-point rating scale. Foods with mean ratings significantly higher than *4* were

categorized as “liked;” foods with mean ratings not significantly different from *4* were categorized as “neutral;” and foods with mean ratings significantly lower than *4* were categorized as “disliked.” Table 3 displays mean ratings for foods in each category in the no-task baseline condition.

For participants in the mindful raisin-eating and nonmindful raisin-eating control conditions, post-task composite liking scores were generated by averaging across post-task liking ratings within each of the three categories of initial food liking (Table 4). The three post-task composite liking scores were then analyzed by a 2 (Task: mindful eating vs. nonmindful eating) x 3 (Initial liking: liked vs. neutral vs. disliked) mixed-model ANOVA. The results showed no differences between the mindful raisin-eating and nonmindful raisin-eating control conditions on the post-task composite liking scores for each category of initial food liking, $F(1, 49) = 0.17$, $p = .68$, and no Task x Initial liking interaction, $F(2, 98) = 0.81$, $p = .45$.

Anchovy Sampling Analyses

Participants were categorized into two dichotomous groups: (1) samplers, those who ate at least one anchovy, and (2) nonsamplers, those who did not eat any anchovy. A chi-square test indicated no significant differences in the likelihood of sampling the anchovy among those in the mindful raisin-eating, 53.8% (14/26), nonmindful raisin-eating control, 48.0% (12/25), and no-task baseline conditions, 56.0% (14/25), χ^2 (2) = 0.34, $p = .84$. For participants who sampled the anchovy, a one-way ANOVA revealed no significant differences in the mean enjoyment ratings for those in the mindful raisin-

eating condition (M = 3.29, SD = 1.68), the nonmindful raisin-eating control condition (M = 3.58, SD = 1.68), and the no-task baseline condition (M = 2.71, SD = 1.64), $F(2, 37) = 0.93$, $p = .41$. A one-way ANOVA on the number of anchovies sampled showed no significant differences among those in the mindful raisin-eating condition (M = 0.69, SD = 1.06), the nonmindful raisin-eating control condition (M = 0.63, SD = 1.02), and the no-task baseline condition (M = 0.92, SD = 1.21), $F(2, 73) = 0.49$, $p = .62$.

A chi-square test was used to examine whether participants' past experiences of eating anchovies had an effect on the willingness to sample the anchovy and the enjoyment ratings in the current study. Due to the small sample size and unequal distribution of participants in each of the aforementioned anchovy-sampling history categories, participants were re-categorized into two dichotomous categories of past anchovy-sampling experiences: no sampling history versus sampling history. Table 5 displays the number and percentage of participants falling in each category according to the re-categorization. A chi-square test indicated no significant differences in the past anchovy-sampling experience among those in the mindful raisin-eating condition, 65.2% (15/23), nonmindful raisin-eating control condition, 63.6% (14/22), and no-task baseline condition, 47.8% (11/23), χ^2 (2) = 1.75, $p = .42$. A one-way ANCOVA (controlling for the anchovy sampling history) showed no significant differences in the adjusted mean enjoyment ratings of the sampled anchovy among those in the mindful raisin-eating condition (M = 3.32, SE = 0.46), nonmindful raisin-eating control condition (M = 3.28, SE = 0.47), and no-task baseline condition (M = 2.73, SE = 0.41), $F(2, 35) = 0.59$, $p = .56$.

Discussion

The purpose of this study was to replicate the previous studies (Hong et al., 2011; Hong et al., in press) with an older adult population. The data did not support the proposed hypotheses. Older adults in the mindful raisin-eating condition did not report higher ratings of expected liking of foods, were not more willing to sample anchovies, and did not report higher enjoyment of the sampled anchovy.

Although a small sample size (N = 76) in the present study may not solely account for the failure to replicate previous findings, it is likely that the failure to replicate Hong et al. (2011) study, in particular, may be primarily due to a lack of statistical power to detect meaningful differences as a result of the small sample size. In Hong et al. (2011) study, the mindful raisin-eating exercise had a relatively large effect (Cohen's d = 0.71) on the expected liking of initially disliked foods, whereas the effect size in the present study was small (Cohen's d = 0.22). A sample size of 52 – 60 in each condition in Hong et al. (2011) study may have provided enough statistical power to detect the relatively large effect size, whereas a sample size of 25 – 26 in each condition in the present study may have lacked the statistical power to detect, especially, the small effect.

There are other possible reasons for the nonsignificant findings. Older adults may not find a one-time mindfulness experience as meaningful or a one-time mindfulness experience may be less impactful in altering attitudes and behaviors in older adults compared to young adults. One possible explanation may be that the attitudes and behavior of an older adult may be more ingrained or reflexive due to a longer lifetime of

rehearsal compared with a younger adult. In addition, due to age-related decreases in cognitive resources (e.g., working memory) older adults may less effectively engage in mindfulness practice, compared with young adults. Vago and Silbersweig (2012) posited that the working memory system supports executive monitoring (i.e., meta-awareness) to maintain intention and motivation and to implement and maintain practice instructions. Mindfulness practice, therefore, may initially require effortful cognitive processing but, over time, become less effortful.

Similarly, Wang and Chen (2006) found that working memory mediated the effects of age in attitude change. Older adults experienced attitude change toward social issues (e.g., marijuana legalization and capital punishment) only when they read 9 (vs. 3) persuasive arguments in both the high and low motivation conditions (i.e., being informed about post-task discussion of the arguments vs. no discussion, respectively). In contrast, young adults experienced an attitude change after reading either 3 or 9 arguments in the high motivation condition but only experienced attitude change after reading 9 arguments in the low motivation condition. High motivation more likely induces effortful cognitive processing that demands more cognitive resources (e.g., working memory) than does low motivation. Due to fewer available cognitive resources, compared with young adults, older adults may tend to employ less effortful cognitive processing regardless of the levels of motivation and may need an exposure to a large number of arguments to experience attitude change. These findings suggest that older adults may need more than one short mindful raisin-eating exercise to influence their attitudes and behavior toward foods, even if they were highly motivated to change.

A one-way ANCOVA controlling for the age, however, did not reveal significant differences in the adjusted mean enjoyment ratings of the sampled anchovy among those in the mindful raisin-eating condition (M = 3.13, SE = 0.41), nonmindful raisin-eating control condition (M = 3.60, SE = 0.44), and no-task baseline condition (M = 2.86, SE = 0.41), $F(2, 36) = 0.78$, $p = .47$. Further investigations of relations between age-related differences in working memory capacity and the effects of mindfulness practice will be necessary.

Other possible explanations could be that the effect of mindful raisin-eating exercise may have mostly dissipated by the time the anchovies were offered to sample due to a longer time to complete the expected food-liking rating form, compared with college students (e.g., 6 – 12 vs. 3 – 6 minutes, respectively). Whereas college students are used to the procedures involved in the present study through carrying out academic activities (e.g., taking written tests, following instructions, or participating in experimental studies), older adults are not used to performing the tasks involved in the present study. Furthermore, older adults might have felt the mindful raisin-eating task, in particular, rather strange or annoying, and thus not being able to experience the desired effects of the mindfulness practice.

A notable observation was that older adults in the mindful raisin-eating condition scored significantly lower on the MAAS than did those in the nonmindful raisin-eating control or the no-task baseline condition. Because the MAAS measures stable, dispositional mindfulness and participants were randomly assigned to each condition, any group differences were not expected. As can be seen in Table 1, the three experimental

groups did not differ in any other demographic and affective measures. One possible explanation may be that the mindful raisin-eating exercise may have influenced the self-report of dispositional mindfulness on the MAAS, resulting in the lower scores than those in the nonmindful raisin-eating control or no-task baseline condition.

Given that the mindful raisin-eating exercise is highly suggestive of paying attention to all aspects of eating experience and being open to new experiences (Appendix B), it might have become salient to older adults, while completing the MAAS after the exercise, that they ordinarily do not pay attention to their surroundings as much as they experienced during the exercise. Older adults in either the nonmindful raisin-eating control or no-task baseline condition were not likely to be influenced in the same manner because neither the nonmindful raisin-eating task (Appendix C) nor no task was suggestive of paying attention to everyday experience. In contrast, the college students in the previous study (Hong et al., in press) completed the MAAS before the experimental task (or no task), and their scores on the MAAS did not differ by the experimental condition. As the MAAS is considered an instrument to measure dispositional mindfulness, if the lower MAAS scores for those in the mindful raisin-eating condition, compared with the nonmindful raisin-eating control or no-task baseline condition, reflected the effects of mindfulness manipulation, then the construct validity of the MAAS should be questioned. A further study examining the construct validity of the MAAS is warranted.

It is important to note that this study concerned the reduced enjoyment of food mainly due to a natural sensory decline (e.g., decreased sense of taste and smell) in an

older adult population. However, other factors such as prescription drugs for various chronic conditions (e.g., hypertension, diabetes, and cardiac diseases), denture wares, and oral health condition can also cause sensory decline in older adults and may limit their food choices. Even though sensory decline is believed to be one of the major factors associated with the reduced enjoyment of food among older adults, subsequently affecting eating behavior and dietary intake, other factors, such as socioeconomic status, availability of and access to healthy food, and social network, also can influence older adults' eating behavior and dietary intake. Therefore, ways to promote healthy eating in older adults should involve a multidimensional approach, weighing in all those factors.

Future Directions

It is most likely that the sample size (N = 76) of the present study was not large enough to provide the needed statistical power to detect any effect of mindfulness practice, in particular, on the expected liking of foods that are usually disliked. Given the promising results of the previous studies with college students, a future study with a larger sample of older adults is warranted. In addition, the present study indicated a possible cohort difference in categories of liked and disliked foods: Older adults liked most of the vegetables disliked by college students, resulting in only 5 items (out of 32) categorized as disliked. As the effect of mindful raisin-eating experience was largest for the typically disliked foods and smallest for the typically liked foods in the previous study (Hong et al., 2011), a revised liking rating form that better reflects older adults' food preferences may be necessary to detect such effects. Given the unexpected

differences in the MAAS scores by the experimental condition, which may have been due to the fact that the MAAS was measured only after the experimental task, it would be useful to measure the MAAS before and after the task to examine both within- and between-group differences.

A longitudinal study with pre- and post-treatment assessments, employing a repeated practice of mindful eating, may be more suitable to evaluate the true effects of mindful eating practice in older adults. One short mindful eating practice may not have been enough to produce a behavioral change given that food preferences and eating behavior tend to be formed during childhood and maintained for a lifetime. Furthermore, a shorter mindful eating exercise (e.g., 5 rather than 12 minutes) that can be practiced 2-3 times a day with any type of food may be more practical and easier to maintain compliance than a mindful eating exercise with a specific food item in a longitudinal study.

Furthermore, a longitudinal study with pre- and post-treatment assessments, employing a repeated practice of mindful eating, will be more suitable to evaluate the true effects of mindful eating practice in older adults. One short mindful eating practice might not have been enough to produce a behavioral change given that food preferences and eating behavior tend to be formed during childhood and maintained for a lifetime. A further study with a larger sample size may yet prove mindful eating to play a significant role in promoting enjoyment of food and quality of life in older adults.

APPENDIX A

Consent Form

Consent Form
University of Wisconsin Oshkosh

The Department of Psychology supports the practice of protecting human participants in research. The following information is provided so that you can decide whether you wish to participate in the present study. Your participation is solicited but is strictly voluntary.

For this study, you will be asked to complete questionnaires after listening to an audio recording lasting approximately 12 minutes. The questionnaires measure mood and attitudes toward different things. In addition, you may be asked to eat a few different food items including nuts, raisins, and meat items. **If you have nut or date (e.g., prunes or raisin) allergies or any other extensive food allergy, please inform the researcher right now. Some of the foods that you may be asked to sample may be hard or chewy, so please alert the researcher if you have any difficulty chewing or are at risk for choking.** You will also be asked to provide basic demographic information.

We do not anticipate that any of the questionnaires or that the listening activity will cause distress.

Please keep in mind that if you agree to participate, you will be free to withdraw at any time. If you decide not to participate in this study, at any time or for any reason, please let the researcher know and you will be excused from the study. You do not need to tell the researcher your reasons for choosing not to participate. If you decide to withdraw from the study, any information, except the consent form, collected from you up to that point will be destroyed.

Although participation in this study may not directly benefit you, we believe that the information you provide will be useful in furthering the understanding of psychological phenomena.

All responses will be confidential and will not be associated in any way with your name. No information that could identify you will be released in any form.

Once the study has been completed, we will gladly provide you with the results. In the meantime, if you have any questions about the study, please contact:
Phan Y. Hong, Ph.D.
Department of Psychology – CF 14
University of Wisconsin Oshkosh
Oshkosh, WI 54901
(920) 424-2302
hongp@uwosh.edu

If you have any complaints or concerns about your treatment as a participant in this study, please contact:
Chair, Institutional Review Board for
Protection of Human Participants
C/o Grants Office
UW Oshkosh
920-424-1415

Although the chairperson may ask for your name, all complaints are kept in confidence.

Consent Statement: I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary, and that I may withdraw at any time. By signing this, I confirm that I am at least 18 years old and can give consent.

_____ _____
Name (Printed and Signature) Date

APPENDIX B

Mindful Raisin-Eating Task CD

Mindful Eating of a Raisin Exercise (A shortened version of the Jon Kabat-Zinn's)

(Bell rings)

Since we've seen that cultivation of mindfulness has to do with paying attention to things that we ordinarily don't pay attention to, we're going to start this series of formal practices with an actual eating meditation. So, for this practice, see if you can arrange to have a couple of raisins on hand and we're going to just take one of them and bring it up towards the face for closer inspection. And, just drinking it in through your eyes, as if you'd never seen one of these things before, and maybe even forgetting that it's called a raisin, and seeing it in its fullness. You've certainly never sent his particular one before. So, noticing its surface features: color, shape, as you turn it in your hands just sort of seeing whether there are any unique features to it. As I'm doing it I notice a kind of little circular scarring in one end, which as you know is the equivalent of our belly button. Sort of evidence that this shriveled up little something was once connected to a much larger whole. But just drinking it in through the eyes. And maybe closing your eyes when you feel like it and feeling it through your fingers. Really getting in touch with this object, noticing the ridges and the valleys and maybe even putting it in the palm of your hand and feeling the heft of it, it has a certain weight to it. And maybe even bringing it up to the nose at a certain point and, again, drinking in the fragrance, anything at all in the domain of smell coming off of this object. And, again, perhaps with the eyes closed if it helps you to be more in touch with your experience from moment to moment. Just sensing what's here to be smelled, allowing the in-breath to bring with it the aroma, the fragrance—if there is any—off of this object. And when you're ready, allowing your eyes to open and continuing to hold it in your fingers and feeling it and seeing it and be aware of the quality of the attention that you're bringing to this hugely familiar object. And staying as best you can present with the seeing, with the touching, as best you can from moment to moment.

When you're ready, you can, if you want to, you can even bring it up to one of your ears and see if you can hear anything coming from it. As you turn it around real close to the ear, so it's not out of the question that we don't often listen to our food, but it's not a question that you could use the hearing sense and some foods actually do fizzle or flame or make crackling noises and you may find that this little object will surprise you if you turn it around near your ears. But then bringing it back to where you can see it and then, gradually, bringing it up towards the lips. And noticing, as you do that, that the arm and the hand really know how to do this position, right in the center, you know. When you were six months old, your body didn't quite do it this way. And whatever you were eating wound up all over your face, all over the floor, all over your body. But, just honoring how well the gross motor functioning of the arm and the hand can bring this object right up to your lips and, as you do that, before you touch it to the lips, or let it come inside, noticing if anything is going on in your mouth. As I do it, I'm finding that there is a strong secreting of saliva in my mouth. And it's clear that there's a certain kind of anticipation that feeding is going to start happening very soon. But noticing this object hasn't come into the mouth yet. So it's all around anticipation, your mind is anticipating eating, and the body is actually secreting and not only secreting but actually synthesizing or generating enzymes and fluid to prepare the mouth for this initial step in the process of digestion. It's a real mind-body phenomenon. And you'd probably have the same thing happen if you didn't even have the raisin in your hand. And you can certainly feel that for yourself if you were to imagine biting down at this moment on a nice juicy fresh-cut wedge of lemon. Mind-body phenomenon.

So now with great sensitivity, slowly bringing the raisin to the lips and noticing how it comes into the mouth. Noticing how this whole thing works. Feeling what goes on to bring this object into the mouth. And then noticing how it gets positioned between the teeth, the role of the tongue in receiving it, in positioning it. Just holding this in awareness, moment by moment, without biting down yet. Just feeling the intelligence in the tongue and the cheeks and the teeth and in the mind. That is so well-suited for this activity called eating, and we do so many times a day with very, very little awareness. And slowly when the raisin is positioned where the mouth wants it to be positioned, slowly start biting down on it and taking maybe three, four, five, very deliberate, intentional, mindful chews while you remain open to whatever is going on in your mouth, in any of the sensory domains. Including hearing, including tasting, including feeling the texture. And, then, slowly continuing to chew and experiencing chewing and tasting moment by moment by moment. Just the direct experiencing of chewing and tasting to the degree that it is possible even underneath any thoughts that may be going on about this experience, the direct sensory experience, the teeth coming down on this object and the taste. And, as you continue to do this, make sure that you don't swallow it yet. But noticing the changes in texture and in taste that go on with continued chewing. And, before we do swallow it, seeing if you can be in touch with the first impulse that arises to actually swallow this stuff. And be aware of the intention to swallow and how that whole thing gets arranged, how whatever's left gets positioned for swallowing and being in touch with the swallowing. And in the aftermath of the swallowing, resting in awareness. How it feels in this moment, as you sit here. And if you like you can, in your mind's eye, or sensing in any way that you can, following what you've swallowed down into the belly where it will come to rest in the stomach. And allowing your awareness to expand to include a sense of the body as a whole sitting here, having just eaten one raisin with this kind of present-moment, open-hearted, spacious, attention. And just resting here in this being, in this awareness, feeling how things are right now in this moment, in the aftermath of all that's come before. Whether your eyes are opened or your eyes are closed, see if you can feel how it is in the body, how it is in the mouth, how it is in the heart, and how it is in the mind. And just resting here. You could say, outside of time, in the present moment, without having to have anything have to happen next.

Of course, if you want to eat another raisin mindfully, on your own at some point, certainly feeling free to do that. But, ultimately, the challenge here in the practice here is to simply be with each moment as it is. For the seeing, for the smelling, for the moving, for the receiving of the raisin, for the chewing and tasting, the swallowing, and the aftermath. And to be the knowing, that which knows the experience in its unfolding, as it's unfolding. And, resting here, moment by moment by moment. Until you hear the sound of the bells which will mark the end of this first guided introductory mindfulness meditation.

(Bell rings)

APPENDIX C

Nonmindful Raisin-Eating Control Task CD

History of Making Cardboard Boxes and Their Utility

Before we start the exercise, please find a comfortable sitting position. You will at times feel inclined to look at each other as you do this exercise, but we urge you to please not do this. We want everyone to concentrate as much on the exercise as possible. Please do not talk to each other starting from this point on. The researcher will come back in as soon as the exercise is finished, so once the exercise is done, please stay in your seated position.
We will begin the exercise now:

We wonder what is in the cardboard box the mailman left on the front porch or in the prettily wrapped gift-box under the Christmas tree. However, as adults, we seldom think about cardboard boxes themselves. We only think about the precious things tucked away inside of them. Young children on the other hand are enchanted with cardboard boxes. A common cliché says that if a child is given a large and expensive new toy, he or she will quickly become bored with it and play with the box instead. This is usually said somewhat jokingly. However, children certainly do enjoy playing with boxes, using their imagination to portray the box as an infinite variety of objects. Children enjoy playing with boxes so much that the cardboard box has been initiated into the National Toy Hall of Fame.

The products we order online, by phone, and through the mail are shipped to us in cardboard boxes. Many of the things we buy in stores are encased in cardboard. Semi-tractor trailers and ship cargo containers house stacks of boxes on their way to warehouses and stores. Boxes protect products before, during, and after shipment and are more economical than other types of containers. They play an integral role in international commerce and the global economy. We use cardboard boxes to protect our possessions on the journey to and from college and when moving to a new home or apartment. In the future, that new home or apartment may be made, in part, from cardboard. Cardboard houses are already available. One model is available for $32,204. It is marketed for short-term accommodation such as when a house is being renovated or for emergency housing after natural disasters. A layer of plastic on the outside of the house makes it water proof.

Almost anything can be made from cardboard. Green Lullaby, an international corporation, manufactures cardboard baby cradles, dollhouses, workbenches, and storage blocks. Their products are easy to transport because they stack flat and are easy to assemble since they do not require tools. They are water resistant and can be cleaned with a damp cloth. Architect Frank Gehry is a well-known designer of cardboard chairs and tables. Levy Design and Manufacturing produces high-end cardboard furniture. Their "low stool" sells for $420. It is a functional piece of art. Modern artists have used cardboard to make everything from abstract sculptures to full-scale replicas of manufactured goods such James Bond's Astro Martin DB8 and acoustic guitars to sculptures of the nude female form.

As you can see, the simple cardboard box plays an important role in our modern society. Surprisingly, cardboard boxes have been around for less than 200 years and have only become common in the last 100 years. Sir Malcolm Thornhil produced the first commercial cardboard box in England in 1817. The Museum of the Cardboard Box in Valréas, France traces the history of cardboard box making in that region. The manufacture of cardboard boxes was a major industry in that area for more than a century. Silk manufactures used cardboard boxes to transport the Bombyx mori moth and its eggs from Japan to Europe.

The first cardboard box manufactured in the United States was made in 1895. Cardboard began to replace wood as the material of choice for crates and boxes. The advent of flaked cereals, in particular, boosted the use of cardboard boxes. Cardboard protects food products and helps

keep them fresh. Since many of the foods we eat are not grown or manufactured locally, this is an important function. Cardboard boxes are made from linerboard. The process of making linerboard from wooden logs is complex and has many stages.

First, the logs are debarked. This is done in a giant revolving barking drum where the bark is knocked off of the logs as they tumble and pound against one another. The de-barked logs are then fed into a chipper where knives on a huge spinning disc cut them into coin-sized pieces. The chips are then screened for size. Chips that are too large are re-chipped and those that are too small are burned for fuel. Chips of the right size are sent to the digesters (huge pressure cookers) where they are mixed with chemicals and cooked to loosen the lignin adhesive that binds wood fibers together. This reduces the wood to a pulpy mass. Once the fibers have been loosened, they are separated from the chemical cooking liquors. Chemicals contained in the "black liquor" are processed and recovered for re-use in another cooking cycle.

In the making of linerboard, a solution of 99.5% water and 0.5% pulp or wood fiber is sprayed onto a rapidly moving wire screen. Water drains through the screen, leaving a soft mat of pulp. Next, additional water is squeezed out by a series of rollers. Heat is then used to evaporate the remaining moisture. Finally, the paper moves between polished cylinders, which smooth the surface of the paper, and wind it up into a reel. After reels reach a designated size they are removed from the paper machine and cut into smaller rolls.

To make corrugated cardboard boxes, linerboard is sent through a large machine called a corrugator. Here an accordion-like inner section is formed from a different kind of paper called corrugating medium. The corrugating medium is glued inside two pieces of linerboard. However, not all cardboard boxes are corrugated. Whether corrugated or not, the next step is to cut the boxboard into the desired size and shape and to print the advertising message or brand name of the product onto the unfolded box.

Graphics and brand names play a major role in today's competitive marketplace. Colored boxes can be made from linerboard that is pre-printed before being converted to boxboard. Bold colors catch shoppers' eyes and can give a product a competitive edge. Colors are often associated with brand names, and even products.

For many, raisins are synonymous with Sun Maid brand's red box and trademarked logo of a bonneted, smiling black-haired girl holding a basket of grapes. This girl, based on an actual person named Lorraine Collett Peterson, has been Sun Maid's trademark since 1916. The trademark has been changed only three times, to modernize the company's image. The last series of changes was in 1970. Sun Maid began using red linerboard cardboard boxes in 1923. Before then the boxes were navy blue in color. Part of the packaging is, of course, designed to catch your eye as bright colors like red and yellow often do. The other part is the structure and integrity of the box, and its use in transporting food. Raisin boxes are not corrugated because raisins do not require the extra protection that corrugated boxes provide during shipping. Simple linerboard cardboard boxes are sufficient and give raisins an extended shelf life of several months. We would now like you to eat 1-2 raisins.

Thank you very much for participating in this exercise. Please stay in a seated position, and the researcher will return shortly. Please do not talk to each other during this waiting process.

APPENDIX D

Food-Liking Ratings Form

Please rate each item along the 1-7 scale. If you never heard of any item on the list, please look it up on the backside. Even if you have never tried the food item, hobby, or been in contact with the animal, please anticipate how much positive or negative you will feel towards it and rate accordingly. Please DO NOT leave any blanks.

1	2	3	**4**	5	6	**7**
Extremely Negative	Very Negative	Somewhat Negative	**NEUTRAL**	Somewhat Positive	Very Positive	**Extremely Positive**

Item	**Rating (1-7)**	**Item**	**Rating (1-7)**	**Item**	**Rating (1-7)**
Hairless Cat – Pet		Flower Arranging		Beets	
Celery		Hot Cinnamon Candy		Chihuahua – Pet	
Cleaning		Stamp Collecting		Bird Watching	
Mushroom		Pot-Bellied Pig – Pet		Onions	
Public Speaking		Raisins		Clay Modeling	
Anchovies - Food		Rock Gardening		Cockatoo – Pet	
Tarantula – Pet		Ant Farm – Pet		Liver	
Cabbage		Horseradish		Wood Carving	
Fishing		Hermit Crab - Pet		Crayfish – Pet	
Brussel Sprouts		Scrapbooking		Prunes	
Mustard		Toad – Pet		Sushi	
Knitting		Siamese Cat - Pet		Sudoku	
Writing Papers		Tomatoes		Oysters - Food	
Baked Beans		Pit bull – Pet		Wasabi Peas	
Green Peppers		Fig Newtons		Sauerkraut	
Bologna		Tofu		Rats – Pet	
Grapefruit		Iguana – Pet		Sardines - Food	
Frog – Pet		Herring - Food		Goose – Pet	
Cauliflower		Square dancing		Ceramics	
Parakeet – Pet		Alligator – Pet		Mice – Pet	
Hunting		Pork		Corn Dog	
Tuna - Food		Cottage Cheese		Rice	

Anchovies: A family of small, common salt-water forage fish
Ant Farm: A man made artificial ant colonies used as a habitat for ants
Beets: Purple root vegetable
Bologna: A large smoked sausage of beef, veal, and pork
Cauliflower: A garden plant related to cabbage and grown for its compact edible head of usually white undeveloped flowers
Celery: A plant of the parsley family, whose leafstalks are eaten raw or cooked
Ceramics: Creating nonmetallic artwork or tools through the manipulation of heat
Chihuahua: The smallest breed of round-headed dog
Clay Modeling: Making a model with clay such as automobile prototypes
Cockatoo: Any of various large noisy chiefly Australasian crested parrots
Corn Dog: A frankfurter dipped in cornmeal batter, fried, and served on a stick
Crayfish: Spiny lobster; kept as pets in freshwater aquarium
Dried Seaweed: Dried laver seaweed pressed into thin sheets and used especially as a seasoning or as a wrapper for sushi
Fig Newtons: Fig roll pastry filled with fig paste
Hairless Cat: A rare breed of cat known for its lack of a coat.
Hermit Crab: Any of various small crabs that occupy empty mollusk shells
Herring: A valuable food fish that is very common in the North Atlantic Ocean
Horseradish: The sharp-tasting root of the horseradish; a strong seasoning made from the root of the horseradish
Iguana: Any of various large plant-eating tropical American lizards that have a ridge of tall scales along the middle of the back
Knitting: An activity that form a garment by interlacing yarn in connected loops with needles
Oysters: Any of various marine mollusks that include important edible shellfish and have a rough uneven shell
Parakeet: Any of numerous usually small slender parrots with a long graduated tail
Pit bull: A dog of any of several breeds originally developed for fighting and noted for strength and stamina
Pot-Bellied Pig: Any of an Asian breed of small pigs having a straight tail, potbelly, and black, white, or black and white coat
Prunes: Dried plum
Raisins: Grapes usually rich in sugar that have been dried
Rock Gardening: An activity related to a type of garden that features extensive use of rocks or stones, along with plants native to rocky area
Sardines: Any of various young or very small fish often preserved in oil for food
Sauerkraut: Finely cut cabbage fermented in brine
Scrapbooking: An activity that construct a book of blank pages for miscellaneous items (as clippings and pictures)
Siamese cat: Any of breed of slender blue-eyed domestic cats with short hair and a light-colored body and darker ears, paws, tail, and face
Square dancing: A lively dance for sets of four couples who form the sides of a square
Sudoku: A logic-based combinatorial number-placement puzzle with a goal to fill in every empty cell in the 3x3 regions with numbers 1-9
Sushi: Cold rice formed into any of various shapes and topped or wrapped with pieces of raw seafood or vegetables
Tarantula: Any of a family of large hairy American spiders that usually move slowly and have a sharp bite but are not very poisonous
Toad: A small animal that looks like a frog but has dry skin and lives on land
Tofu: A soft, white food made from soybeans and often used in vegetarian cooking instead of meat—called also bean curd
Wasabi Peas: Roasted green peas coated with hot mustard/horseradish

APPENDIX E

Food Sampling Instructions

(Outside the box)

Please open the box slowly and carefully (not to tip it) and then follow the directions inside the box. You will have about **3 minutes** to do this task. The researcher will time it and return at the end of 3 minutes. You will then complete a questionnaire packet.

(Inside the box)

Please feel free to sample the available food. Do not ask the researcher any questions. When you are finished, close the box. The researcher will bring a questionnaire packet at the end of 3 minutes.

Thank you.

APPENDIX F

Enjoyment of the Sampled-Anchovy Rating Form

Complete this form first and then the other questionnaires.

Of the food offered to you, please indicate how much you ate and rate your enjoyment of the food along the 7-point scale. If you do not remember, feel free to look inside the food box and count the food items left in the container.

Dried Anchovies

1. Did you try (i.e., actually put it in your mouth or licked it and tasted it) the dried anchovies?

   YES_____ (*if yes, please answer # 2 and # 3 below*) NO_____

2. # of dried anchovies left in container:_____

3. If you tried them, please indicate how much you enjoyed the dried anchovies using the scale below.

1	2	3	**4**	5	6	**7**
Extremely Negative	Very Negative	Somewhat Negative	**NEUTRAL**	Somewhat Positive	Very Positive	**Extremely Positive**

Are you vegetarian? YES_____ NO_____

Have you ever had anchovies in the past? If you have, please indicate the number of times you have had anchovies.

Never_____ 1 − 2_____ 3 – 9_____ 10^{+}_____

Was it dried or non-dried anchovy? Dried_____ Non-dried_____ Both_____

APPENDIX G

Mindful Attention Awareness Scale

MAAS

Brown & Ryan 2003

Directions: Below is a list of statements. For each statement, please indicate (circle) the extent to which you agree or disagree with the statement using the following scale.

		Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never
1.	I could be experiencing some emotion and not be conscious of it until sometime later.	1	2	3	4	5	6
2.	I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
3.	I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
4.	I tend to walk quickly to get where I am going without paying attention to what I am experiencing along the way.	1	2	3	4	5	6
5.	I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
6.	I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
7.	It seems I am always "running on automatic" without much awareness of what I'm doing.	1	2	3	4	5	6
8.	I rush through activities without being really attentive to them.	1	2	3	4	5	6
9.	I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.	1	2	3	4	5	6
10.	I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
11.	I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6
12.	I drive places on "automatic pilot" and then wonder why I went there.	1	2	3	4	5	6
13.	I find myself preoccupied with the future or the past.	1	2	3	4	5	6
14.	I find myself doing things without paying attention	1	2	3	4	5	6
15.	I snack without being aware of what I'm eating.	1	2	3	4	5	6

APPENDIX H

Positive and Negative Affect Schedule

PANAS

Watson, Clark, & Tellegen, 1988

Directions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent ***you feel this way right now***.

	Very slightly or not at all	**A little**	**Moderately**	**Quite a bit**	**Extremely**
1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

APPENDIX I

Demographic Form

Demographic Form

Gender (circle one): Male Female

Age: _____

Ethnicity (Check all that apply):

_____ African-American
_____ Asian
_____ Caucasian
_____ Hispanic
_____ Middle Eastern
_____ Native American (American Indian)
_____ Multi-racial (Please also check all ethnicities you identify with)
_____ Other _____

Marital Status

_____ Now married
_____ Widowed
_____ Divorced
_____ Separated
_____ Never married

Living arrangement

_____ Living alone
_____ Living with family or relatives (e.g., spouse, adult children, grandchildren, siblings, nephew/niece, etc.)
_____ Community living (e.g., nursing home)

Education

_____ Ph.D./M.D./Psy.D.
_____ Masters Degree
_____ Bachelors Degree
_____ Associates Degree
_____ Some college, no degree
_____ High School Degree
_____ Some high school, no diploma
_____ None

APPENDIX J

Debriefing Form

Debriefing

At this point, we would like to ask you three short questions before we provide you with some information about the purposes of this research. During today's session, you may have been asked to listen to a CD and then complete a set of questionnaires or just complete a set of questionnaires without listening to a CD, followed by food sampling and another set of questionnaires.

What do you think the study was about?

_____

_____

What did you do in the study? Please be specific (e.g. if you listened to a CD – what was the CD about?)

_____

_____

How do you feel after completing the study?

_____

_____

In this study, we are interested in the effect of mindfulness on expected liking of food in general and willingness to sample unfamiliar or previously disliked food and enjoyment of the sampled food. Mindfulness is defined as the practice of becoming more aware, more accepting, more tolerant, and less judgmental of one's self and one's experiences as well as others and their experiences. Some of the participants are asked to listen to a CD with a mindfulness exercise (mindful raisin-eating exercise) and some are asked to do an equivalent exercise (they listen to how boxes are made and used to store food). Then, participants are asked to complete a questionnaire assessing the liking of different foods, pets, and activities. Some are asked to complete the questionnaire without listening to a CD. We anticipate that individuals who listen to the mindful raisin-eating CD will report a decrease in negative mood and either an increase in positive mood or no change in positive mood and an increase in positive experiences toward different food items. We expect that participants who listen to the box-making CD will experience no change or an increase in negative mood and no change in their positive mood. In addition, we expect the individuals who listen to the mindful raisin-eating CD to report an increase in liking of foods that most people find aversive such as anchovies. After the completion of the questionnaire, all participants are offered the anchovy that was previously rated as aversive. We expect participants who do the mindful raisin-eating exercise to be more willing to try the anchovy and be more likely to eat more of the previously disliked foods.

The purpose of this debriefing form is to inform you that it is natural to have some positive and/or negative feelings after these types of exercises. We do not anticipate that these emotions will be long lasting or harmful to you, but may cause you a little discomfort. The emotions you experience and the information you provide about how you feel as you go through this study is vital to helping us understand what real patients may be experiencing when they go through a mindfulness exercise. In addition, you may have eaten food that you are not accustomed to, thus, if you feel physically ill in the next few hours, please seek medical help. However, anchovy was chosen because, although most people may not like it, it is unlikely to cause physical illness.

Please accept our apologies for not telling you all of the purposes of our study right from the beginning. In order to gain insight into the thought processes and the mood experiences underlying mindfulness practice, it would have been difficult for us to tell you everything about the study ahead of time as the information might have affected your responses. **For this reason, we ask that you not tell other people who might be participating in our research what the specific purposes of this study are.** We thank you in advance for your help.

If you would like additional information concerning this study, please feel free to contact Dr. Phan Y. Hong by e-mail or phone (hongp@uwosh.edu, **920-424-2302**).

APPENDIX K

Table K-1

Demographics, MAAS Scores, and PANAS Scores by Mindfulness Condition.

Measure	Experimental Condition			Total	Statistical Test
	Mindful (N = 26)	Nonmindful (N = 25)	Baseline (N = 25)	(N = 76)	
Age[a]	69.19 (9.41)	65.68 (7.17)	67.04 (9.13)	67.33 (8.65)	$F(2, 73) = 1.07$ $p = .35$
Caucasian	26 (100.0%)	25 (100.0%)	23 (92.0%)	74 (97.4%)	$\chi^2(2) = 4.19$ $p = .12$
Married	15 (57.7%)	15 (60.0%)	14 (56.0%)	44 (57.9%)	$\chi^2(8) = 3.13$ $p = .93$
Education[b]	15.77 (2.78)	15.36 (2.74)	14.48 (2.93)	15.21 (2.83)	$F(2, 73) = 1.39$ $p = .26$
Female	17 (65.4%)	18 (72.0%)	15 (60.0%)	50 (65.8%)	$\chi^2(2) = 0.80$ $p = .67$
MAAS[c]	4.00 (0.57)	4.42 (0.59)	4.50 (0.49)	4.30 (0.59)	$F(2, 73) = 6.10$ $p = .004$*
PANAS-Pos[c]	29.65 (9.23)	32.39 (6.92)	32.00 (7.95)	31.32 (8.09)	$F(2, 73) = 0.86$ $p = .43$
PANAS-Neg[c]	11.70 (2.87)	11.12 (1.59)	11.82 (2.80)	11.55 (2.48)	$F(2, 73) = 0.57$ $p = .57$

Note. [a] Mean age with standard deviations in parentheses. [b] Mean years with standard deviations in parentheses. [c] Mean scores with standard deviations in parentheses; MAAS = Mindfulness Attention Awareness Scale (1 = *almost always*, 6 = *almost never*; higher scores indicated more mindfulness); PANAS-Pos and PANAS-Neg (10 = *not at all/very slightly*, 50 = *extremely* with higher scores indicating more positive or negative mood, respectively). * Two-tailed, $p < .05$.

Table K-2

Means (*and Standard deviations*) *for Food Liking Ratings by Mindfulness Condition*

	Mindfulness Condition			
Food items	Mindful	Nonmindful	Cohen's *d*	*t* Values
Tomatoes	6.12(0.86)	6.28 (0.89)	-0.18	-0.67
Celery	5.69 (1.32)	5.68 (1.03)	0.01	0.04
Rice	5.65 (1.09)	6.12 (0.83)	-0.49	-1.71
Beets	5.62 (1.50)	5.44 (1.53)	0.12	0.41
Cauliflower	5.62 (1.06)	5.52 (1.36)	0.08	0.28
Raisins	5.58 (1.17)	5.12 (1.33)	0.37	1.30
Pork	5.54 (1.42)	5.44 (1.64)	0.07	0.23
Onions	5.54 (1.50)	5.56 (1.33)	-0.01	-0.05
Green Peppers	5.50 (1.27)	5.24 (1.59)	0.18	0.65
Mushroom	5.46 (1.65)	5.24 (1.59)	0.14	0.49
Tuna	5.46 (1.33)	5.80 (0.91)	-0.30	-1.05
Grapefruit	5.23 (1.63)	5.64 (1.55)	-0.26	-0.92
Cottage Cheese	5.15 (1.49)	5.52 (1.64)	-0.24	-0.84
Brussel Sprouts	5.12 (1.31)	4.60 (1.76)	0.34	1.19
Baked Beans	5.08 (1.47)	5.32 (1.49)	-0.16	-0.59
Prunes	5.00 (1.44)	4.68 (1.44)	0.22	0.79
Cabbage	4.92 (1.29)	5.40 (1.00)	-0.42	-1.47
Mustard	4.85 (1.12)	5.04 (1.02)	-0.18	-0.65
Sauerkraut	4.73 (1.46)	4.96 (1.49)	-0.16	-0.56
Fig Newtons	4.73 (1.64)	4.96 (1.43)	-0.15	-0.53
Horseradish	4.58 (1.58)	4.12 (1.42)	0.31	1.08
Wasabi Peas	4.46 (1.27)	4.16 (1.14)	0.25	0.89
Hot Cinnamon Candy	4.42 (1.06)	4.44 (1.42)	-0.02	-0.05
Liver	4.23 (1.70)	3.80 (1.96)	0.23	0.84
Bologna	4.15 (1.41)	3.96 (1.59)	0.13	0.46
Herring	4.04 (1.95)	4.12 (2.13)	-0.04	-0.14
Corn Dog	3.96 (1.22)	4.08 (1.41)	-0.09	-0.32
Oysters	3.69 (1.11)	3.44 (1.66)	0.18	0.47
Sushi	3.65 (1.85)	3.32 (1.75)	0.18	0.66
Tofu	3.62 (1.24)	4.24 (1.48)	-0.45	-1.64
Sardines	3.55 (1.79)	3.12 (1.99)	0.23	0.81
Anchovies	3.04 (1.71)	3.08 (1.78)	-0.02	-0.09

Note. Ratings were made on a 7-point Likert scale with higher scores representing higher liking of item (4 = *neutral*).

Table K-3

Means and Standard Deviations for Composite Liking Scores for Disliked, Neutral, and Liked Foods in the No-Task Baseline Condition (*N* = 25)

	Descriptive Statistics	
Stimulus	Mean	Standard deviation
Foods		
Disliked	2.99	1.07
Neutral	4.23	0.94
Liked	5.42	0.56

Note. Ratings were made on a 7-point Likert scale with higher scores representing higher liking of item (4 = *neutral*). A one-sample *t*-test was conducted to compare mean ratings for each food against the neutral value of *4* on the 7-point rating scale. Foods with mean ratings significantly higher than *4* were categorized as "liked;" foods with mean ratings not significantly different from *4* were categorized as "neutral;" and foods with mean ratings significantly lower than *4* were categorized as "disliked." Composite liking scores were generated by averaging across post-task liking ratings within each of the three categories of initial food liking.

Table K-4

Food Liking Rating Means (and Standard Deviations) for Composite Liking Scores by Mindfulness Condition and Initial Food Liking Category

	Mindfulness Condition			
Initial Food Liking	Mindful (*N* = 26)	Nonmindful (*N* = 25)	Cohen's *d*	*t* values
Disliked	3.68 (1.28)	3.42 (1.09)	0.22	0.77
Neutral	4.40 (0.79)	4.32 (0.80)	0.10	0.37
Liked	5.33 (0.70)	5.41 (0.62)	-0.12	-0.45

Note. Ratings were made on a 7-point Likert scale with higher scores representing higher liking of item (4 = *neutral*). For participants in the mindful raisin-eating and nonmindful raisin-eating control conditions, post-task composite liking scores were generated by averaging across post-task liking ratings within each of the three categories of initial food liking.

Table K-5

Descriptive Statistics of Anchovy Sampling by Experimental Condition

	Experimental Condition			
Anchovy Sampling	Mindful	Nonmindful Control	No-Task Baseline	Statistical Test
Nonsamplers				
No sampling history	3 (13.0%)	5 (22.7%)	7 (30.4%)	
Sampling history	8 (34.8%)	5 (22.7%)	2 (8.7%)	
Sub Total	11 (47.8%)	10 (45.5%)	9 (39.1%)	
Samplers				
No sampling history	5 (21.7%)	3 (13.6%)	5 (21.7%)	
Sampling history	7 (30.5%)	9 (40.9%)	9 (39.2%)	
Sub Total	12 (52.2%)	12(54.5%)	14 (60.9%)	
No sampling history	8 (34.8%)	8 (36.4%)	12 (52.2%)	$\chi^2(2) = 1.75$
Sampling history	15 (65.2%)	14 (63.6%)	11 (47.8%)	$p = .42$
Total	23 (100%)	22 (100%)	23 (100%)	

Note. Nonsamplers = those who did not sample anchovies; samplers = those who sampled anchovies. No sampling history = never sampled anchovies in the past; Sampling history = sampled anchovies in the past.

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